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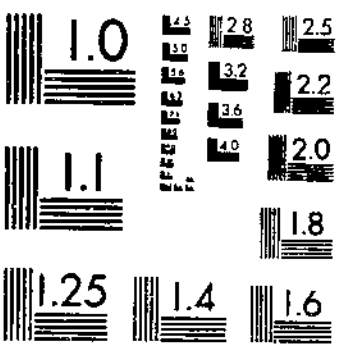

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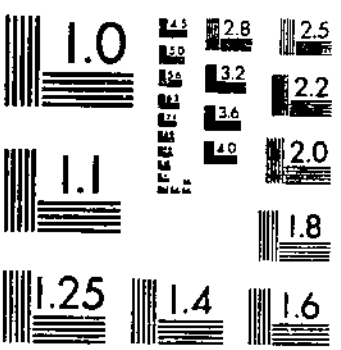

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Technical Bulletin No. 466 March 1935

UNITED STATES DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.

AGRICULTURE IN SOUTHERN AFRICA

By CLIFFORD C. TAYLOR, *principal agricultural economist, Foreign Agricultural Service Division, Bureau of Agricultural Economics*[1]

CONTENTS

	Page
General considerations:	
Value of the study	2
Area and population	3
Historical background	4
Resources	5
Crops and livestock	8
Political subdivisions	11
Foreign trade	21
Wool:	
International significance	25
Trend of production in the Union of South Africa	26
Trend of production in adjoining areas	37
Correlation analysis of changes in sheep numbers	39
Methods of production	43
Quality characteristics of South African wool	46
Methods of marketing	50
Costs of marketing	53
Prices	55
Seasonal movement of wool in the Union of South Africa	57
Destinations of wool from the Union of South Africa	60
Governmental assistance to South African wool growers	60
Mohair:	
Trend of production	63
Methods of marketing	65
Mohair grades	67
Prices	67
Destination of mohair exports	70
Government aid	70
Cattle:	
International significance of cattle in south and east Africa	70
Union of South Africa	72
Basutoland, Swaziland, Bechuanaland, South-West Africa	94
Southern Rhodesia	98
Northern Rhodesia	116
Tanganyika	120
Kenya	121
Uganda	122
Dairy products:	
Union of South Africa	122
Southern Rhodesia	129
South-West Africa	132
Hogs	132
Poultry	133
Fresh deciduous fruit:	
International significance	134
Union of South Africa	135
Southern Rhodesia	163
Tanganyika	164
Dried fruit:	
International significance	164
Trend of production	165
Methods and costs of production	178
Methods of marketing	182
Government aids	185
Citrus fruit:	
International significance	186
Union of South Africa	188
Southern Rhodesia	205
Mozambique	210
Tanganyika	213
Nyasaland	213
Kenya	213
Uganda	215
Tobacco:	
Production in south and east Africa	215
Union of South Africa	219
Southern Rhodesia	239
Northern Rhodesia	246
Nyasaland	247
Mozambique	252
Tanganyika	254
Kenya	255
Uganda	255
Cotton:	
Production in southern Africa	257
Union of South Africa	260
Southern Rhodesia	265
Northern Rhodesia	268
Nyasaland	268
Mozambique	272
Angola	277
Tanganyika	278
Kenya	282
Uganda	284
Sugar:	
International significance of south and east African countries	291
Union of South Africa	291
Mozambique	305
Southern Rhodesia	307
Tanganyika	308
Kenya	308
Uganda	311
Corn:	
International significance	312
Union of South Africa	314
Southern Rhodesia	320
Basutoland, Swaziland, and Bechuanaland	323
South-West Africa	323
Northern Rhodesia	324
Nyasaland	325
Mozambique	326
Angola	326
Tanganyika	327

[1] This bulletin is based upon studies made by the author while serving as agricultural attaché to the American Legation at Pretoria, Union of South Africa. Credit is due R. G. Hainsworth, in charge Graphics Section, Bureau of Agricultural Economics, who supervised the preparation of the graphic material in this bulletin.

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CONTENTS—Continued

	Page
Corn—Continued.	
Kenya	327
Uganda	328
Wheat:	
Union of South Africa	330
Basutoland	333
Southern Rhodesia	333
Angola	335
Wheat—Continued.	
Kenya	335
Miscellaneous grains:	
Kafir	36
Barley, oats, and rye	37
Peanuts	37
Literature cited	338

GENERAL CONSIDERATIONS

VALUE OF THE STUDY

American agricultural interests are vitally concerned with foreign competitive supplies. No rational agricultural policy can be evolved for production or for marketing without a thorough knowledge of the developments that are taking place in foreign agriculture and their probable effects on world price levels. A wisely planned policy of production and marketing will forestall much waste of capital and effort, benefiting not only American farmers but also producers in all countries that export to common destinations. A general recognition throughout the world of the mutual gains to be derived from a broader knowledge of the present and probable future production of farm products in other countries will contribute greatly toward enhancing general well-being.

This bulletin is published as a contribution toward that end. It analyzes quantities present and potential, qualities in relation to consumer demand, seasonal characteristics of supply, geographical aspects of production and export movements, and certain governmental policies that affect marketing. This general review precedes a discussion of each important commodity: wool and mohair, cattle and other livestock, fruits, tobacco, cotton, sugar, and corn and other grains.

From a detailed consideration of impending agricultural developments in southern Africa the following seem evident: (1) A decrease in the production of wool, mohair, and exportable corn; (2) an increase in the production of cattle, citrus fruit, deciduous fruit, and sugar; (3) a probable increase in the production of cotton and tobacco, especially by natives in countries south of the Equator, with the exception of the Union of South Africa.

The probable decrease in wool production transcends all other items in its significance because the Union of South Africa is predominantly a sheep-grazing country and because South African wool represents so large a part of the world's total annual production. This decrease is a factor distinctly favorable to world-wide agricultural rehabilitation.

The probable glutting of English and other European markets with South African (and Brazilian) citrus fruits during the months of June to October, and with South African deciduous fruits during the months of January to May, is a danger which should be anticipated by American fruit interests concerned with foreign outlets for surplus production.

The potential production in south and east African countries of cotton, tobacco, and (if prices improve) sugar, is enormous and should be given due consideration.

Millions of cattle may eventually be shipped annually from southern Africa if the natives come to consider them as commercial property and if trypanosomiasis and other deadly cattle diseases can be controlled.

AREA AND POPULATION

A proper perspective is essential for an understanding of the agricultural situation of southern Africa (fig. 1). The area of the 13 African countries lying south and east of the Belgian Congo is

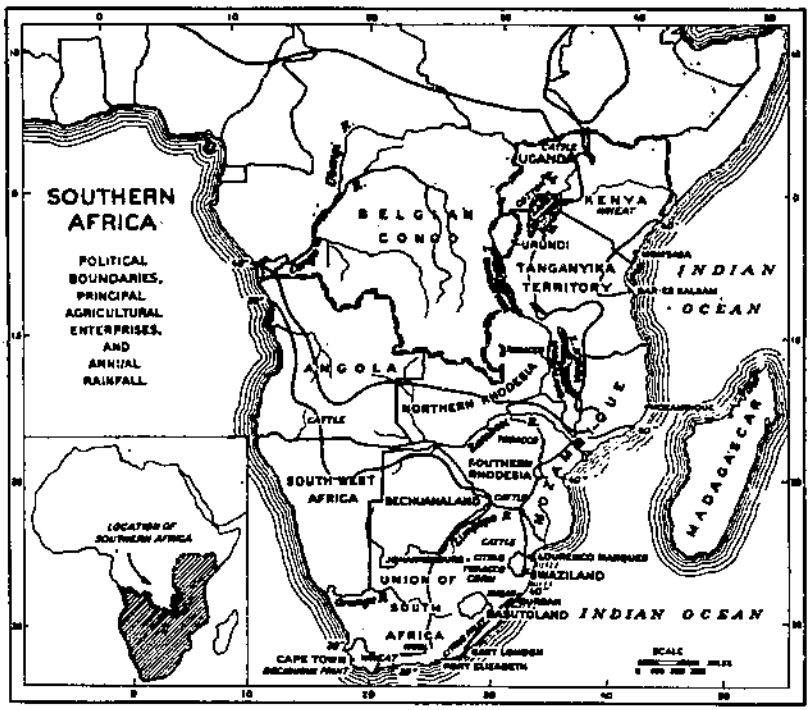


FIGURE 1.—Deciduous fruit and wheat are concentrated in the extreme southern part of the Union of South Africa and citrus fruit in the eastern part; sugar in a few localities along the eastern coast; tobacco in the Union of South Africa, Southern Rhodesia, and Nyasaland; wool in the Union of South Africa; and cattle throughout south and east Africa, except in the arid west. Corn is grown nearly everywhere, except in the arid regions, but chiefly north of Basutoland.

almost exactly the same as the total area of the United States. The total population, however, is only about 2,000,000 whites and approximately 28,000,000 blacks and Asiatics, which is only about one-fourth of the population of the United States (table 1).

The largest of these 13 countries are Angola (Portuguese West Africa) and the Union of South Africa. The largest population is in the Union, where about 20 percent of the natives and 90 percent of the whites are to be found. In each of 4 of these countries the Europeans (whites) number less than 2,000, and in the other 8 they range up to 50,000. The largest native populations are to be found in the Union, in east Africa, and in Angola.

TABLE 1.—*Approximate population and land area of 18 countries of south and east Africa*

Country	Population			Land area	
	Europeans (whites)	Natives (blacks)	Mixed, and Asiatics		
	Number	*Number*	*Number*	*1,000 square miles*	*1,000 acres*
Union of South Africa [1]	1,828,175	5,519,500	783,800	472	302,027
Basutoland [2]	1,603	495,937	1,241	12	7,498
Swaziland [3]	2,205	110,295	451	7	4,291
Bechuanaland [2]	1,743	150,185	1,055	275	176,000
South-West Africa	[3] 24,115	[4] 261,117	[3] 30,845	322	206,245
Southern Rhodesia	[1] 49,904	[5] 965,763	[4] 3,800	150	96,227
Northern Rhodesia	[1] 13,630	[1] 1,372,000	----------	288	184,320
Nyasaland [6]	1,462	1,210,344	[7] 669	40	25,600
Mozambique	[8] 35,751	[4] 3,665,502	(9)	297	190,483
Angola	45,000	2,650,000	----------	485	310,254
Tanganyika	5,274	4,740,706	15,000	365	233,600
Kenya [3]	12,529	2,736,000	41,140	225	144,000
Uganda [10]	1,752	3,149,000	11,613	94	60,160
Total [11]	2,023,143	27,026,355	889,614	[12] 3,032	1,940,705

[1] 1931 census (natives, Asiatics, and mixed population estimated).
[2] 1921 census.
[3] 1926 census.
[4] 1929 estimate.
[5] 1928 estimate.
[6] 1925.
[7] Asiatics only.
[8] 1928 includes Asiatics and mixed.
[9] Not separately reported.
[10] 1927.
[11] Population in 1933 probably somewhat larger, especially with respect to natives.
[12] Comparative total area of United States, 3,026,789 square miles

HISTORICAL BACKGROUND

European progress in south Africa and in North America provide many points of similarity. Both countries were discovered by white men in an effort to facilitate trade with the East Indies. The colonization of south Africa was begun by the Dutch in 1652, only 45 years after the first colonization of North America by the English. Both encountered primitive types of indigenous people with primitive types of agriculture.

The parallel should not be too closely drawn. The original situation and the rate of change differed. The red men of North America were typically roving hunters; the black men of south Africa were typically pastoralists with their herds of cattle and flocks of sheep. North America was colonized to take advantage of promising agricultural possibilities; south Africa was colonized originally merely to serve as a provisioning station for vessels engaged in the East Indian trade. North America offered superior advantages for colonization. It was closer to Europe, and the rainfall was more suitable for farming purposes. Even with improvements in ocean transportation, settlement in south Africa did not surge forward as in North America. Were it not for the stimulating influence of enormous mineral resources, which attracted settlement and encouraged food production for the mining population, south African agricultural development would have been even further delayed pending the more complete exploitation of more attractive agricultural areas in other continents. The historical lag in agricultural development truly reflects poorer agricultural resources.

South African agriculture has now become increasingly important because of the pressure of population on the better grade of agricultural lands in other continents and because of improvements in refrigerated ocean transportation which have minimized the disadvantage of location remote from the important European markets.

RESOURCES

Southern Africa, from Capetown to the headwaters of the Nile at the Equator, is a high plateau of ancient geological origin. This area, located south and east of the Belgian Congo, is fairly homogeneous as to geographical characteristics. Inland from any point on this long coastline, the elevation rapidly rises to several thousand feet. There are, therefore, no navigable rivers. Instead of a tropical jungle there are, even far north toward the Equator, grass- or bush-covered plains with scattered trees of scrubby growth where the rainfall is sufficient for trees.

Erosion on this ancient plateau has been irregular so that the plains are studded with small rocky hills (kopjes). There are few mountains, although the outer edges of the plateau, indented by erosion, present a mountainous appearance. It is actually mountainous along the eastern edge of the plateau, especially in Basutoland. Volcanic mountains occur northward from Basutoland to equatorial Kenya. Mount Kilimanjaro, in Tanganyika near the Kenya border, is almost 20,000 feet high.

As the plateau is mostly from 2,000 to 6,000 feet high, the moderating influence of high elevation creates temperate conditions even in equatorial Kenya. A tropical climate occurs only on the coastal belt within 20° of the Equator.

From Lake Victoria on the Equator, headwaters of the Nile, southward to Lake Nyasa, there occurs a strange geological phenomenon, the Rift Valley, apparently caused by the pulling apart of the earth's crust. Along these lakes the elevation is only 1,600 to 3,700 feet, and the climate is subtropical or tropical.

The soils of southern Africa are not very fertile although there are notable exceptions. Nitrogen and phosphorus deficiency is general. Erosion has left only a shallow layer of stony soil overlying solid rock over many thousands of square miles. Within recent years overgrazing has induced erosion in the valleys of good alluvial soil. Torrential thunderstorms and floods make crop production along the narrower valleys precarious. Good soils are found around Basutoland and in north-central Transvaal. The most productive soils occur along the base of the mountains or kopjes. Most of the soil in southern Rhodesia is a gravelly granitic soil (the sand veld) which is not fertile, but there is also a large area of red loamy soil, especially in the north-central part, which is good. The areas of black clay "cotton" soil in east Africa are fertile. Scattered throughout the entire plateau area are many small swales (vleis) in which the black alluvial soil is unusually fertile.

Rainfall is deficient for agriculture in a large part of South Africa. In addition, it falls only during the summer months (October to March) in most areas, and the feed problem is serious, during the dry winter months (table 2). Moreover, the rains are chiefly of

the thunderstorm type. This causes serious loss of moisture through run-off, loss of soil from erosion, and the depositing of silt causes loss of storage capacity in irrigation reservoirs.

TABLE 2.—*Rainfall: Normal seasonal distribution at seven stations, southern Africa*

Month	Malmesbury, Union of South Africa	Pretoria, Union of South Africa	Salisbury, Southern Rhodesia	Mazabuka, Northern Rhodesia [1]	Beira, Mozambique	Morogoro, Tanganyika	Eldama Ravine, Kenya
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
January	0.4	5.7	6.1	9.2	12.6	3.2	1.1
February	.4	4.4	5.2	2.0	11.0	3.4	1.9
March	.5	3.9	5.0	4.9	11.2	5.2	3.8
April	1.1	1.3	1.0	.3	4.4	6.3	6.5
May	2.6	.7	.3	.0	2.6	2.0	6.2
June	3.1	.1	.0	.0	1.2	.9	4.3
July	2.6	.3	.0	.0	1.1	.3	4.9
August	2.5	.5	.0	.0	1.1	.4	5.2
September	1.9	.6	.3	.0	.8	1.2	2.6
October	1.3	2.7	1.3	.4	1.6	1.2	2.6
November	.8	4.6	3.3	2.3	5.1	2.0	3.2
December	.5	4.4	0.7	8.3	9.7	3.7	1.7
Total	17.7	29.2	30.2	27.4	62.4	29.8	44.0

[1] Season of July 1927 to June 1928, which was fairly normal.

Normals are averages over a long period. Note the dry winter months (April or May to September) except at the extreme southwest (Malmesbury) and at the Equator (Kenya). October, November, and December are corn-planting months; April, May, and June are corn-harvesting months. In Kenya corn is planted in November (short-rains crop) or in February and March (long-rains crop) and requires 8 or 9 months to reach maturity. Malmesbury is in a winter wheat area where corn is not grown.

Crop production is precarious west of the 20-inch-rainfall line which, extending northward from Port Elizabeth, delimits the larger part of the Union of South Africa. Arid areas with less than 5 inches of rainfall per year cover a considerable part of northwestern Cape Province in the Union and of Bechuanaland. Rainfall along the eastern edge of the plateau and along the eastern coast amounts to 30 or 40 inches per year (as in our own Midwestern States) and in the more mountainous areas amounts to 50 or 60 inches. These rains, especially in the coastal mist belt, are less frequently torrential thunderstorms. Most of the agricultural production is in the eastern areas.

Along the southwestern coast of South Africa the rains fall during the winter months (March to September) instead of during the summer months—typical elsewhere in South Africa. This makes livestock grazing more precarious and, as in southern California, facilitates the production of deciduous fruits and winter grains.

In Uganda, Kenya, and parts of Tanganyika (closer to the Equator) the rainfall is more evenly distributed throughout the year and, in the principal agricultural areas, amounts to 40 to 60 inches per year.

Temperature conditions also affect the agriculture of south and east Africa. Generally speaking, they are more favorable than moisture and soil conditions. Freezing temperatures occur at night on most of the high plateau during the winter months of June, July, and August, but the sunny winter days are warm enough to make central heating of residences unnecessary. The destruction of fruit by frosts rarely occurs, but citrus-fruit production is possible only at the lower

elevations. Snow seldom falls except in the mountains of the winter-rainfall area near Capetown, and grazing lands are seldom snow-covered.

In east Africa frosts rarely occur and snows never fall except in the mountains. Summer shade temperatures on the high plateau seldom reach 90° F., but the direct rays of the sun, especially within 20° of the Equator and at the higher elevations are intense. Along the coast and along the lake shores of east Africa, summer temperatures rise above 100° and the climate is tropical.

Variations in elevation, therefore, give rise to marked variations in climate. In the Union of South Africa the coastal sugarcane area is only 200 miles from an inland area which is too cold for corn. In Kenya one may pass from the tropical area of coconuts, cotton, and coffee to the temperate area of wheat and corn within a relatively short distance.

The countries located on or near the Equator have the disadvantage of fewer hours of daylight during the summer season. In those countries the summer days are no longer than the winter days. This retards plant growth in the summer months as compared with summer growth in areas farther from the Equator, where summer days are longer. In Kenya it requires 8 or 9 months for corn to reach maturity.

Hailstorms interfere seriously with the growing of crops in the high plateau of South Africa and make orchard production particularly hazardous. Corn crops are also subject to considerable damage although the areas affected may be a small part of the total in any year.

Locusts cause serious injury to crops in east Africa, but European settlement in south Africa is sufficiently close to permit the destruction of most of the young hoppers before they swarm. Only rarely do flying swarms invade the Union of South Africa in sufficient numbers to cause extensive damage but constant vigilance by Government officers is necessary to kill the young hoppers which result from eggs laid by invading swarms. In east Africa locust-breeding grounds are too extensive to be effectively controlled by the small European population, and locust damage to crops is a serious impediment to agricultural development.

The field and orchard crops are subject to most of the same insects and diseases that occur in the United States and, in addition, serious damage to fruit crops is caused by false codling moth and fruit flies. Jassids (leaf hoppers) cause serious reduction in cotton crops, but resistant varieties and strains are being developed. Tobacco worms are not found.

The livestock industry is seriously handicapped by various diseases. Among sheep the blowfly is a constant source of loss. Among cattle, tick-borne diseases commonly occur, and in most areas weekly dipping is compulsory by law. The tsetse fly renders a large part of the Rhodesias and east Africa useless for cattle grazing. Foot-and-mouth disease has recently occurred in Southern Rhodesia and a few parts of the Union of South Africa. Rinderpest decimated the herds of cattle and wild game in 1898 and still occurs in Tanganyika. Many authorities believe that the veterinarian holds the key to the future agriculture of south and east Africa.

Human diseases, especially malaria and African sleeping sickness, have impeded European settlement in some of the tropical parts of south and east Africa, but the high plateaus are remarkably healthful. Modern control measures have minimized this disease factor that has been retarding settlement.

CROPS AND LIVESTOCK

Most of south and east Africa is grazing land and, because of natural conditions, will so continue. Only 5 percent of the land in the farms of Europeans in the Union of South Africa is in crops (6.4 percent including fallow land, orchards, vineyards, and timber plantations). In the native reserves the percentage is even lower. In the other south and east African countries the percentage in crops is extremely small. The crop areas are usually scattered and unlike as to products grown.

At the extreme southern tip of the continent, in the vicinity of Capetown, is located an intensive deciduous-fruit industry which outweighs in importance the deciduous-fruit production of all other African areas south of the Equator. Most of the wheat and all of the Turkish tobacco production of the Union of South Africa is also produced in this one limited area. The fact that the rain falls during the winter months is the determining factor in locating these industries in this area.

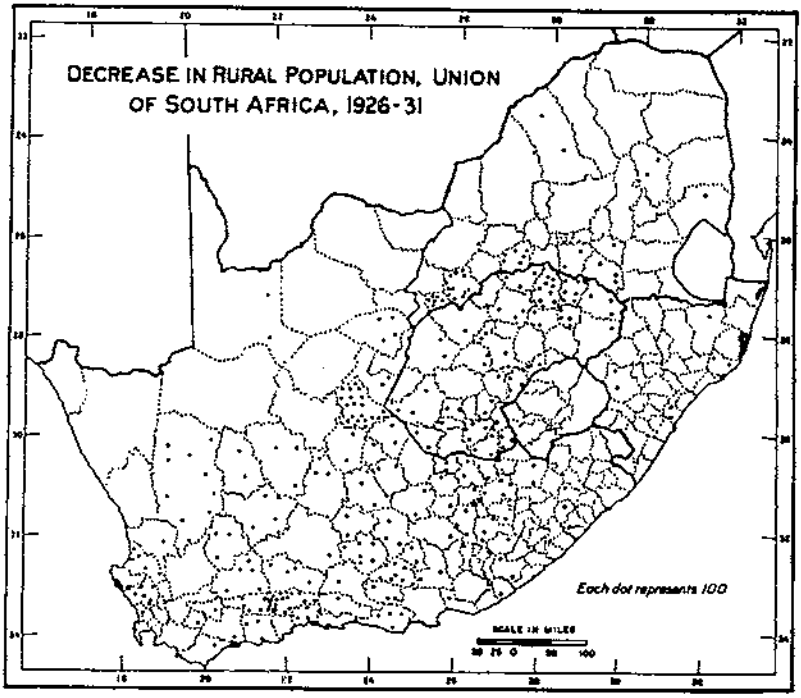
The citrus-fruit areas are more widely scattered. The principal orange-growing districts are located at the lower elevations near Port Elizabeth in eastern Cape Province and north and east of Johannesburg in Transvaal Province, but secondary areas are located in Natal and in southwestern Cape Province. Outside of the Union, citrus production is of minor importance. There are two citrus-growing areas in Southern Rhodesia—one near Salisbury in the north-central part and the other on the railroad near the Mozambique border. This latter area extends eastward into Mozambique but is of minor importance. One other area in Mozambique, located near Lourenco Marques, produces oranges and grapefruit for export.

Tobacco-producing areas are widely scattered from the Equator to the southern end of the continent but the three most important areas are located in Southern Rhodesia near Salisbury, in the southern end of Nyasaland and in the northern part of the Union. There are also several less-important tobacco-growing areas in the Union at various points along the eastern edge of the plateau. Most of the Rhodesian tobacco is flue-cured; the Nyasaland tobacco is fire-cured; and the Union-grown tobacco is air-cured. These distinctions are attributable partly to the difference in soil and partly to the inclinations and the technical skill of the growers. Nearly all of the tobacco grown in Southern Rhodesia and the Union is grown by European farmers, whereas most of the tobacco grown in Nyasaland is produced by natives.

Cotton is not grown extensively in the Union or Southern Rhodesia, although there are a few cotton-growing areas in the northern part of the Union, especially at low elevations where temperatures are relatively high. Cotton production is somewhat more important in the lowland areas of Nyasaland, Mozambique, and Tanganyika. But none of these countries produce a quantity of cotton that is of

international significance. Uganda, on the other hand, is preeminently a cotton-growing country and has recently (1932) increased its production to 233,000 bales of 478 pounds net weight.

Corn is an important crop in all these countries. It constitutes a major item in the diet of natives and, in Southern Rhodesia and the Union of South Africa, it constitutes an important item in export trade. Conditions of soil, moisture, and temperature have brought about a relatively high concentration of corn production in certain areas. In the Union this area covers much of southern Transvaal



PICTURE 2.—Decreases in rural population occurred throughout the principal wool-producing areas.

and northern Orange Free State. In Southern Rhodesia the corn production is chiefly concentrated around Salisbury, in the north-central portion.

Wheat is important in only two areas which, strangely, are at the two opposite ends of the territory considered. The Union grows enough wheat for its own consumption, nearly all of which is produced in the vicinity of Capetown. Kenya, on the Equator, grows a smaller quantity of wheat, but it is sufficient for export to neighboring countries and occasionally for more distant exportation. The possibility of growing wheat on the Equator is due to the moderate temperatures caused by the high elevation of the central plateau in Kenya, combined with an ample rainfall during the winter months. Between these two widely separated wheat-growing areas the rainfall occurs during the summer months, and winter-wheat production is, generally speaking, not feasible.

Tropical and subtropical crops are grown along the lowlands of the east coast, and to some extent, near the interior lakes of the Rift Valley. Sugarcane is especially important in the vicinity of Durban in Natal Province of the Union. Coconuts are grown along the east coast from Mozambique to Kenya. Sisal is an important crop in the eastern part of Tanganyika. Tea and coffee are grown on the mountain slopes of Angola, Nyasaland, Tanganyika, and Kenya.

Food crops are grown by the 27,000,000 natives in these 13 countries for their own consumption. In the southern and drier areas

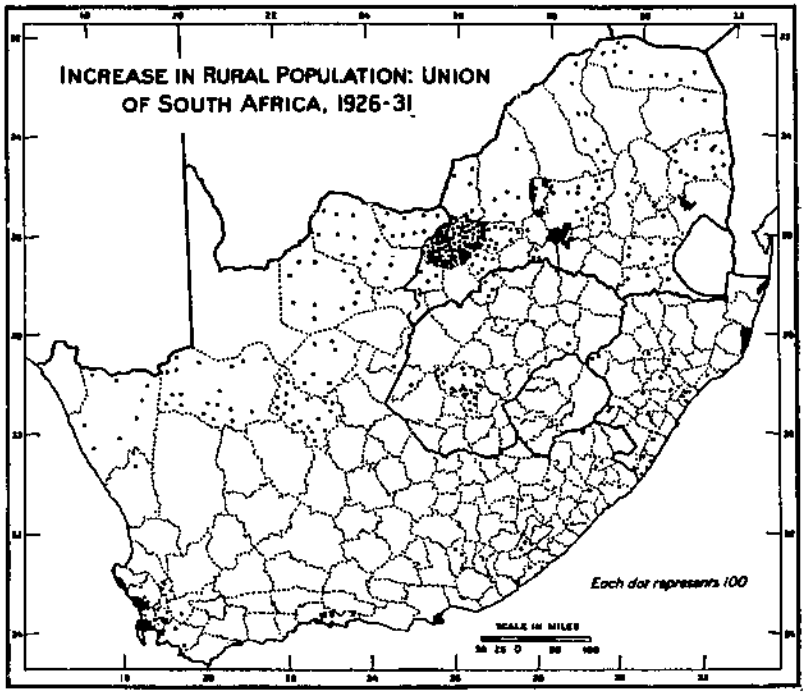


FIGURE 3.—Rural population increased in northern Transvaal, in northern Cape Province, and around the cities of Johannesburg, Bloemfontein, Port Elizabeth, and Capetown. The remarkable increase in the Lichtenburg district was partly due to the sudden development of alluvial diamond diggings.

corn and kafir constitute the principal native-grown crops. In Mozambique, and to some extent in the more northern countries, natives grow considerable quantities of peanuts. In the vicinity of Lake Victoria rice and plantains are important native crops. In other areas casava and millet are important items in the native diet. The combined acreage of native-grown crops is exceedingly small in relation to the total area. The extent of forest land is also insignificant. Over 95 percent of the land is used for grazing livestock.

Wooled sheep are important only in the Union of South Africa. Within the Union the production of wool is highly concentrated in the grazing lands of the high plateau east of the 20-inch-rainfall line. West of this line conditions are too arid to support even sheep except in limited numbers. Rural population has been decreasing in some areas (figs. 2 and 3). In the northern part of the Union

and northward the temperatures are too high and the character of the vegetation is unsuitable for the successful production of wool except in a few isolated areas.

Cattle are more important numerically than sheep. Cattle are commonly found throughout the sheep-grazing lands of the Union except in the more arid portions. Cattle are preeminently suitable for the utilization of the grazing lands which extend northward from the wool-producing area. In these 13 south and east African countries there are about 30,000,000 head of cattle as compared with about 45,000,000 head of sheep. The cattle industry has not yet acquired international importance chiefly because most of the cattle are owned by natives who consider their cattle as measures and evidences of wealth to be used primarily for the payment of lobola in the acquisition of wives rather than as articles of ordinary commerce.

Nonwooled sheep suitable for production of mutton are to be found in the more arid portion of the wool-growing area and in the cattle-producing areas, which are too warm or too thickly covered with thorn bush to make the production of wool possible. Common goats are also associated geographically with nonwooled sheep, especially among the natives. Angora goats for the production of mohair are concentrated in a small area near Port Elizabeth in the Union of South Africa and among the natives in Basutoland. Sheep for the production of karakul skins are more important than any other class of sheep or goats in South-West Africa.

POLITICAL SUBDIVISIONS

That part of Africa which is located south and east of the Belgian Congo is commonly designated as south Africa and east Africa or, more simply, southern Africa. It consists of 13 countries, of which the Union of South Africa, at the extreme south, is the most important.

UNION OF SOUTH AFRICA

The Union of South Africa comprises four Provinces—Cape, Orange Free State, Transvaal, and Natal, which were independent political units prior to 1910 (fig. 4). In many respects the four Provinces may be likened to States comprising the United States of America. The Union of South Africa is a Dominion in the British Empire, coordinate with Canada and Australia. In land area and general characteristics it is similar to the States of Texas, New Mexico, and Arizona, taken together. The similarity is even closer if southern California is included and east Texas excluded from the area compared.

There are four important coastal cities, Capetown, Port Elizabeth, East London, and Durban. There are three important inland cities—Johannesburg, Pretoria, and Bloemfontein. All of these cities are in the southern or eastern part of the Union, where most of the agricultural, mining, and commercial activities of the Union are found. The coastal cities are chiefly commercial. Johannesburg is concerned chiefly with gold mining. Pretoria is the administrative capital and Capetown the legislative capital. The cities are populated chiefly by Europeans of English or Dutch extraction.

There are almost 100,000 farmers in the Union; most of them are of Dutch descent, especially in Orange Free State and Transvaal Provinces. There are three times as many natives in the Union as there are Europeans. Many of the natives live in cities, employed there by Europeans, and many live on European farms either as squatters who give a certain amount of labor for living privileges or as employed wage laborers, but most of the natives live in native reserves located chiefly east of Basutoland, in Natal, and in Transvaal.

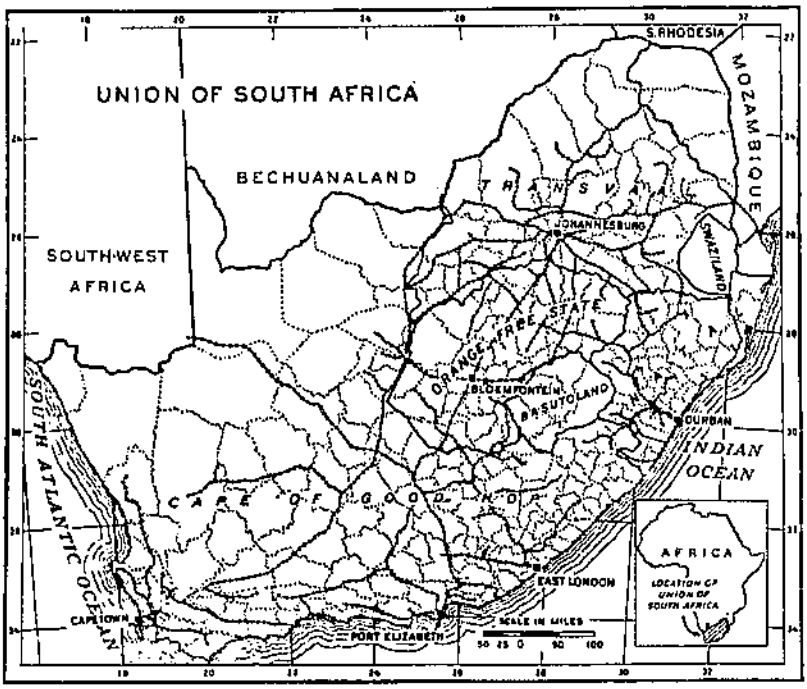


FIGURE 4.—Agricultural production is most important in the eastern half of the Union of South Africa and along the south coast, as indicated roughly by the location of the railroads. Basutoland and Swaziland are native territories not under the Union government.

BASUTOLAND, SWAZILAND, AND BECHUANALAND

There are three native protectorates—Basutoland, Swaziland, and Bechuanaland—adjacent to but not a part of the Union of South Africa. With minor exceptions these protectorates are not open to European settlement. They are administered by the British Government and not by the Union. There are only about 2,000 Europeans in each protectorate, and most of these are traders not engaged in farming. Basutoland and Swaziland are mountainous or hilly and have ample rainfall, but Bechuanaland is a high, arid plateau. The native population per 1,000 acres in these three protectorates is 66, 26, and 1, respectively. Natives are mainly interested in livestock, chiefly cattle, but they grow large quantities of corn and kafir for their own consumption and occasionally for sale. Basutoland natives also produce considerable quantities of wheat, wool, and mohair.

SOUTH-WEST AFRICA

South-West Africa is a mandated territory under the administration of the Union of South Africa. It is two-thirds as large as the Union, but the climate is arid, especially in the southern part, where annual rainfall is less than 10 inches. Parts of the territory are mountainous. Malaria is prevalent in the northern part, which is the only section that has more than 20 inches of rainfall. As a result, population and agricultural production are relatively unimportant. The chief commercial interest is in mining. Both the European and native populations are small.

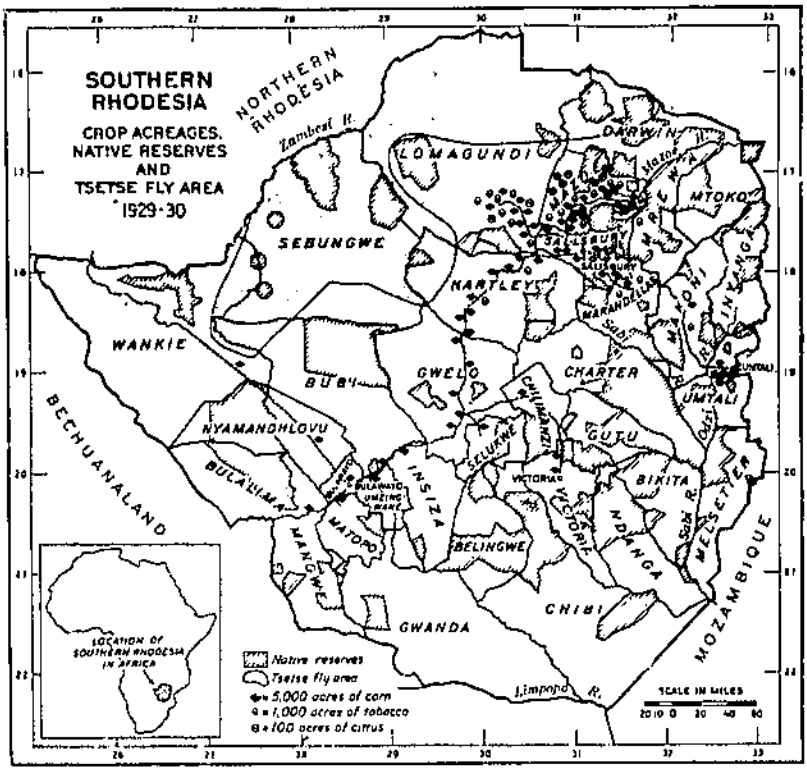


FIGURE 5.—Native reserves in Southern Rhodesia occupy 22 percent of the land area. Tsetse-fly infestation bars cattle from the northern part. The southern and western parts are arid. Crop production centers around Salisbury.

SOUTHERN RHODESIA

Southern Rhodesia is a self-governing colony of the British Empire. It is slightly larger than the State of New Mexico. It is divided into 32 districts (fig. 5). A portion of each district, with one exception, is set aside exclusively as native reserve; the aggregate area in these reserves is 22 percent of the land area. The western half of the colony, commonly known as Matabeleland, is semiarid, but the eastern part, commonly known as Mashonaland, has 30 to 40 inches of rainfall and even more than this along the eastern border, which is mountainous. The Zambesi River constitutes the northern border

of the colony and the Limpopo River the southern border. There is very little agriculture in the Zambesi Valley on account of the tsetse fly. The southern part of the colony is too arid for anything except cattle grazing. The principal European farming area is on the central high plateau. Mining is important in the colony, but agricultural interests predominate. Southern Rhodesia was first settled by Europeans in 1890, and by 1932 the European population was only 51,000 as compared with approximately 1,000,000 natives.

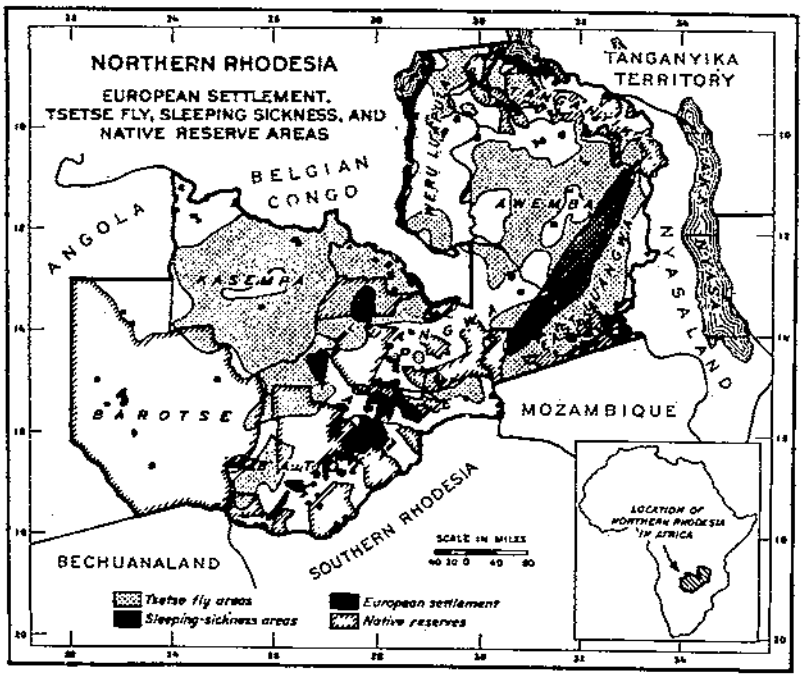


FIGURE 6.—European settlement in Northern Rhodesia is concentrated in the south-central and southeastern areas. Tsetse fly and sleeping sickness bar settlement from a large part of the country. Native reserves cover a large part of the area suitable for settlement.

NORTHERN RHODESIA

Northern Rhodesia is a British possession that is not self-governing. It is about equal in size to the combined acreage of the States of Arizona, Utah, and Nevada. About half the total area has been set aside as native reserves (fig. 6). It is bounded on the south by the Zambesi River and on the northwest by the Congo Basin. The territory is better suited for agriculture than its proximity to the Equator (8° to 18° south latitude) would indicate because its elevation is approximately 3,000 to 4,000 feet. The normal rainfall in the higher northwestern portion is 50 to 55 inches, gradually decreasing to 25 inches in the southern portion. Most of the settled area receives normally 30 to 40 inches of rainfall, most of which occurs during the summer months November to April. Of 55 reporting stations, 11 had maximum temperature of 105° F. or more during the year 1929–30 while several stations reported frost during the winter months.

Northern Rhodesia has been settled by Europeans within the last 25 years. In 1931 there were 1,372,000 natives in the country, representing a considerable increase since 1921. In 1931 there were only 14,000 Europeans, most of them connected with copper mining near the Congo border. There are only about 400 European farmers in the territory. Most of them are situated along the railroad, which extends across the narrow part of Northern Rhodesia, but a number are in the tobacco area of Fort Jameson in the vicinity of the Nyasaland border. The farm area is less than 0.5 percent of the total land area, and the crop area is only one-tenth of this. Some farms have been temporarily abandoned while the owners are working at the copper mines. In the present condition of the agricultural depression no more Government lands are being offered for sale. Northern Rhodesia is less likely to become internationally important in the agricultural realm than are the other countries here considered because of its small European population, the occurrence of serious human diseases, and the inland location, which makes exportation too costly.

NYASALAND

Nyasaland is a small country bordering on Lake Nyasa on the west and south (fig. 7). It is almost as large as the State of North Carolina and is densely populated by about 1,200,000 natives. Europeans and Asiatics number only about 3,000. Nyasaland is mountainous except in the southern part. Frosts occur at the higher elevations. The cotton- and tobacco-producing area is concentrated in the southern part, but with the extension of railway facilities this area is reaching northward.

MOZAMBIQUE

Mozambique, also called Portuguese East Africa, lies along the east coast from about 10° to 27° south latitude. It is divided into 9 districts, 2 of which are under the administration of the chartered company, Companhia de Mocambique. The remainder are under the direct administration of the Portuguese Colonial Government although the 2 most northern districts were formerly under the administration of another chartered company (fig. 8). The colony is larger than the combined areas of the South Atlantic States. It is densely populated by natives. The nonnative population, consisting of Portuguese, East Indians, and people of mixed blood, numbered 35,751 in 1928, of whom about 23,000 were living in the towns of Lourenco Marques, Beira, Mozambique, Inhambane, Quelimane, Tete, and Porto Amelia. Most of the nonnatives are located in the southern part, near Lourenco Marques or Beira, the two ports reached by rail from the interior.

The principal agricultural areas have a rainfall of 30 to 40 inches, most of which falls, as in the Union, during the summer months, November to April. The colony is mountainous along the western border, where the climate is temperate. Tropical conditions prevail along the coast. Near the mouth of the Zambesi River sugar is important. Along the coast, north of the river, coconuts and sisal predominate. South of the river corn, cotton, and some citrus fruits are grown. Extension of the cultivation of crops is hampered by the existence, throughout most of the colony, of tsetse fly, which

makes it impossible to keep work oxen. In 1929–30 there were only 1,094 farmers in Mozambique. Their farm area represented only 2.5 percent of the total land area; and, of this, less than one-tenth was in cultivation.

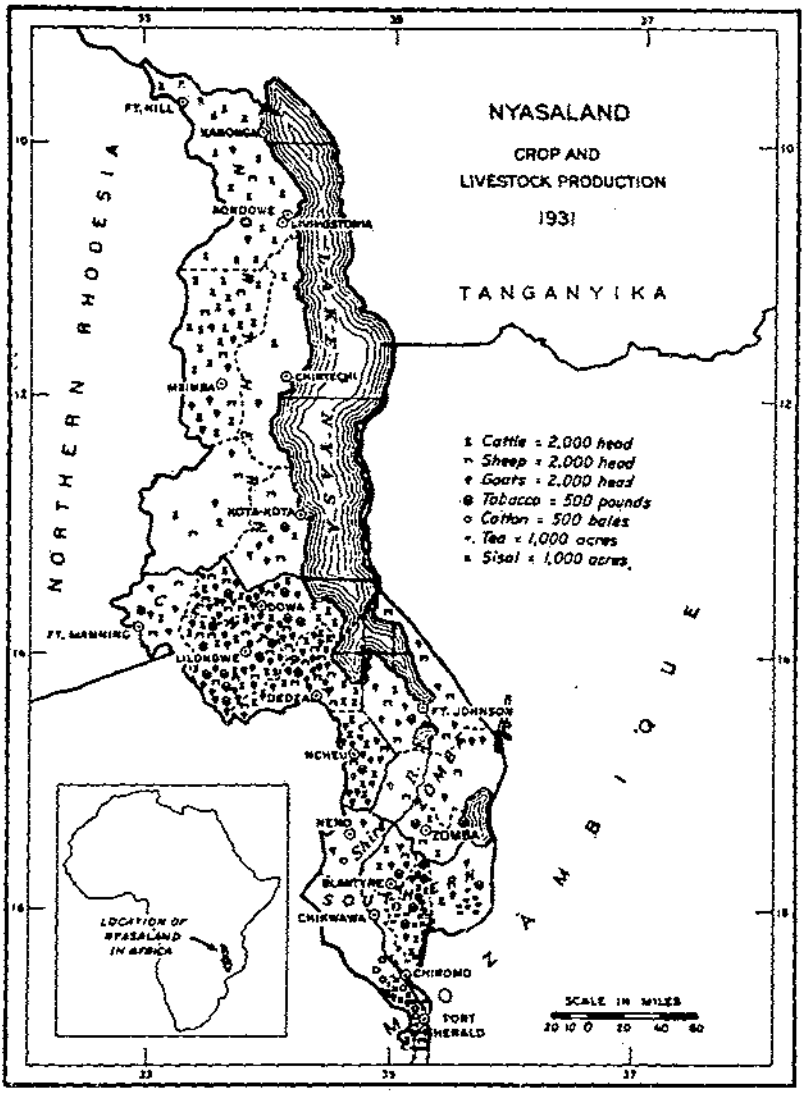


FIGURE 7.—Agricultural settlement in Nyasaland is concentrated in the southern part.

ANGOLA

Angola, known also as Portuguese West Africa, is situated on the west coast of Africa between Belgian Congo and South-West Africa and lies between 6° and 18° south latitude (fig. 9). In the northern part, merging into the Congo Basin, is dense tropical forest. The southern part is dense thorn-bush country and sandy desert. The

south coastal area, extending 30 to 100 miles inland, is also dry and unsuitable for agriculture. But the high plateau area at 4,000 to 6,000 feet altitude is well watered and has a few settlements of

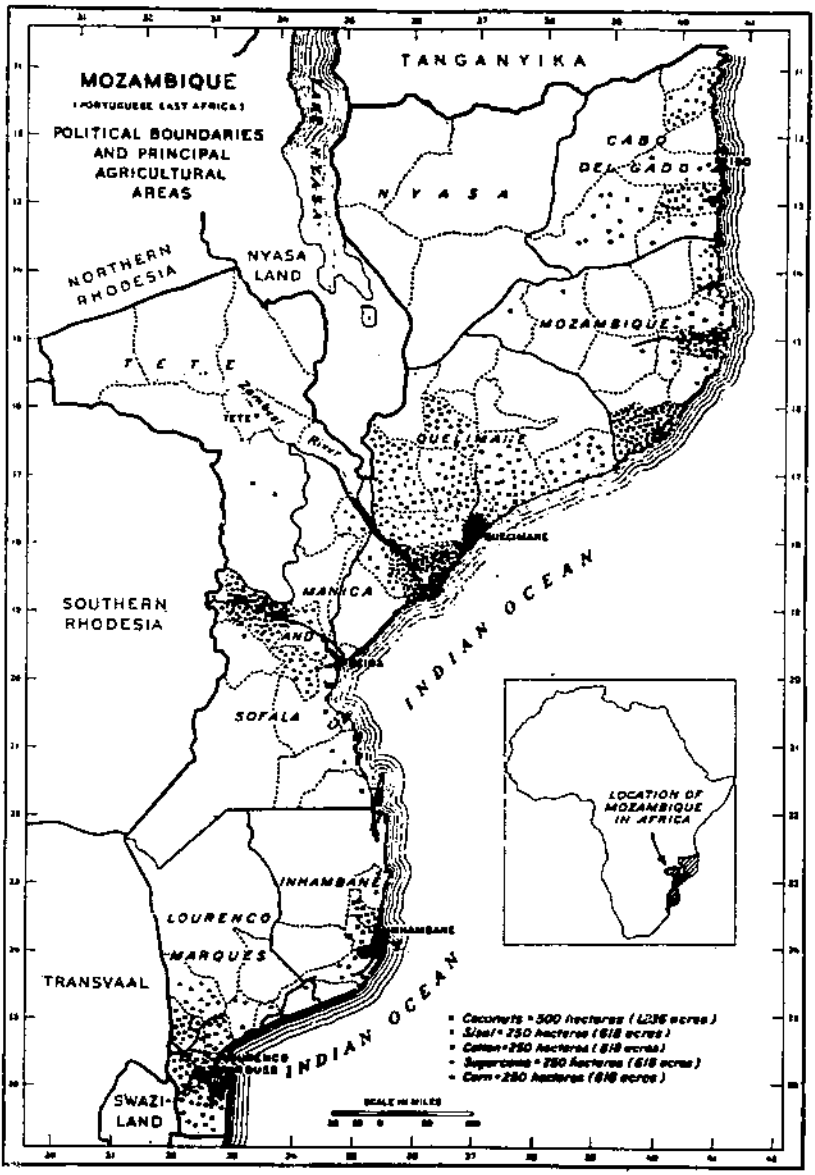


FIGURE 8.—Agricultural production in Mozambique is concentrated in the vicinity of the towns Lourenco Marques, Inhambane, Beira, Mozambique, and Porto Amelia. Considerable sugar, corn, and sisal are produced around and north of the mouth of the Zambesi River.

European farmers. The entire colony is one-sixth as large as the United States but is populated by only about 45,000 Europeans and 2,650,000 natives. Most of the Europeans live in the coastal towns,

Luanda, Lobito Bay, and Benguela. At the higher elevations the temperatures are moderate, and rainfall is more favorable. Most of the rain falls during the summer months, October to May, with maximum rainfall around April. Progress in the colonization of the country has been slow, but the recent (1931) completion of a railroad from Benguela to the copper mines of Northern Rhodesia somewhat facilitates inland development and has stimulated corn production.

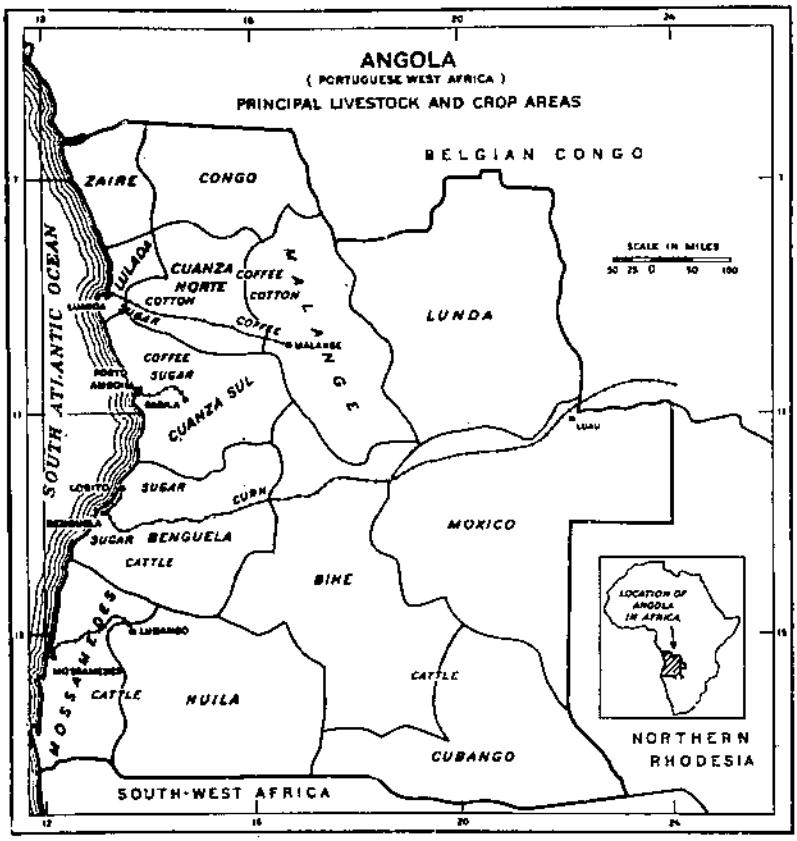


FIGURE 9.—Agricultural production in Angola is concentrated along the western border. Sugar, cotton, and coffee are found in the north and cattle in the south.

TANGANYIKA

Tanganyika, formerly German East Africa, is also very large. It is situated close to the Equator (2° to 11° south latitude) but because of high elevation in part of the territory opportunities are afforded for the production of diverse crops (fig. 10). The principal agricultural activities are along the Indian Ocean or in the vicinity of Lake Victoria, Lake Tanganyika, and Lake Nyasa, along the western border. A railroad crosses the country from Dar-Es-Salaam on the coast to Kigoma on Lake Tanganyika, and most of the European settlement is along this railroad. In 1928 the estimated

population of the territory was 4,500 Europeans, 4,107,000 natives, and 15,000 Asiatics and mixed people. The annual rainfall was between 40 and 65 inches in the northeast corner, 40 to 80 inches in the southeast corner, and 40 to 60 inches along the western border. The central portion is semiarid. Most of the rain falls during the summer months, November to April, although along the eastern coast rainfall is heavy during the winter months, May to October. Sisal, copra, and cotton are grown along the east coast, rice and

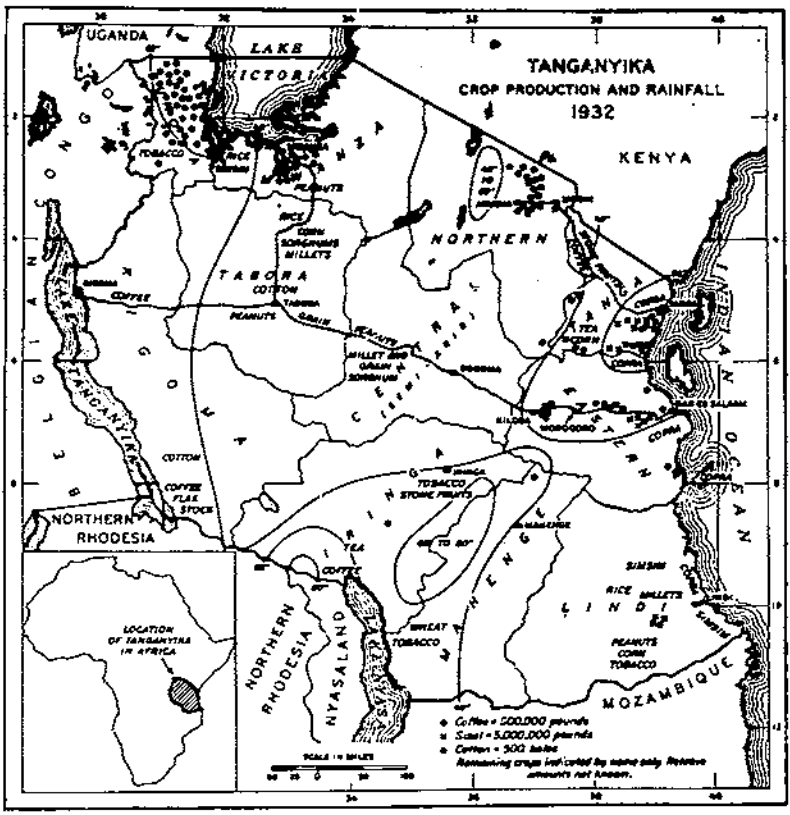


FIGURE 10.—In Tanganyika cotton and sisal are important in the northern coastal area, dry-land grains in the central area, and cotton and rice in the northwestern portion.

cotton in the lake areas, and coffee and tea in the mountainous areas. Corn, kafir, millets, and peanuts are the principal crops grown by natives throughout the territory.

KENYA

Kenya is located on the Equator, but owing to the high elevation of the inland plateau, grain crops represent an important part in the agricultural program (fig. 11). Throughout most of the colony the annual rainfall averages less than 40 inches, and in the northeastern part rainfall is less than 20 inches. There are three areas with fairly heavy rainfall, however—the coastal area near Mombasa, with

more than 40 inches, the central plateau area around Nairobi, with 40 to 60 inches, and the small area around the northeastern part of Lake Victoria, where the rainfall is above 60 inches. The eastern coastal area is devoted to coconut and sisal production and the Lake Victoria area to coffee, tea, sugar, and sisal, but the central area,

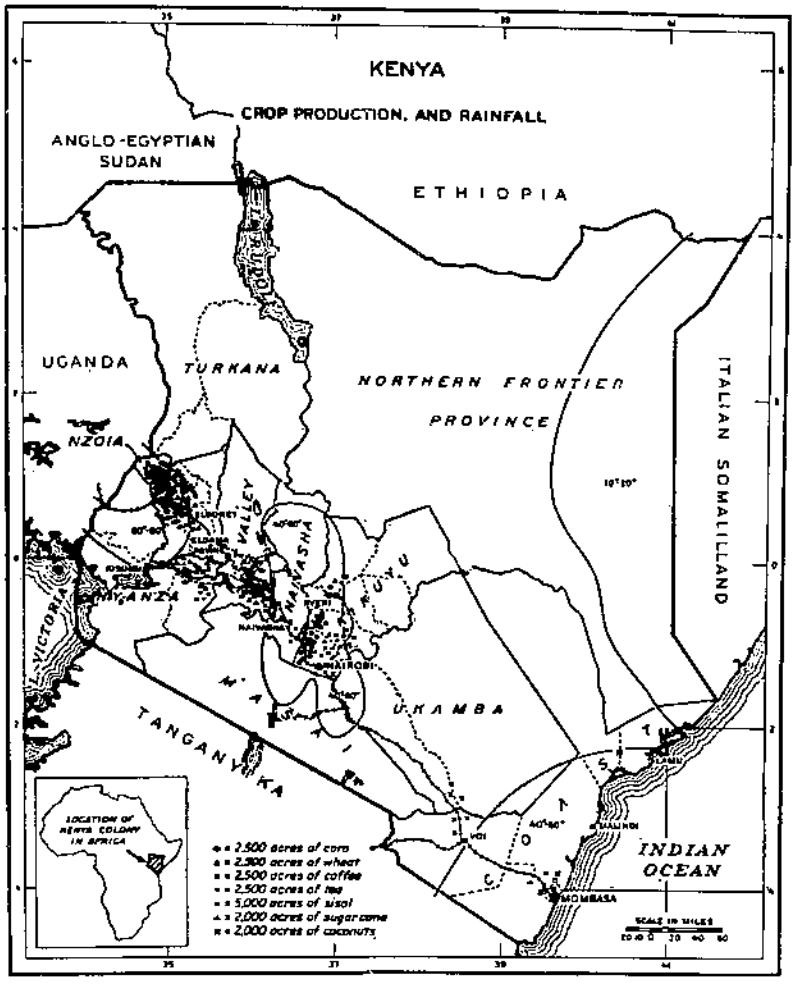


FIGURE 11.—European settlement and crop production in Kenya are concentrated on the high lands along the railroad from Nairobi to the Uganda border.

extending northwestward toward Uganda, produces considerable quantities of corn and wheat at elevations of 5,500 and 6,500 feet.

Kenya is considerably larger than the State of California; but a considerable part has been set aside for native reserves, and only 5,206,264 acres were in occupied farms in 1933. This is only 3.6 percent of the land area. Of this, less than one-tenth is in crops. In 1932 there were only 2,102 farms occupied by Europeans. The total European population in 1926 was 12,529, as compared with 2,736,000

natives and 41,140 others. The European settlements are chiefly on high inland plateaus where rainfall averages 25 to 35 inches per year. Unlike the rainfall in the other countries here considered, the rainfall is well distributed throughout the year except in the dry season during November, December, and January. Kenya possesses superior possibilities for agricultural development.

UGANDA

The British protectorate, Uganda, is located on the north side of Lake Victoria at the headwaters of the Nile (fig. 12). It is about as large as the States of North Carolina and South Carolina. It is rather densely populated with natives, but there are very few Europeans and practically none of them are farmers. Native population is concentrated in areas lying around Lake Victoria and are largely concerned with the production of cotton for sale to European and Asiatic traders. The rainfall in northeastern Uganda is less than 40 inches. Most of the protectorate has 40 to 60 inches of rainfall, whereas three areas have 60 to 80 inches, one along the west shore of Lake Victoria, one near the southern end of Lake Albert, and the third and most important area, along the northern extension of the railway which penetrates the east-central part. The semiarid portions in the northern half of the protectorate are used chiefly by the natives for grazing cattle, sheep, and goats. The same is true of the southwestern corner of the protectorate. The important cotton areas are north and northeast of Lake Victoria. The development of the native cotton industry in Uganda is indicative of what may occur in other countries where the native population is large but as yet on only a self-sufficing basis.

FOREIGN TRADE

Most of the foreign trade of the 13 countries in southern Africa centers in nonagricultural commodities. In each instance imports consist chiefly of textiles, metals, metal manufactures, and gasoline; foodstuffs and alcoholic beverages are less important. Exports consist chiefly of gold, diamonds, copper, zinc, asbestos, and other mined products, but this is not uniformly true throughout all 13 countries. Agricultural exports predominate from Nyasaland, Mozambique, Tanganyika, Kenya, and Uganda.

The foreign trade of the Union of South Africa is more important than that of the other 12 countries combined. In 1932 exports, including gold specie, were valued at $318,548,000 (converted at par of exchange), not including ship stores nor small exports by land to South-West Africa, Southern Rhodesia, Northern Rhodesia, and the three native protectorates (table 3). Of this total, 79 percent consisted of mined products, chiefly gold, 12½ percent of livestock products, chiefly wool; and 8 percent of crops, chiefly fruit, sugar, and corn. Imports in 1932 were $149,006,000 (converted at par of exchange), not including small imports from South-West Africa, Southern Rhodesia, Northern Rhodesia, and the three native protectorates. Imports consisted chiefly of textiles, metals, and metal manufactures.

South-West Africa in 1930 had total exports of $12,780,777 (converted at par of exchange), consisting chiefly of diamonds, copper, and vanadium. Its agricultural exports consisted chiefly of hides and skins, livestock, and butter. Its imports amounted to $10,318,352

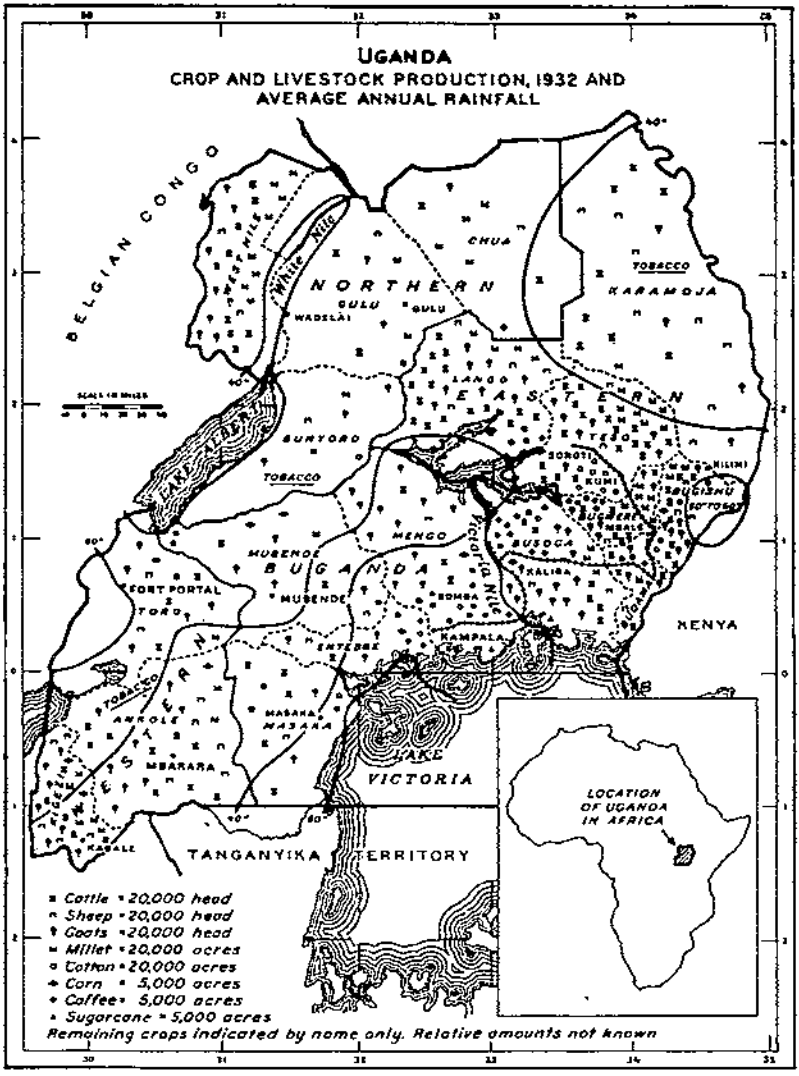


FIGURE 12.—Cotton production in Uganda is concentrated around Lake Victoria and livestock production in the north and the extreme southwest.

(converted at par of exchange) and consisted chiefly of metals, metal manufactures, textiles, gasoline, and certain foodstuffs. Most of the trade of South-West Africa is with the Union of Africa and the United Kingdom.

TABLE 3.—*Foreign trade: Union of South Africa, 1931–32*

EXPORTS TO OVERSEAS COUNTRIES

Commodity	1931			1932	
	Unit	Quantity [1]	Value [2]	Quantity [1]	Value [2]
			1,000 dol.		*1,000 dol.*
Livestock products:					
Wool	Pound	236,648,924	27,742	372,660,575	31,927
Mohair	do	5,442,883	1,115	6,434,774	464
Sheepskins, goatskins	do	34,880,052	3,586	41,693,439	2,490
Cattle hides	do	21,978,404	1,015	18,570,204	1,230
Meats (fresh)	do	21,760,302	1,140	16,070,428	776
Butter, cheese, condensed milk	do	6,541,270	1,416	7,015,700	1,611
Eggs, fresh in shell	Dozen	5,847,445	1,579	5,321,084	1,180
Livestock and other products			537		307
Total, livestock products			30,030		39,991
Crops:					
Sugar, molasses, and treacle	Short ton	193,397	7,007	182,508	6,435
Grain (chiefly corn) and grain products	do	249,295	3,881	418,197	5,702
Fruit, citrus	Box	1,837,385	4,144	1,890,929	4,584
Fruit, deciduous and grapes	do	2,012,733	2,424	2,530,434	3,140
Fruit, dried	Pound	10,216,266	950	13,338,075	1,468
Fruit, preserves, jams, jellies	do	2,009,249	177	4,334,975	349
Wines, spirits, beverages			717		669
Cotton	Pound	3,120,322	202	1,159,416	85
Tobacco	do	307,424	213	102,149	92
Wattle bark and extract	do	173,082,547	3,231	169,023,839	2,399
Other crop products			250		330
Total, crops			23,340		25,223
Mined products—principal items:					
Gold	Fine ounce	8,941,259	184,830	11,202,649	231,570
Gold specie			33,678		4,448
Diamonds	Metric carat	1,758,738	17,390	819,864	9,517
Copper	100 pounds	193,851	2,195	108,570	1,843
Coal, cargo	Short ton	1,049,151	2,415	720,230	1,415
Platinum, asbestos, tin			2,058		1,343
Total			243,166		250,142
Miscellaneous			9,325		3,192
Total exports, including gold specie			314,887		318,548

IMPORTS FROM OVERSEAS COUNTRIES

Metals and metal manufactures			67,304		44,930
Textiles, yarns, fibers, apparel			69,925		41,363
Oils, waxes, resins, paints, varnish			16,495		11,858
Foodstuffs (chiefly coffee, tea, rice, fish, wheat)			20,001		11,717
Drugs, chemicals, fertilizers			10,800		8,598
Books, paper, stationery			10,114		6,962
All other			40,273		23,878
Total			234,972		149,006

[1] Quantities exported in 1932 include considerable quantities, especially of wool, which would have been exported during the latter part of 1931 except for exchange difficulties following the abandonment of the gold standard by England in September 1931.

[2] Values converted at $4.8665 per pound sterling.

Union of South Africa, Trade and Shipping (46).[2] [This (46) and other italic numbers in parentheses in text and footnotes refer to Literature Cited, p. 338.]

Southern Rhodesia, in 1932, exported, including re-exports, commodities valued at $26,217,057 (converted at par of exchange). Most of the exports consisted of gold, but asbestos, coal, tobacco, corn, and oranges, were also exported. Exports were destined chiefly for the United Kingdom, Northern Rhodesia, and the Union

of South Africa. Imports in 1932 were $20,790,306 (converted at par of exchange), consisting chiefly of textiles, metal manufactures, gasoline, wheat, sugar, tea, and alcoholic beverages. Imports were chiefly from the United Kingdom, the Union of South Africa, the United States, and Canada.

Northern Rhodesia in 1929 exported, including re-exports, commodities valued at $4,510,384 (converted at par of exchange) consisting chiefly of copper, zinc, tobacco, hides and skins, and corn. The United Kingdom and nearby countries were the principal destinations. Imports in 1929 were valued at $17,858,347 (converted at par of exchange), chiefly metals and metal manufactures for the mining industry, textiles, and certain foodstuffs. Imports were chiefly from the United Kingdom, the United States, and Germany.

From Nyasaland exports, including reexports, in 1932 were $3,839,659 (converted at par of exchange), chiefly tobacco, tea, and coffee shipped to the United Kingdom. Imports in 1932 were $3,603,084 (converted at par of exchange), chiefly cotton and metal manufactures from the United Kingdom.

From Mozambique exports in 1932 were $9,055,806 (converted at par of exchange), chiefly gold specie, vegetable oils, cotton, sisal, sugar, corn, and fruits. Imports in 1932 were $13,589,412 (converted at par of exchange), consisting chiefly of textiles, metals, and metal manufactures. Most of the imports were from the Union of South Africa, Great Britain, and Portugal. Exports were destined chiefly for Portugal, the Union of South Africa, and France.

Angola in 1930 exported commodities valued at $10,542,688 (converted at par of exchange), chiefly diamonds, corn, coffee, sugar, and fish. Imports in 1930 were $11,068,222 (converted at par of exchange), chiefly textiles, vehicles, gasoline, wine, flour, and olive oil, from Portugal, the United Kingdom, Germany, and the United States.

Tanganyika in 1932 exported commodities valued at $10,658,355 (converted at par of exchange), consisting chiefly of sisal, coffee, cotton, hides, copra, and rice. The principal destinations were United Kingdom, Belgium, Uganda, and Germany. Imports in 1932 were $9,748,291 (converted at par of exchange), chiefly textiles, cement, metals and metal manufactures, tobacco, sugar, flour, and alcoholic beverages, most of which were imported from the United Kingdom, India, and Japan.

Kenya and Uganda in 1932 exported commodities valued at $21,927,768 (converted at par of exchange), of which $11,100,399 (at par) was from Kenya and $10,827,369 (at par) from Uganda. The exports consisted chiefly of cotton, coffee, corn, sisal, and hides and skins. Exports were chiefly to the United Kingdom (39 percent) and other British pos-essions (44 percent). Imports into the two countries in 1932 were $23,722,105 (converted at par of exchange), consisting chiefly of cotton textiles, gasoline, and machinery. Imports were chiefly from the United Kingdom (39 percent), British possessions (24 percent), and Japan (11 percent).

Foreign-trade statistics are not separately compiled for the three native protectorates Basutoland, Swaziland, and Bechuanaland.

The confusion in foreign exchange rates during recent years often makes it necessary to convert foreign currency into American cur-

rency at par of exchange although actually the rates of exchange vary. Tables 4 and 5 show the actual exchange rates between the Union of South Africa and the United States since 1918. Between 1919 and 1925 the South African currency was depreciated approximately to the same extent as English sterling. The Union of South Africa did not depart from the gold standard with England in September 1931, although the other British countries in southern Africa did. However, since January 1933 the currency of the Union of South Africa has also been depreciated approximately to the same extent as English sterling.

TABLE 4.—*Exchange rates: Average value of the Union of South African pound in United States dollars, by months, January 1930–December 1933* [1]

Month	1930	1931	1932	1933	Month	1930	1931	1932	1933
January	$4.85	$4.83	$4.71	$3.46	July	$4.84	$4.83	$4.78	$4.44
February	4.84	4.83	4.71	3.41	August	4.85	4.83	4.78	4.49
March	4.84	4.83	4.75	3.40	September	4.84	4.71	4.77	4.01
April	4.84	4.84	4.73	3.54	October	4.84	4.82	4.76	4.61
May	4.84	4.84	4.80	3.89	November	4.83	4.68	4.78	5.09
June	4.84	4.84	4.80	4.09	December	4.83	4.71	4.79	5.06

[1] Noon buying rate for cable transfers payable in foreign currencies. Par of exchange, based upon the gold content of the two currencies is $4.8665 per pound (24.3 cents per shilling). The buying rate is the price paid by the bank for South African pounds and is usually slightly below par. The selling rate is the price charged by the bank for South African pounds and is usually slightly higher than par.

January 1930–February 1933, from Statistical Year-book of the League of Nations, 1932-33 (*16*); March-December 1933, quotations of Federal Reserve Board.

TABLE 5.—*Exchange rates: Average value of the Union of South African pound in United States dollars, annual, 1918–33*

Year	Exchange value	Year	Exchange value	Year	Exchange value
1918	$4.77	1924	$4.8[illegible]	1930	$4.84
1919	4.44	1925	[illegible].84	1931	4.81
1920	3.63	1926	[illegible].84	1932	4.77
1921	3.88	1927	4.84	1933	4.15
1922	4.39	1928	4.84		
1923	4.51	1929	4.83		

1918–23, computed from quotations on the South African pound in London and the British pound in New York; 1924–33 from Statistical Year-book of the League of Nations, 1932-33 (*16*).

WOOL

INTERNATIONAL SIGNIFICANCE

The Union of South Africa is primarily a grazing country similar in extent and general characteristics to the States of Texas, New Mexico, and Arizona. Only 5 percent of the land is in crops and a negligible part in forests. The great majority of it is grazing land. The value of grazing, measured in terms of output, was estimated at the low prices of 1932 to be $57,000,000 for sheep and $74,000,000 for cattle, but much of the latter represents grazing for work oxen. Commercially, sheep are more important than cattle. Wool is the most important agricultural product in the Union and is second only to gold among its exports (table 3). In 1932 exports of gold and gold specie were $236,000,000, wool exports $32,000,000, and total

overseas exports $319,000,000. During the years 1924 to 1929 when wool prices were high, the value of wool exports was 2 or 3 times the 1932 figure.

The Union of South Africa is one of the principal wool-producing countries of the world. Its annual production of slightly more than 300,000,000 pounds represents 10 percent of the world production, excluding those of Russia and China, and its annual exports are about 14 percent of the total world exports. Its production is almost equal to that of the United States or Argentina and is greater than that of New Zealand but is only about one-third as great as Australian production. Most of the wool from the Union of South Africa is fine Merino, and for this kind of wool the Union of South Africa is second in importance only to Australia.

The Union has an area equal to our three large Southwestern States, Texas, New Mexico, and Arizona, but it has five times as many sheep as there are in those States. The further development of wool production in the Union would have a profound influence on world prices for wool, especially of the finer types. Prior to 1930, 20 to 35 percent of the combing and clothing wool consumed in the United States was imported largely from Australia but partly from the Union of South Africa. Even in 1932, when wool imports were greatly reduced, some wool of these types was imported from these countries. The conclusion is inescapable that American wool interests are affected by wool production in the Union of South Africa.

Of the 13 countries in south and east Africa—11 British and 2 Portuguese—only the Union of South Africa and the small native protectorates, Basutoland and Swaziland, farthest from the Equator, are important wool producers. The others are, in the main, too warm for wooled sheep. Exports from Basutoland and Swaziland move through Union ports so that separate treatment of these countries here is not necessary.

TREND OF PRODUCTION IN THE UNION OF SOUTH AFRICA

During the five wool seasons ended in 1933, production in the Union of South Africa has been slightly in excess of 300,000,000 pounds per year. Production in the next few years is expected to be somewhat smaller owing to the unusual drought during 1932–33. The 1934–35 clip is estimated to be only 245,000,000 pounds, the smallest since 1925–26. Production is not expected greatly to exceed 300,000,000 pounds even after the effects of the drought have been overcome. Several facts lead to the conclusion that the rapid expansion in wool production which has characterized the last 25 years has come to an end. As grazing lands are becoming overstocked and the carrying capacity, in some cases, is being impaired, the sheep are more likely to suffer from drought than in earlier years. The efforts to improve the carrying capacity of the grazing lands for sheep offer little hope of rapid or material improvement. Most of the sheep are improved Merinos which are already producing almost as much wool per sheep as is possible without altering the fineness of the wool. In the future, more sheep and lambs will be slaughtered for meat to supply the increasing per capita local consumption and the newly developed export demand for lamb. To some extent sheep will give

way to cattle in the northern areas where they compete for the use of grazing land. This will be particularly true while work oxen are more economical than tractors in the corn belt, and while the export of chilled beef is more profitable than the export of wool. Wool production in the Union of South Africa has reached approximately its maximum level of production, although production will vary from year to year, depending upon rainfall, the price of wool, the price of cattle, and the extent to which shearing of short wools at the end of the season draws upon the following year's production.

Wooled sheep were introduced into Cape Province during its early colonial days, but the commercial developments date only from about 1840 (fig. 16). In 1904 the Union had 11,820,000 wooled and 4,502,000 nonwooled sheep. By 1911 these numbers were practically doubled. By 1930 wooled sheep had more than doubled again, while

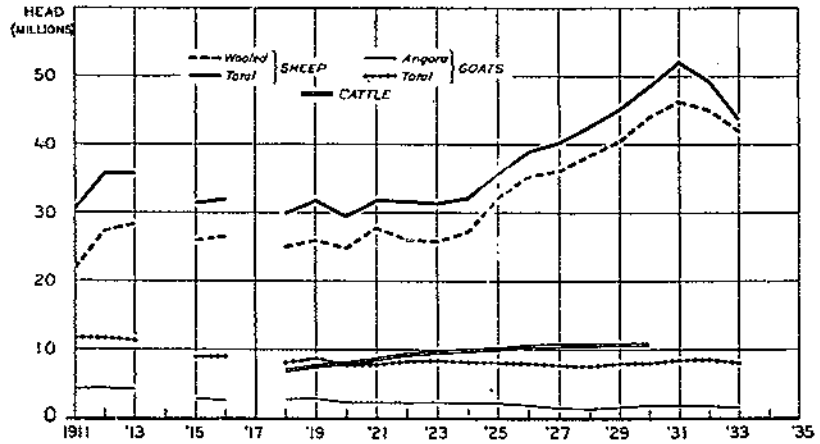


FIGURE 13.—NUMBER OF SHEEP, GOATS, AND CATTLE, UNION OF SOUTH AFRICA 1911-33.

Wooled sheep have increased in number until recently while nonwooled sheep have decreased. Cattle have increased at the same rate but not in identical years. Goats have decreased, Angora goats rapidly and common goats slowly. Grazing lands are now more largely used for wooled sheep and cattle than formerly.

nonwooled sheep had receded to the 1904 number. The most spectacular increase in number of wooled sheep occurred between 1920 and 1930, even exceeding a similar expansion in the United States during that period (fig. 13). In 1 year, 1929–30, wooled sheep numbers increased 9 percent, and, in fact, 12 percent in Cape Province. Between 1924 and 1930 they increased 62 percent. Since 1931 the number has declined, chiefly because of drought and low wool prices. The total number will probably not exceed 50,000,000 for many years to come.

Most of the sheep in the Union are located in the grazing lands surrounding mountainous Basutoland excepting that the area east of Basutoland, being native reserve, is given over mostly to cattle (figs. 14 and 15). The northern part of this semicircular sheep area blends into the cattle area, and there both sheep and cattle are found in large members. West of the 20-inch-rainfall line (a line running north from Port Elizabeth to Mafeking) the rainfall is so low that

the natural grazing consists only of karoo bushes of various kinds. In this large area sheep are much fewer per 100 acres, and there are practically no cattle, but there is a large tonnage of wool. An irregular belt bordering the 20-inch-rainfall line is mixed veld, both karoo bushes and grass, used chiefly for sheep. The grassland areas south of Basutoland were formerly used chiefly for cattle, but after being closely grazed the grass covering has so changed in character that it is now used chiefly for sheep.

Competition for the use of grazing land lies not only between sheep and cattle but, especially in the drier sheep areas, between wooled sheep, nonwooled sheep, Angora goats, and common goats (table 8). The original sheep in south Africa were fat-tailed and were covered

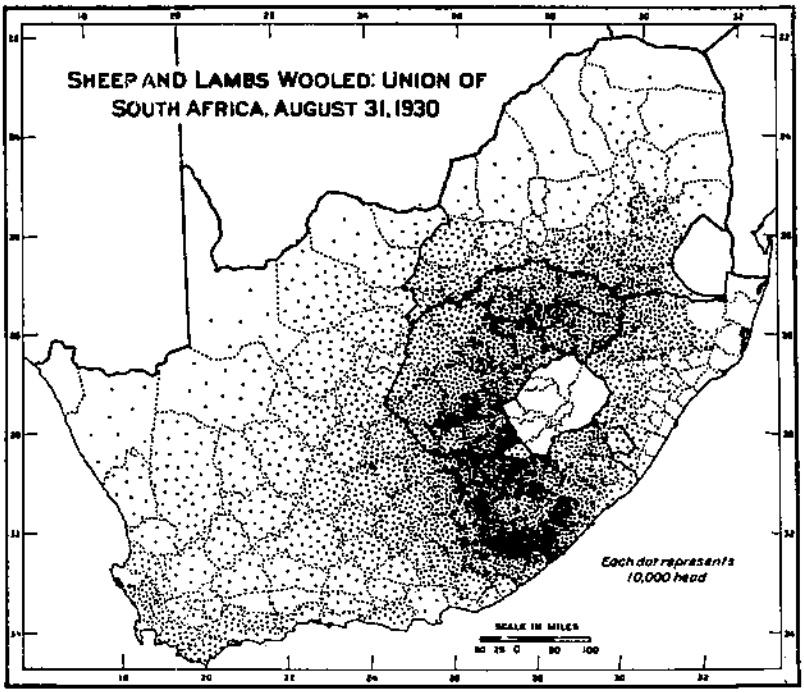


FIGURE 14.—Wooled sheep are produced mostly around Basutoland, where rainfall is above 20 inches per year and where grazing consists of grass or grass and karoo bush combined.

with coarse hair instead of wool. There are still a few such sheep, but the principal nonwooled sheep are now of an improved mutton breed, the Blackhead Persian. These sheep have short hair (like that of a fox terrier dog), a black head and neck, and an entirely white body with an immense fat tail and rump. They can thrive on grazing land too dry and too poor to carry Merino sheep successfully. They furnish a considerable part of the lamb and mutton consumed. About 20 percent of the sheep and lambs slaughtered at Johannesburg are Persians or Persian-Merino crosses. There are large numbers of crossbred Persian-Merino sheep from which the commercial Cape skin is obtained. These sheep are particularly common among

the natives (blacks). Where grazing conditions are too adverse for either type of sheep, common goats which are used for skins can exist. There are enormous numbers of these goats, especially among the natives. Angora goats producing mohair are more exacting in their environment. Nearly all of them are concentrated in one dry area lying back of Port Elizabeth; they have been displaced by Merino or Blackhead Persian sheep in most other areas.

English breeds of strong-wooled (coarse-wooled) sheep—Suffolk, Romney Marsh, Corriedale, Border Leicester, and Dorset Horn—occur in small numbers in the areas of Natal and eastern cape Provinces that have more rainfall. Their chief importance is for the production of crossbred lambs for export.

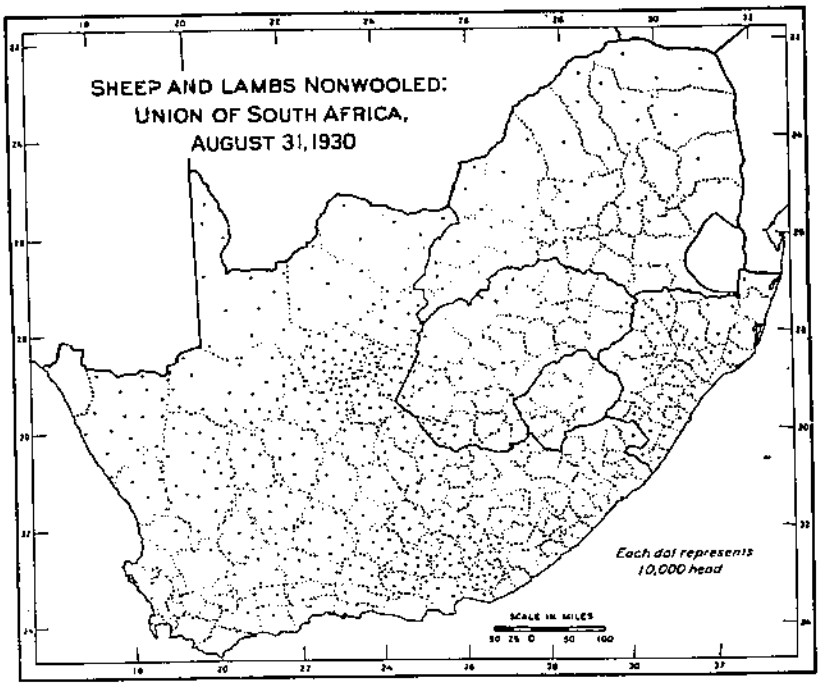


FIGURE 15.—Nonwooled sheep are raised mostly in the arid west and in the native reserves.

The number of sheep enumerated by the 1930 farm census of the Union was 48,358,349, mostly Merinos owned by Europeans (table 6).

The production of wool in the Union, as reported by the annual agricultural census, increased from approximately 130,000,000 pounds in 1919–20 to 250,000,000 pounds in 1929–30 (table 7). These figures are less than exports would indicate. During the 10 years ended in 1930 production totaled 1,778,000,000 pounds, while exports totaled 2,313,000,000 pounds. This average annual overrun of 53,500,000 pounds, amounting to 30 percent, is more than can be accounted for by wool from Basutoland, Swaziland, Southern Rhodesia, Bechuanaland, and South-West Africa. Difference in carry-over, divided over the 10 years, would be insignificant and

would probably tend to accentuate the larger exports. Pulled wool and other wool not originating on farms would account for a small part of the overrun. The census enumerations are too low, chiefly because of underestimates by the farmers. On the other hand, a considerable quantity of wool is exported on the 5,000,000 Merino sheepskins annually exported.

TABLE 6.—*Sheep, lambs, and goats: Classification on farms, Union of South Africa, August 31, 1930*

Class	Owned by Europeans	Owned by natives		Total
		On farms owned by Europeans	On native reserves	
Woolled sheep:	*Number*	*Number*	*Number*	*Number*
Merinos	37,768,977			
English breeds [1]	12,364			
Cross breeds [2]	1,520,718			
Woolled Persians [3]	117,783			
Total	39,419,842	328,324	4,163,995	[4] 43,912,161
Nonwoolled sheep:				
Blackhead Persians	2,267,108			
Africanders [5]	1,448,868			
Karakuls [6]	14,650			
Total	3,730,626	204,621	510,941	[7] 4,446,188
Total woolled and nonwoolled sheep	43,150,468	532,945	4,674,936	[8] 48,358,349
Sheep shorn, 1929–30	[9] 34,923,371			
Common goats	2,076,480	907,724	3,079,428	6,153,632
Angora goats	1,574,334	86,966	139,471	1,800,771

[1] Probably about 5,000 Suffolk, 5,000 Corriedale, and 1,000 Romney Marsh—not all purebred.
[2] Chiefly Merino-Blackhead Persian crosses.
[3] A coarse-woolled breed distinct from Blackhead Persian.
[4] As in previous years, 18 percent of the Merinos and 24 to 26 percent of the other woolled breeds were lambs. Merino wethers are kept for wool production; other wethers are sold for lamb and mutton.
[5] Namaquas and Ronderibs—the former spotted, with short hair, long legs, and long tapering tail; the latter white or cream-colored, with long silky hair, large body, legs not so long, and tail broad as the rump, turning up or twisting at the point.
[6] Chiefly in northwestern Cape Province; used for Karakul lambskins.
[7] 28 percent of Blackhead Persians, 27 percent of the Africanders, and 16 percent of the Karakuls were lambs.
[8] Not including 108,516 woolled and 52,952 nonwoolled sheep estimated in towns.
[9] Average production 7.14 pounds per sheep shorn, according to census enumeration.

Union of South Africa, Agricultural Census (*48, report 13*), and Official Yearbook (*47, no. 15, p. 555*).

TABLE 7.—*Wool production in the Union of South Africa 1919–20 to 1929–30*

Year ended Aug. 31—	Cape	Orange Free State	Transvaal	Natal	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
1919–20 [1]	66,924,450	44,827,650	14,484,950	5,798,830	132,035,880
1920–21 [1]	66,833,137	47,373,558	15,812,392	5,909,032	135,929,019
1921–22 [1]	71,349,877	47,895,218	15,147,762	5,660,092	140,052,949
1922–23	72,045,812	44,344,880	15,271,370	5,555,523	137,217,585
1923–24	77,674,058	48,076,833	15,910,541	6,204,061	147,865,493
1924–25	81,189,510	52,475,098	16,741,184	6,563,542	156,969,334
1925–26	91,256,894	51,713,737	17,759,762	7,191,117	167,921,510
1926–27	101,615,124	61,911,823	22,400,139	8,182,930	194,110,025
1927–28	108,962,700	71,562,029	26,379,104	10,000,270	216,924,103
1928–29	119,216,472	73,957,585	27,708,839	11,121,528	232,004,424
1929–30	133,163,303	76,535,029	27,823,893	11,919,837	249,442,062

[1] Year ended Apr. 30.

Union of South Africa, Official Yearbook (*47, Yearbook 15, p. 554*); census enumeration.

Most of the product is Merino wool. The so-called "crossbred" wool in South Africa consists chiefly of kempy, coarse, and colored wools from Merinos having more or less Persian or Africander blood. In certain areas where feed conditions are more favorable there is a tendency to produce big-bodied sheep producing large fleeces of "strong" wool 60's to 64's instead of wool of 64's to 70's fineness. Market demand during 1931–32 accentuated this tendency. The drift toward Merinos and Blackhead Persians and away from the other breeds is clearly shown by the census classifications of European-owned sheep (table 8).

Most of the Union's sheep are in Cape Province. In 1930, Cape had 53 percent, Orange Free State 29 percent, Transvaal 12 percent, and Natal 6 percent of the wooled sheep. These proportions did not

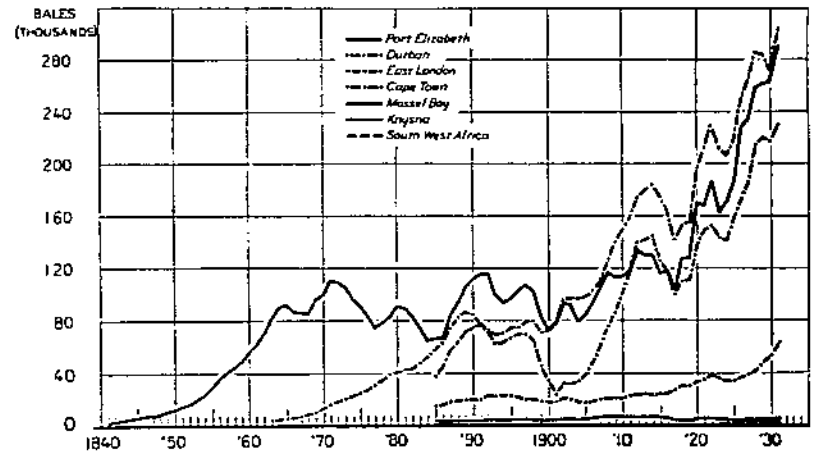


FIGURE 16.—TREND OF WOOL EXPORTS BY PORTS, UNION OF SOUTH AFRICA, AS REPORTED BY PORT ELIZABETH WOOL AND MOHAIR BUYERS' ASSOCIATION, 1840 TO 1931.

Wool exports date from 1840 at Port Elizabeth. Since 1885 exports have been about equally important from Port Elizabeth, East London, and Durban, except just after the Boer War. Exports increased rapidly after 1905. The 3-year moving averages have been centered.

vary appreciably during the period 1911 to 1930, although total numbers expanded from 22,000,000 to 44,000,000. With respect to nonwooled sheep in 1930, Cape had 81 percent, Orange Free State 5 percent, Transvaal 8 percent, and Natal 6 percent, but these proportions have not been constant between 1911 and 1930. Nonwooled sheep in Orange Free State and Transvaal have become relatively less important, but in Cape and Natal relatively more important. These changes were conspicuous in the years 1925 and 1930. The total number of nonwooled sheep decreased between 1911 and 1930 from 8,800,000 to 4,500,000. The decrease was particularly abrupt in 1915, 1920, and 1925. The decrease in nonwooled sheep has been less marked in Cape Province than elsewhere because in many of the arid western portions the grazing is too meager to support Merinos. In Natal the smaller decrease in numbers is associated with native ownership in Zululand.

TABLE 8.—*Sheep: Number in the Union of South Africa, classified by breed, census years, 1911, 1921, 1925, 1926, and 1930*

WOOLED SHEEP AND LAMBS

Breed	1911	Apr. 30, 1921	Aug. 31, 1925	Aug. 31, 1926	Aug. 31, 1930
European-owned:	*Number*	*Number*	*Number*	*Number*	*Number*
Merinos		23,426,530	26,521,484	29,472,530	37,768,977
English breeds		(2)	20,504	16,819	12,304
Cross-breeds [1]		1,680,460	1,728,074	1,942,498	1,520,718
Wooled Persian		(3)	269,515	252,589	117,783
Total		25,106,990	28,539,577	31,684,436	39,419,842
Total, including native-owned [3]	21,842,215	27,757,213	32,153,221	35,377,744	44,020,677

NONWOOLED SHEEP AND LAMBS

	1911	Apr. 30, 1921	Aug. 31, 1925	Aug. 31, 1926	Aug. 31, 1930
European-owned:	*Number*	*Number*	*Number*	*Number*	*Number*
Blackhead Persian		986,870	1,193,203	1,154,908	2,267,106
Africander		2,424,190	1,876,874	1,730,355	1,448,868
Karakul		(4)	12,439	(4)	14,650
Total		3,411,060	3,082,516	2,885,263	3,730,626
Total, including native-owned [3]	3,814,444	3,972,299	3,611,211	3,642,501	4,490,140

[1] Mostly Merino-Blackhead Persian crosses.
[2] Included with crossbreeds.
[3] Including sheep in towns, enumerated in some years, estimated in others.
[4] Not enumerated.

Union of South Africa, Agricultural Census 1921, 1925, 1926, 1930 (48).

In periods of low wool prices, interest shifts to Persians for producing lambs, whereas in periods of high wool prices the reverse is true. In 1930–33 there arose a sudden interest in producing crossbred lambs for export. This enterprise may be used as a refuge in periods of low wool prices.

The annual increase in sheep obviously depends chiefly upon the number of lambs raised, the number of sheep that die, and the number slaughtered. By studying the weather and price factors as they affect these changes, the current changes in sheep numbers may be approximated well in advance of official estimates. The chief variable is the size of the lamb crop; the least important is slaughterings. On the basis of 40,000,000 wooled and nonwooled sheep in the Union, about 18,000,000 are ewes, 12,000,000 wethers and rams, and 10,000,000 lambs. The number of sheep and lambs annually slaughtered in abattoirs is about 3,000,000, and the number slaughtered on farms and in native reserves,[2] 2,500,000. If 4,000,000 lambs are used to replace death losses, 500,000 are left to increase the size of flocks. This accounts for a lamb crop of 10,000,000 and indicates a lambing percentage of about 55 percent.[3] In individual years the lamb crop may vary as much as 2,000,000 from this figure.

[2] Agricultural census returns show the number of sheep and goats slaughtered in abattoirs in 1929–30 to be 2,643,231; those slaughtered on farms (excluding native locations) in 1929–30, 2,113,882. Until recently, about 5,000,000 Merino sheepskins and 2,000,000 other sheepskins have been exported annually.

[3] The 1929–30 census reported only 8,400,000 lambs on European farms Aug. 31, 1930, indicating a total, including native reserves, of about 9,000,000 lambs, but this does not represent all the lambs raised during the year.

Actually, according to annual census enumerations, the number of sheep has decreased as much as 600,000 in a year when the total was only 31,000,000 and has increased as much as 3,650,000 in a year when the total was 36,000,000. With present numbers now close to 42,000,000, an increase as much as 4,000,000 might be expected in an exceptionally favorable year. In recent years, however, increased slaughterings and heavier death losses have stopped any further increase in numbers. In 1933 official estimates indicate a decline in 2 years of 7,000,000 sheep, especially as a result of drought and low prices.

Comparison with the United States is significant. In the United States there were 53,000,000 sheep in 1932, of which 36,000,000 were ewes and only a small number were wethers. Slaughterings, chiefly of lambs, were about 25,000,000 or about four times as many as in the Union. Death losses, including lambs, were about 8,000,000—considerably more than in the Union.

The annual slaughter in abattoirs of sheep, lambs, and a few goats, has almost doubled during the last 10 years (table 9). Returns from 39 abattoirs which slaughtered 68 percent of total abattoir sheep slaughterings in 1929–30, indicate that abattoirs slaughtered in 1932–33 about 3,350,000 sheep, lambs, and goats, as compared with 2,600,000 3 years previously. Consumption in South Africa has shifted decidedly from beef to mutton and lamb during the 3 years since 1930. This is operating to check any further expansion in sheep numbers. In addition, an export trade in frozen lamb is developing which will possibly operate in the same direction. As many as 1,000,000 fat lambs per year have been estimated as available for export.

The areas in which rainfall is considered ample to enable lambs to reach 35 pounds dressed weight within 20 weeks are the wheat districts of western and eastern Cape Province and the corn districts of northeastern Orange Free State, southern Transvaal, and parts of Natal and Griqualand East. Small irrigated areas growing alfalfa might be added to this list.

Johannesburg dealers stated in 1932 that more Persians were arriving at market as lambs and more Merinos as young wethers or ewes. This indicates that the grazing lands are fully stocked and that farmers are endeavoring to limit their sheep numbers.

The occurrence of drought and sheep diseases causes wide annual variations in death losses (table 10). Such losses, including a small number of goats, varied during the 8 years ended in 1929–30 between 3,000,000 and 7,000,000 head, according to census reports. The estimates since 1929–30 are those of the livestock inspectors of the South African Department of Agriculture. They indicate that in 1930–31 sheep losses totaled 1,908,564 and goat losses 423,642. Sheep losses from sickness were 1,237,403, from drought 438,423, from vermin 100,000, and by being stolen 132,658. Goat losses from these causes were 259,554, 108,397, 30,772, and 24,919, respectively. In 1931–32 drought conditions became more severe. Total sheep losses rose to 2,330,693 (including 705,000 lost through drought and 1,293,000 through disease) and goat losses to 486,645. In 1932–33 the Union experienced one of the worst droughts on record. Losses due to drought were 2,252,000 sheep and 290,000 goats. Losses from disease were

1,252,000 sheep and 289,000 goats. Lamb crops were poor in many areas, death losses were heavy, and abattoir slaughterings were at a high level. The number of sheep has stopped increasing and, in fact, there has actually been a decrease. The South African Department of Agriculture estimated that during the 2 years ended June 30, 1933, wooled sheep had decreased 3,600,000 head and that non-wooled sheep had decreased 4,000,000 head while goats decreased slightly. Death losses continued at a high rate during 1933–34 even after the drought was broken.

TABLE 9.—*Number and indexes of animals slaughtered in all abattoirs in the Union of South Africa, 1918–19 to 1929–30*

Year ended June 30	Sheep, lambs, and goats [1]	Cattle [2]	Calves	Hogs	Index numbers (1929–30 = 1,000)			
					Sheep, lambs, and goats	Cattle	Calves	Hogs
	Number	*Number*	*Number*	*Number*				
1918–19	1,939,994	350,212	15,128	147,309	734	602	357	752
1919–20	2,089,420	366,932	16,585	166,805	790	631	392	851
1920–21	2,016,077	330,420	15,692	117,729	763	568	371	601
1921–22	2,445,352	312,544	20,803	123,133	925	537	491	628
1922–23	2,371,454	381,285	24,163	163,456	897	655	571	834
1923–24	2,369,497	445,350	28,294	159,562	896	765	668	814
1924–25	2,251,544	494,857	30,573	158,742	852	850	722	810
1925–26	2,347,209	538,795	32,718	174,019	850	926	773	888
1926–27	2,400,649	569,904	36,869	221,048	908	979	871	1,131
1927–28	2,612,101	577,027	41,719	218,058	988	992	985	1,113
1928–29	2,548,830	590,304	41,634	204,378	972	1,014	983	1,043
1929–30	2,643,231	581,955	42,353	196,000	1,000	1,000	1,000	1,000
1930–31 [3]		[4]385,235						
1931–32 [3]		[4]311,984						
Quarterly [5] [6]								
1932:								
Third quarter	589,785	84,252	8,725	43,619	1,308	777	922	1,043
Fourth quarter	589,721	82,508	10,329	45,122	1,308	761	1,092	1,078
1933:								
First quarter	601,479	81,902	8,291	39,414	1,334	756	877	942
Second quarter	616,074	96,275	9,685	49,807	1,366	888	1,024	1,190
Third quarter	562,441	102,994	10,156	52,113	1,247	950	1,074	1,246
Fourth quarter	435,584	97,294	10,543	48,993	966	898	1,115	1,123

[1] Sheep slaughtered for farm consumption on European farms were: 1917–18, 2,390,650; 1920–21, 2,382,287; 1924–25, 1,998,495; and 1929–30, 2,113,682. South African Department of Agriculture and Census Reports.
[2] Cattle slaughtered for farm consumption on European farms were: 1917–18, 43,657; 1920–21, 45,912; 1924–25, 80,954; and 1929–30, 62,601. South African Department of Agriculture and Census Reports.
[3] Returns from 29 abattoirs. Slaughtering of cattle, 1929–30, represents 71 percent of total cattle slaughtered in abattoirs.
[4] Oxen and cows slaughtered.
[5] Returns from 39 abattoirs. Slaughterings for 1929–30 represent the following proportions: Sheep, 68 percent; cattle, 75 percent; calves, 89 percent; and hogs, 83 percent—of all sheep, cattle, calves, and hogs, respectively, slaughtered in abattoirs.
[6] Index numbers based on one-fourth of 1929–30 slaughterings at the same abattoirs.

Union of South Africa, Office of Census and Statistics, Official Yearbook; monthly bulletins, October 1930 to April 1933.

A mapping of the districts officially declared drought stricken in each year 1926–33, inclusive, shows that more of the principal wool areas were drought stricken in June 1933 than at any other time during this period and the drought was still spreading (fig. 17). Several districts in the areas of Orange Free State which are most heavily stocked with sheep were declared drought-stricken in 1933 for the first time within this period. This proved to have a pronounced influence on the quantity and quality of the following wool

clips. The only important sheep areas not declared drought stricken by June 1933 were in the vicinity of Port Elizabeth and the districts extending northeastward from Basutoland. Many of these districts are declared drought stricken every year, but the sheep numbers in those arid districts are of minor importance. Beaufort West and Victoria West districts have been the core of a drought-stricken area in each of the 8 years studied. In 1926 the drought belt extended north and south through these districts, in 1927 and 1928 in a large circle around these districts, in 1929 west and south, in 1930 and 1931 north and south, and in 1932 and 1933 both westward and eastward. Droughts affected the important wool areas south of Basutoland slightly in 1926, severely in 1927 and 1928, slightly in 1929, and severely in 1932–33. The Orange Free State, excepting for the more western districts, has been practically free from drought except for 1932–33. The Natal sheep areas have been free from drought except in 1926–27 and 1931–32. Natal was only slightly affected by the 1933 drought. Southern Transvaal and northern Free State were drought stricken in 1933 for the first time within this 8-year period except for the 3 or 4 districts which were affected in 1926–27. Considering the Union as a whole, drought was unusually severe in 1927 and 1933 and very moderate in 1930.

TABLE 10.—*Sheep and goats: Losses in the Union of South Africa, 1922–23 to 1929–30*

Year ended Aug. 31	Died from disease, drought, and exposure				Missing or killed by vermin, Owned by Europeans
	Owned by Europeans	Native-owned		Total	
		On farms occupied by Europeans	On reserves, etc.		
	Number	*Number*	*Number*	*Number*	*Number*
1922–23	5,297,080	(1)	792,644	6,090,324	[2] 855,112
1923–24	3,328,002	(1)	718,978	4,046,980	[2] 768,303
1924–25	3,416,916	(1)	803,449	4,220,365	480,515
1925–26 [3]	2,020,401	39,053	307,819	2,367,333	[2] 453,519
1926–27	3,606,927	93,103	500,197	4,200,227	514,577
1927–28	3,997,322	114,581	786,963	4,898,866	515,058
1928–29	2,667,466	95,429	562,146	3,325,041	437,203
1929–30	3,225,456	122,307	756,343	4,104,106	471,347

[1] European farms include particulars of these native losses.
[2] Includes number stolen.
[3] Sheep only.

Agricultural census reports.

After the map shown in figure 17 was prepared, on May 5, 1933, the drought-stricken area extended northward to include Barkly West and southward to include Beaufort West, Middleburg Cape, and a part of Willowmore district.

In several areas of the Union the numbers of sheep are limited by the prevalence of the disease called heartwater which is carried by the bont tick. It is customary in these areas to graze the lands with cattle and nonwooled sheep, dipping them regularly for a few

years until the lands have been freed of all ticks. It has been generally held that Merino sheep could not be dipped at 7-day intervals over a period of 12 months and that the introduction of Merino sheep must be postponed until the lands are tick-free. Recent experiments at the Bathurst Experiment Station, between Port Elizabeth and East London, however, seem to show that Merino sheep can be dipped weekly in arsenite of soda over a period of 12 months without suffering harmful effects, although the fleece loses in attractiveness and appearance and depreciates slightly in value. The fleece was not affected as regards greasy weight, indicating that the dipping

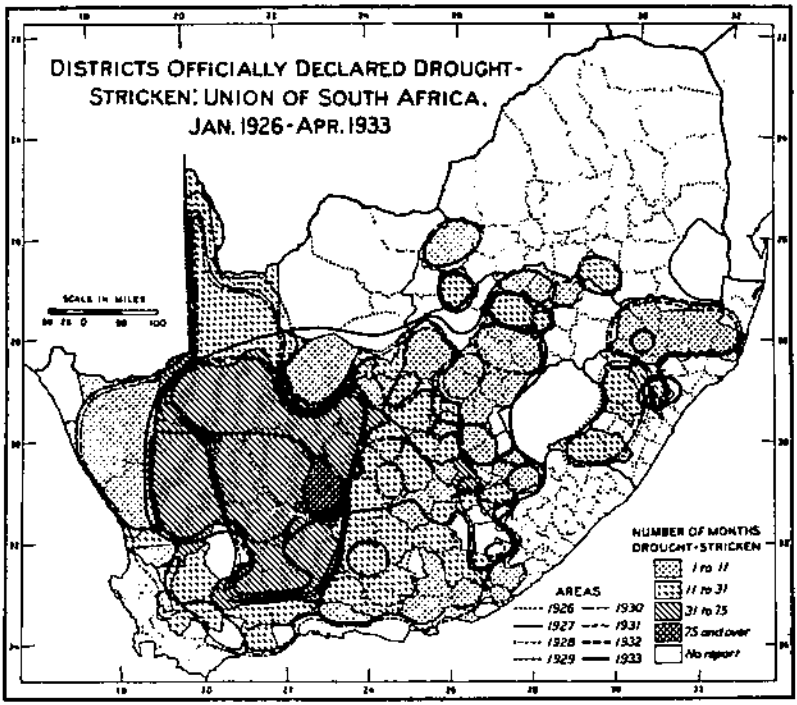


FIGURE 17.—The western karoo is drought-stricken nearly every year. Occasionally the drought extends eastward into the principal wool-producing areas, as in 1932 and 1933.

process was not instrumental in washing out and removing the impurities from the fleece, but rather served to distribute them along the entire length of the staple. This was probably the cause of the unattractive appearance. The wool from arsenite-dipped sheep had slightly less tensile strength. The English firm that scoured and combed the wools reported that the wool from the undipped sheep in the experiment was made into tops worth 2d. (4 cents) per pound (approximately 8 percent) more than the wool from the dipped sheep. This is approximately equivalent to a difference of 1d. (2 cents) per pound in the grease for 50-percent-yielding wool. Those who conducted the experiment conclude that the loss in value of the wool, due to dipping, is not sufficiently serious to justify the con-

tinuation of the practice of using cattle and nonwooled sheep for a preliminary period of years before introducing Merinos. But the relatively higher prices now obtained for beef and mutton will probably prevent widespread response among farmers to these findings.

The Veld Research Station at Fauresmith in the western part of Orange Free State, where rainfall is about 13 inches per year, is studying different kinds of karoo bushes and is growing seeds for multiplication and distribution by the agricultural schools. By the sowing of karoo-bush seeds of the proved varieties on bare spots or where inferior kinds predominate, the important karoo district which now carries 10 to 30 sheep per 100 acres might be made able to carry additional numbers or at least the evil effects of overgrazing might be remedied. The best farms in Fauresmith district carry 50 sheep per 100 acres, but at the Fauresmith Veld Reserve, under controlled grazing, the best kinds of bushes have carried over 100 sheep per 100 acres. Some farmers are also beginning to grow salt bush, spineless cactus, and other drought-resistant fodder crops. Some are providing additional drinking places so they can further subdivide their farms into camps for better controlled grazing. In some cases carrying capacity will be moderately increased.

Past relationships between wool production and numbers of sheep, slaughterings, deaths, rainfall, and wool exports are summarized in table 11.

TREND OF PRODUCTION IN ADJOINING AREAS

The wool industry of the Union cannot be separated accurately from that of the adjoining territories because the wool is sold and exported together, but it is known that exports from these territories are not a large part of the total exports. In Basutoland the number of sheep in each of the 6 years 1928 to 1933 was 2,100,000, 2,149,000, 2,400,000, 2,829,000, 1,949,000, and 1,885,000, respectively. The amount of wool shipped from Basutoland to the markets in the Union in each of the years 1930 to 1932 was 9,700,000, 9,325,000, and 14,525,000 pounds, respectively. It may be noted that traders' returns for 1932 show only 11,832,000 pounds but these returns may not cover the precise year covered by the official returns. The production of wool in Basutoland is somewhat larger than these figures would indicate because in 1931 there were exported 11,287 sheep and goats and 119,619 pounds of sheepskins. In the following year the corresponding figures were 7,066 and 43,958, respectively. Production in Basutoland is carried on exclusively by natives and is somewhat primitive. However, the Basutoland administration has authorized the employment of additional demonstrators to help the natives in the selection of their breeding sheep, their shearing methods, and the classification of their wool.

Swaziland is also chiefly native territory. It is commonly used as grazing land during the winter months for sheep brought from the Union but not sheared in Swaziland. During the 5 years 1928 to 1932 exports of wool from Swaziland were 10,000, 4,000, 27,000, 72,000, and 30,000 pounds, respectively.

Bechuanaland is too dry and too far north for wool production and its exports are insignificant.

TABLE 11.—*Wool: Production, receipts, and exports in relation to sheep numbers, slaughtering and deaths, and to rainfall, Union of South Africa, 1918 to 1934*

Year	Wooled sheep on hand [1]	Sheep, lambs, and goats		Merino sheepskins exported [4]	Wool			Rainfall average, 10 stations [7]
		Slaughtered in abattoirs [1] [2]	Died [3]		Production [5] [6]	Received at ports [2]	Exported, grease basis [2] [4] [6]	
	Thousands	*Thousands*	*Thousands*	*Thousands*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Inches*
1918	25,059				166,610		[8] 141,562	29.83
1919	26,009	1,940					[8] 209,806	18.59
1920	24,764	2,089			176,928		[8] 202,743	25.66
1921	27,757	2,016			182,145		[8] 133,124	27.80
1922	26,091	2,445			187,671		[8] 305,594	23.71
1923	25,824	2,371	6,945		183,872		180,993	22.97
1924	27,084	2,369	4,755	[9] 4,844	198,139		184,479	26.10
1925	32,153	2,252	4,701	[9] 3,262	210,338		175,718	30.71
1926	35,378	2,247	[10] 2,821	2,615	225,015		235,081	22.65
1927	36,114	2,401	4,805	5,025	260,107		249,159	22.24
1928	38,351	2,612	5,414	5,067	290,678		273,128	22.53
1929	40,463	2,569	3,762	4,841	310,885		283,004	30.27
1930	[11] 44,021	2,643	4,575	5,313	303,753		307,212	23.04
1931	[12] 46,300	[12] 2,900	[12] 2,332	3,795	305,000	293,202	293,264	26.01
1932	[12] 45,000	[12] 3,160	[12] 2,817	3,469	306,000	[13] 309,000	299,460	20.72
1933	[12] 42,000	[12] 3,350	[12] 6,000	4,081	316,305	[14] 319,305	337,067	20.48
1934 (preliminary)	[13] 39,000	[13] 2,700	[13] 6,000	3,500	273,917	274,767	245,952	

[1] From Union of South Africa, Official Yearbook, (*17, Yearbooks 12: 337; 15: 581–7*).
[2] Year ended June 30.
[3] From census reports year ended Aug. 31, excludes lambs, includes number stolen.
[4] From monthly issues of South African Crops and Markets.
[5] Includes production in Basutoland, Swaziland, and Bechuanaland Protectorate. These countries, chiefly Basutoland, produced about 10,000,000 pounds in 1929–30. Production 1919–20 to 1928–29 calculated by increasing the census estimate of production in the Union by 34 percent, the average excess of exports for that period; Official Yearbook 13: 354. The 1929–30 estimate was obtained by adjusting exports, grease wool equivalent, by the difference in carry-over at the ports. The estimates of 1930–31 and 1931–32 are approximated from wool receipts at the ports. The 1932–33 estimate is that of the South African Department of Agriculture, lowered by 3,000,000 pounds to reconcile with receipts of wool held up-country in the 2 preceding years. The 1933–34 estimate is that of the South African Department of Agriculture.
[6] Only about 1,000,000 pounds per year are not exported. Not including wool exported on skins, from 20,000,000 to 24,000,000 pounds per year during the 3 seasons 1930–31 to 1932–33. Very little is pulled.
[7] Meteorological Office.
[8] Offices of Customs and Excise.
[9] South African Department of Agriculture.
[10] Sheep only.
[11] Agricultural census enumerations were discontinued after 1930.
[12] Estimates by American Agricultural Attaché.
[13] South African Department of Agriculture estimates, year ended June 30, excludes lambs, includes number stolen.
[14] Including about 3,000,000 pounds calculated receipts not by rail, considering exports and carry-over (grease basis).

Wool production in South-West Africa is also unimportant. The climate is unfavorable for the production of wool. Most of the sheep are either of the nonwooled type grown for mutton purposes or Karakul, raised for lamb skins, and the tendency is definitely in those directions rather than toward wool production. In 1931 there were 269,000 Merino sheep and 406,000 Karakul sheep from which 97,000 pelts were exported.

In Southern Rhodesia the climate is too warm and the thorny bush growth is unsuitable for the successful production of wool, except along the mountainous and well-grassed eastern border. Elsewhere the sheep are either unimproved native sheep or Blackhead Persians. On the eastern border Merino sheep, especially rams, have been introduced during recent years, and the native nonwooled sheep

have been bred up to satisfactory wool production. In 1932 there were about 20,000 Merino sheep around Chipinga and Melsetter, and the number was rapidly increasing. The district can support between 200,000 and 300,000 sheep. The wool from the sixth generation of improved sheep grades 60 to 64 percent clean scoured weight. Rainfall is heavy (50 to 60 inches per year), and the sheep cannot be bred and selected for density of wool. Southern Rhodesia imports annually about 25,000 to 30,000 sheep for mutton, and the eastern border looks with favor upon crossbred Merino-Corriedale or Merino-Romney Marsh to supply this demand. If this development takes place, about 2,000,000 to 3,000,000 pounds of wool of 60's quality will be exported annually through Beira. Conditions are exceptionally favorable on the eastern border. The carrying capacity of the grass is 75 to 200 sheep per 100 acres, in addition to 4 or 5 cattle. Native labor costs about 15 shillings per month, including rations of corn meal and meat, the latter often shot on the farm. Land is worth about 15 shillings per acre. Lambing occurs during April and May, at the end of the summer rains. Shearing is done during September and October, before the heavy summer rains begin.

The number of sheep in Southern Rhodesia is gradually increasing, but will never be large. Between 1928 and 1930 the number of European-owned sheep increased from 80,000 to 91,000. Of the latter, 20,000 were classed as Merinos. The others were nonwooled, either native sheep or Blackhead Persian. Between 1928 and 1930 the number of native-owned sheep decreased from 280,000 to 269,000. None of these sheep were classed as Merinos.

Rhodesian wool was formerly shipped to Durban for sale, but in recent years it has been consigned direct to London. In 1932–33 Rhodesian wool sold at the London auctions at prices ranging from 8 to 9¼ pence (16 to 19 cents at par) per pound. These prices compared favorably with prices paid for Australian wool. The high clean content is probably a factor contributing to the favorable price.

CORRELATION ANALYSIS OF CHANGES IN SHEEP NUMBERS

The number of sheep in the Union seems to be definitely limited by the amount of rainfall (fig. 18). Among the 45 karoo-bush districts, where the normal rainfall varies from 4 to 22 inches, the number of sheep, lambs, and goats per 100 farm acres, excluding those on native reserves, varied in 1930 from 6 to 36 head. The number of sheep increased from one district to another at an average rate of 1.19 head for every additional inch of normal rainfall.[4] Among 30 grass-covered districts in the northern part of Orange Free State, where the normal rainfall varied from 16 to 36 inches, the number of sheep, lambs, and goats per 100 farm acres varied in 1930 from 18 to 56, while the number of cattle varied from 2 to 14. It is estimated that sheep increased from one district to another at an average rate of 1.66 head for every additional inch of normal rainfall, consideration being given to the influence of the number of cattle (fig. 19), which reduces

[4] $Y=2.8+1.19\ X$. Standard error of estimate, corrected for number of observations, 4.5; coefficient of correlation, corrected, +.76.

the number of sheep below what it would otherwise be at the average rate of 1.36 head for every additional head of cattle.[5] The plotted evidence indicates that in the districts having 16 to 26 inches of normal rainfall the number of sheep increases 2.2 for every additional inch while between 26 and 36 inches the average increase is only 0.6 head per inch of rainfall. Similarly, among 16 adjoining districts of southern Transvaal the number of sheep per 100 farm acres varied from 8 to 50 while cattle numbers varied from 3 to 11. Sheep numbers increased from one district to another at an average rate of 1.48 sheep for every additional inch of normal rainfall with very little correction for the number of cattle.[6] Among the 38 districts of

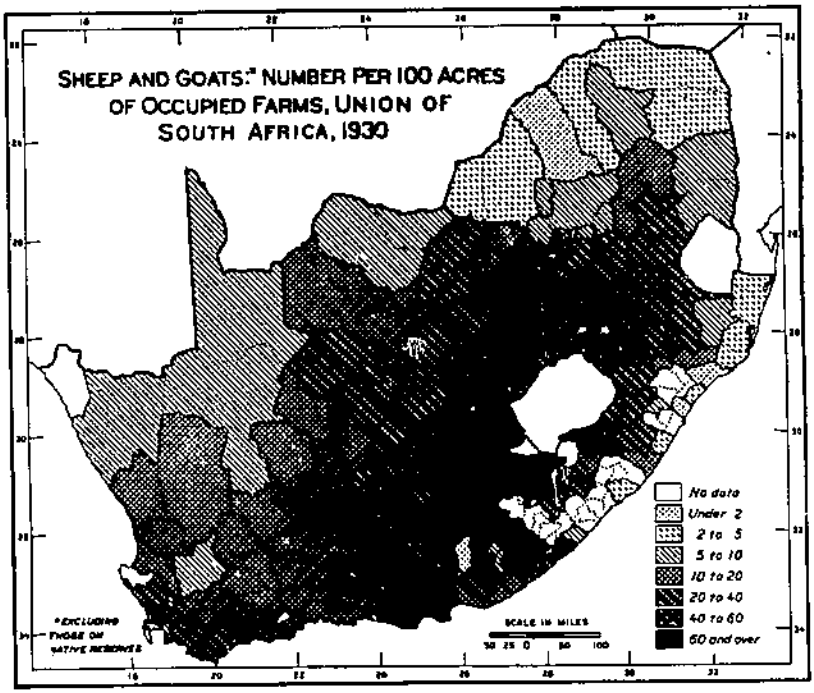


FIGURE 18.—The number of sheep (including a few goats) per 100 farm acres ranges from 8 to 28 in the dry western Karoo, where almost no cattle occur; from 1 to 10 in the cattle districts of northern Transvaal; and from 40 to 70 in the principal sheep and cattle districts around Basutoland.

southern Orange Free State and eastern Cape Province the number of sheep is not materially reduced by larger numbers of cattle where the rainfall is the same.[7]

Annual variations in rainfall have a significant effect upon increases and decreases in the number of sheep and goats. The percentage changes in the number of sheep and goats were correlated

[5] $Y=9.90+1.66$ (rainfall) -1.36 (cattle); standard error of estimate, corrected for number of observations, 8.5; coefficient of multiple correlation, corrected, 0.55.

[6] $Y=-16.13+1.485$ (rainfall) $+0.226$ (cattle); standard error of estimate, corrected for number of observations, 8.3; coefficient of multiple correlation, corrected, 0.77.

[7] $Y=46.2-.6$ (rainfall) $+7.6$ (cattle); standard error of estimate, corrected, 9.7; coefficient of multiple correlation, corrected, 0.80.

with rainfall of the preceding calendar year, with the average price of wool during the preceding year ended June 30, and with concurrent percentage changes in cattle numbers (fig. 20). The number of sheep and goats decreased between 1918 and 1930 whenever the rainfall at 10 selected stations averaged less than 21 inches during the previous calendar year, while increases occurred at a diminished rate as the average rainfall increased from 21 to 30 inches. Decreases occurred when wool prices during the preceding season were below 14 pence (28 cents at par) per pound and increases in sheep numbers were associated with prices from 14 pence to 21 pence (43 cents at par). Decreases occurred when the number of cattle increased simul-

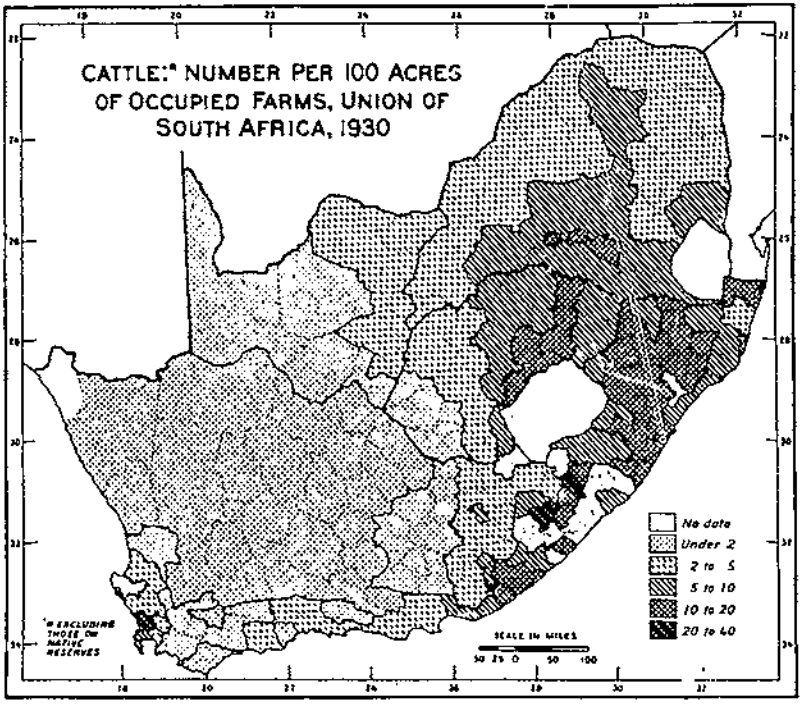


FIGURE 19.—Cattle compete for the use of grazing lands except in dry western parts of Cape Province. They displace sheep in northern Transvaal; cattle and sheep occur together in the districts around Basutoland, where the number of cattle per 100 farm acres commonly ranges from 3 to 6 in eastern Cape Province and from 7 to 12 north and east of Basutoland.

taneously more than 3 percent, but otherwise the number of sheep increased slightly. Percentage changes in the number of sheep and goats varied from a decrease of 8.77 percent to an increase of 10.59 percent, a total spread of over 19 percent. The final residuals, after allowing for rainfall, wool prices, and percentage changes in cattle numbers, were less than 1 percent in all years, except in 1924 and 1927 (4 and 4½ percent). The estimated decrease in the number of sheep and goats since 1930 is attributable in the first instance to low wool prices and, in 1933, to a serious drought. The number of sheep

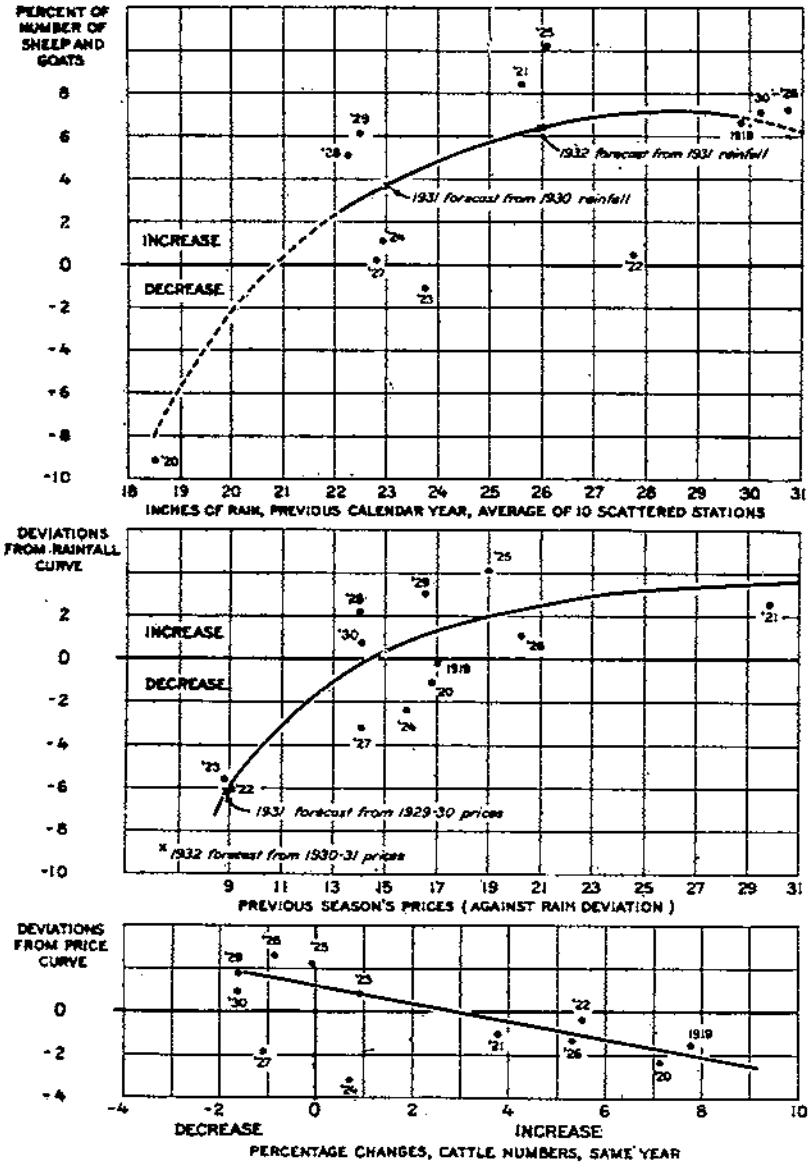


FIGURE 20.—EFFECT OF RAINFALL AND WOOL PRICES ON TOTAL SHEEP AND GOAT NUMBERS, EXCLUDING NATIVE RESERVES, UNION OF SOUTH AFRICA.

The number of sheep is increased by rainfall of 21 to 30 inches, by wool prices of 15 pence per pound or more, and by decreases in the number of cattle. A forecast is possible from these curves.

and goats since 1930 can be approximated by reference to figure 20, when rainfall and price data are available. However, it is probable that the effect of rainfall on the percentage change in the number of sheep from year to year will depend to some extent on the level of sheep numbers.

METHODS OF PRODUCTION

About 60 percent of the ewes are bred around the month of December for autumn lambing around the month of May. Autumn-born lambs are better able to resist internal parasites during the spring months and usually grow into larger and stronger sheep than spring-born lambs. However, in the colder areas spring lambing is necessary. In the Karoo area of Cape Province 70 percent of the lambs are born during the autumn months, March to June, and 30 percent during the spring months September to November. In the contiguous area of western Transvaal 60 percent are born from March to May and 40 percent during September and October. In eastern Transvaal and eastern Cape Province only 25 percent are born during March to May and 75 percent during September and October. In Natal the

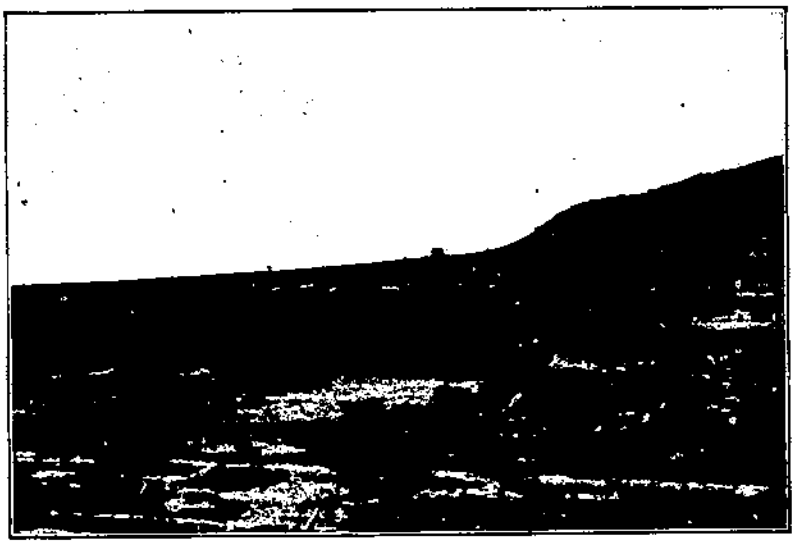


FIGURE 21.—Typical sheep-grazing country, northeastern Orange Free State. These Merinos had not yet been shorn on December 18.

lambing season continues through all but the summer months; 45 percent are born from March to May, 25 percent from June to August, and 30 percent from September to October. The same is true of the important Orange Free State Province, where the percentage of the lamb crop born each month, from March to November, is 4, 9, 19, 17, 9, 16, 16, 6, and 4, respectively. In the unimportant western Cape Province (in the winter-rainfall area), winter lambing is the rule. Lambing begins a few weeks after the first rains in May (10 percent of the lambs), and most of the lambs (85 percent), are dropped before the heavy rains of July and August, and only 5 percent of the lambs are born during the spring months September and October.

Spring lambing is practiced in the grass-veld areas in the eastern parts, where rainfall is high and winters are cold. There are districts in this area, such as Barkly East, where 90 percent of the lambs are born in the spring. Autumn lambing is the rule in the

dry western areas, where the success of spring lambing depends on the uncertain spring rainfall.

Blackhead Persian sheep occur chiefly in the drier western districts and lamb usually at the same time as Merinos, but if good spring rains fall, these and other fat-tailed sheep will often produce both autumn and spring crops in the same year, or at least three lamb crops in 2 years.

Wool is shorn to a certain extent in every month of the year in southern Africa, but the spring shearing, September to December, represents the largest part of the annual clip. In Orange Free State

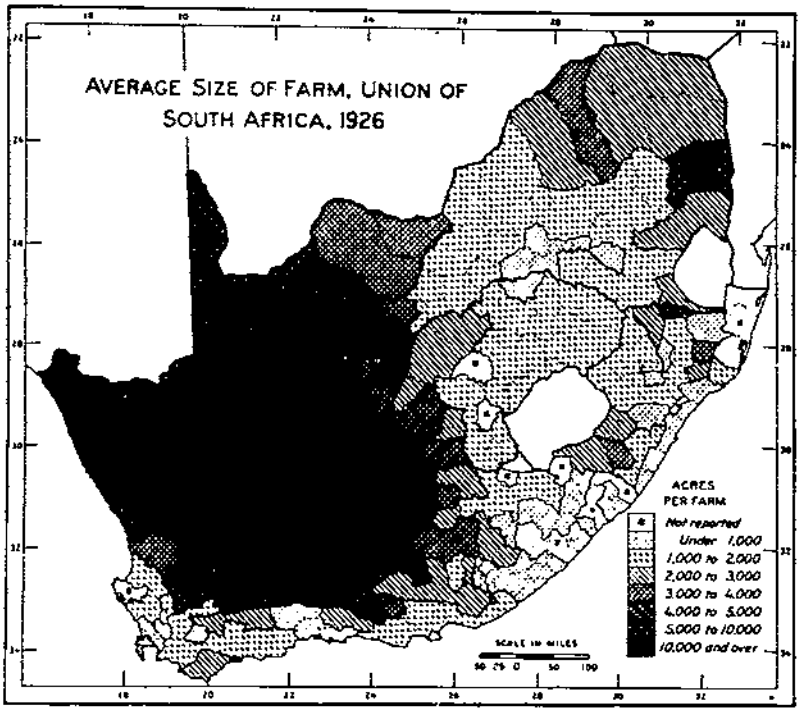


FIGURE 22.—In the dry areas of western Cape Province farms average well above 5,000 acres in size; in the principal sheep and cattle areas they average between 1,000 and 2,000 acres. Farms smaller than 1,000 acres rarely occur except near cities and along the coastal sugar belt.

it is customary to delay shearing until December or January, partly in order to allow early summer rains partially to clean the dust-laden fleeces.

During March, April, and May many wool growers shear short wools of 6 and 8 months' growth. This is especially common in the areas troubled with grass seeds, which work their way through the wool and through the skin of the sheep, and where the blowfly is a serious pest, and in the native territories. The practice varies with the variations in the margins between long-wool and short-wool prices and the grower's judgment as to the future price of wool. These variations cause corresponding variations in the total annual clip because in a year when short shearing increases, the clip repre-

sents in some cases 1½ year's growth of wool. This was true in 1931–32.

April and May are also the months when most of the lamb's wool is sheared and marketed. In those months 65 to 70 percent of the lambs are a year old.

The claim that the Karoo sheep areas are overstocked is borne out by experiments at Grootfontein (near Middleburg, Cape Province), where 6,500 sheep were formerly carried on the farm of 25,000 acres, of which all but 200 acres of irrigated land is sheep-grazing land consisting of mixed karoo bush and short grass. The number of

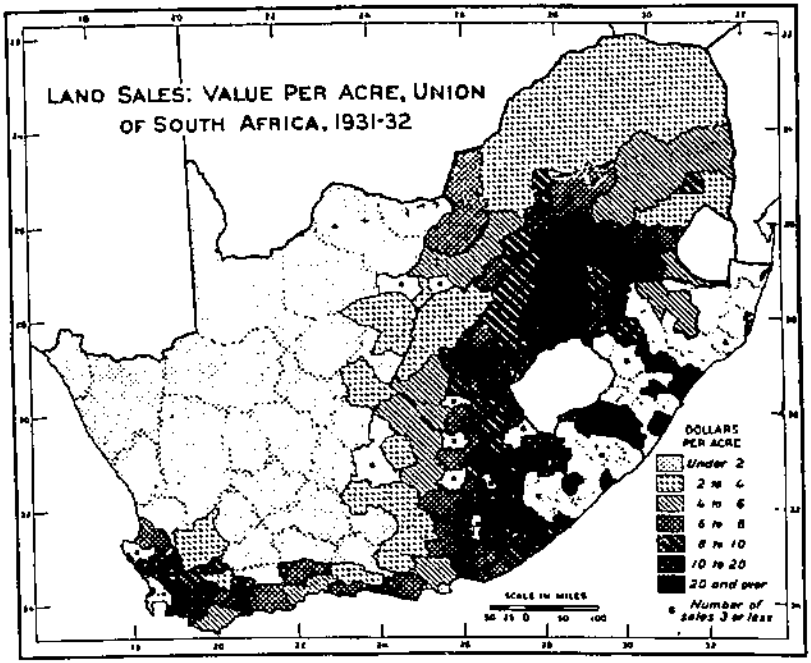


FIGURE 23.—Average values exceed $10 per acre only around Capetown and in a broad belt around Basutoland.

sheep has now been reduced to 4,500 head consisting of 2,000 ewes, 1,000 hamels (wethers), and 1,500 lambs. The practice here is to lamb during March, April, and May and to sell the surplus sheep either after lambing or after the shearing which occurs 6 months later. The wethers are usually sold at the age of 3 years or younger. Experiments are proving that the death losses during years of drought can be greatly reduced by growing reserve fields of spineless cactus and salt bush. One lot of sheep was fed 10 to 12 ounces of alfalfa hay per head per day while consuming 10 to 20 pounds (average 16 pounds) of pulped cactus per day, eaten at will. These sheep had received no water for 12 months and had gained in condition. A second lot of sheep had also gained in condition during the 12 months without any water whatever on a ration of 3 pounds of salt bush and about 16 pounds of pulped cactus per day. A third lot, fed unpulped cactus leaves, would consume only 10 to

12 pounds per day and compared unfavorably in condition with the other two lots. Various kinds of salt bush are valuable for sheep feed, but the one used here is the tall bushy-growing species called old man salt bush (*Atriplex nummularia*).

At Grootfontein, lamb crops of 70 to 90 percent are obtained when counted at the age of 1 month. Death losses, excluding those of new-born lambs, average 3½ percent among the sheep of all ages. Most of the deaths occur among old ewes in poor condition during the periods of cold rains following drought. At Grootfontein, dogs and theft account for considerable losses. Jackal losses have been eliminated by proper fencing.

A typical wool producer in the Karoo district runs about 2,000 sheep on 4,000 acres (fig. 22). The average production of wool from sheep and lambs on European-owned farms during the 12 months ended August 31, 1929, was 6.7 pounds. Assuming an average production of 7 pounds, 2,000 sheep would produce 14,000 pounds of wool which, at 1932 prices, would bring only about $1,400. The sale of old ewes, surplus lambs, and the skins of dead and slaughtered sheep would bring about $500 more. Thus the gross income was only about $1,900, from which must be paid the following: wages of the white bywoner or working foreman, $300; two native laborers, $200; shearing at 2 cents per sheep, $40; freight on wool and skins, approximately $150; salt, fencing, windmill repairs, etc., $100; interest on 50 percent of the value of the land ($5 to $10 per acre) $200 (fig. 23). The balance of approximately $900 was available for the food, clothing, housing, and education of the farmer and his family.

Those farmers who were more heavily in debt or whose wool did not sell for an average of 10 cents per pound were in a position even worse than that indicated by the foregoing figures. Since wool has been selling for many years at prices 2 or 3 times as high as those obtainable in 1932, it is apparent that producers were required to exercise most rigid economy from 1930 to 1933.

QUALITY CHARACTERISTICS OF SOUTH AFRICAN WOOL

Revised standards for classifying wool clips were compiled by G. J. Schuurman, principal sheep and wool officer for the Union, and were adopted at the annual meeting of the National Wool Growers' Association. The A standard, designed for clips of more than 10 bales, carries with it the right to use the Springbok brand. The B standard, for clips of 10 bales or less, does not. The grade descriptions are shown in table 12.

The actual methods of classing and the quantity of wool falling in each quality class have been determined by analyzing Port Elizabeth auction catalogs of October 5 and 10, November 1, 15, and 29, and December 13, during the long-wool season; also those of May 2, 9, 16, and 22, during the short-wool season of 1932–33 (table 13).

South African wool growers, marketing through the Boere Saamwerk Beperk at Port Elizabeth, usually make about 7 classes of wool if they have 30 bales or more in the consignment. They usually make 4 or 5 classes of 20- to 29-bale consignments and usually only 4 classes of 13- to 19-bale consignments. In no case were more than 13 classes represented in any one consignment. There were a few

TABLE 12.—*Grade descriptions of South African wool*

A STANDARD, FOR MORE THAN 10 BALES

Class	Fineness	Minimum length	Characteristics
		Inches	
Fine super combing (FC)	70 or finer	2	Lightest conditioned, sound, attractive.
Super combing (ESC)	64–70	2¾	Do.
Strong combing of super length (SSC).	60–64	2¾	Do.
First combing (C)	64–70	2	Do. (In all of above classes mushy, tender, and sandy locks must be taken out.)
Second combing (CC)	64–70	1½	Heavier conditioned, sound.
Hoggets (H)		2½	Light conditioned, sound, good quality (from sheep not previously shorn).
Long lambs (LL)		1¾	Most attractive lambs' wool.
Lambs (L)			Shorter and less attractive lambs' wool.
Fine mediums (FM)	70 or finer	1¾	Lightest conditioned, most attractive
Mediums (M)	64–70	1¾	Do.
Shorts (S)			All shorter and less attractive fleeces.
Coarse shorts (XS)	Below 64		All coarse short wool.
Outsortings:			
Combing, bellies, and pieces (CBP).	64 or finer	1¾	Bulkiest and cleanest pieces and broken fleeces.
Bellies and pieces (BP)	do		Shorter and heavier bellies and pieces or short fleeces.
Coarse bellies and pieces (XBP).	Below 64		Sometimes matched with XM.
Backs (BKS)			Earthy, tender, or mushy backs taken from fleeces.
Locks (LOX)			Locks and dried urine-stained wool exclusive of dags.
Coarse wool (XM)	Below 60	2¾	
Tender (TDR)	Below 64	Below 2¾	Low tensile strength. May be classed with backs.
Rams (RA)			
Burry and seedy (BUR)			Classed separately only if not numerous.
Dead wool (DEAD)			Taken from dead animals or skins.

B STANDARD, FOR 10 BALES OR LESS

First fleeces (F)	Lightest conditioned, longest, best Merino quality; sound fleeces.
Second fleeces (FF)	Next-best sound fleeces of Merino quality.
Lambs (L)	All lambs' wool (but not hoggets).
Outsortings:	
Bellies and pieces (BP)	All bellies and pieces of Merino quality.
Coarse bellies and pieces (XBP).	Coarse, hairy, britches; neckfolds and bellies. Sometimes matched with XM.
Backs (BKS)	Very earthy, tender, or mushy backs taken from fleeces.
Locks (LOX)	Locks and urine-stained wool exclusive of dags.

lots of unclassed wool. The methods of classing are not very different for the early-season and late-season wools, although the proportions falling in each class vary.

The classes most frequently made are ESC, C, SSC, LOX, and various combinations of bellies and pieces. Late in the season shorts are most important.

During the long-wool season, the wool according to weight was about 50 percent first fleeces, 12 percent seconds and mediums, 16 percent bellies and pieces, 6 percent hoggets and lambs, 8 percent locks, and (until December) 5 percent short wools. The remaining percentage was chiefly backs, burry, and rams' wool.

During the short-wool season the wool weight cataloged was about 10 percent first fleeces, 23 percent seconds and mediums, 13 percent bellies and pieces, 10 percent hoggets and lambs, 6 percent locks, 30 percent short wools, and 8 percent backs, rams, etc.

TABLE 13.—*Wool: Analysis of classes offered at Port Elizabeth auctions, 1932–33*

Item	Unit	Long-wool season							Short-wool season			
		Oct. 5	Oct. 10	Oct. 24	Nov. 1	Nov. 15	Nov. 29	Dec. 13	May 2	May 9	May 16	May 22
Total consignments studied	Number	39	56	80	74	91	98	40	218	227	170	151
Weight of wool	1,000 pounds	444	533	863	621	805	952	346	560	616	395	466
Percentage in each class:												
First fleeces [1]	Percent	50	50	51	46	43	47	41	10	12	9	16
Second, third, medium, and mixed [2]	do	11	12	10	13	15	14	15	24	19	25	24
Bellies and pieces [3]	do	15	14	17	16	17	17	14	12	12	13	14
Hoggets and lambs [4]	do	6	6	5	6	6	5	7	9	13	8	9
Lox [5]	do	8	7	9	8	8	7	8	5	7	6	7
Short wools [6]	do	5	1	2	6	6	8	12	30	30	33	25
Backs, rams, etc.[7]	do	5	10	6	5	5	2	3	10	7	6	5
Consignments of 30 bales and over	Number	13	18	33	18	32	33	13	6	3	3	12
Classes, minimum-maximum	do	5-11	2-10	4-13	5-12	3-13	3-13	3-11	3-10	3-9	3-9	4-9
Classes, most frequent	do	7	7	9	7 and 8	6	4	7	4	-------	-------	5
Percentage in each class:												
First fleeces [1]	Percent	53	51	49	44	43	54	39	14	13	12	25
Second, third, medium, and mixed [2]	do	14	9	9	14	15	12	14	39	27	26	22
Bellies and pieces [3]	do	15	16	17	18	17	17	14	12	12	17	15
Hoggets and lambs [4]	do	5	3	6	5	6	6	9	7	10	12	9
Lox [5]	do	8	7	10	10	10	6	9	4	8	9	9
Short wools [6]	do	1	2	1	2	3	2	10	8	26	21	14
Backs, rams, etc.[7]	do	4	12	8	7	6	3	5	16	4	3	6
Consignments of 20–29 bales	Number	12	15	20	17	25	32	10	9	14	10	14
Classes, minimum-maximum	do	3-9	1-7	2-8	2-9	3-9	2-8	4-9	3-9	3-6	3-6	3-7
Classes, most frequent	do	4	4 and 6	6	4	7	4	4 and 5	5	5	3-5	4-5
Percentage in each class:												
First fleeces [1]	Percent	47	53	53	57	53	33	41	16	14	3	15
Second, third, medium, and mixed [2]	do	15	18	13	11	12	18	11	35	20	37	26
Bellies and pieces [3]	do	18	10	18	15	18	18	16	16	14	14	16
Hoggets and lambs [4]	do	7	7	6	7	7	6	5	11	5	7	11
Lox [5]	do	9	7	7	4	5	8	6	8	10	8	10
Short wools [6]	do	2	0	2	3	2	14	20	7	25	20	20
Backs, rams, etc.[7]	do	2	5	1	3	3	3	1	7	12	11	2
Consignments of 13–19 bales	Number	14	23	27	39	34	33	17	28	33	19	10
Classes, minimum-maximum	do	2-9	2-8	1-6	1-8	2-7	1-9	1-7	2-8	2-6	3-5	3-5
Classes, most frequent	do	4	4	3	3 and 4	4	4	4	4	4	4	4
Percentage in each class:												
First fleeces [1]	Percent	35	46	55	41	33	41	46	2	12	13	17
Second, third, medium, and mixed [2]	do	13	14	13	14	19	16	21	26	21	17	24
Bellies and pieces [3]	do	14	16	15	15	14	13	12	14	10	14	14

Hoggets and lambs [4]	do	7	7	4	7	7	5	5	7	11	7	4
Lox [5]	do	4	6	5	6	7	7	7	8	9	8	6
Short wools [6]	do	10	1	6	15	10	16	8	23	34	31	27
Backs, rams, etc.[7]	do	7	10	2	2	4	2	1	20	3	10	8
Consignments of 1-12 bales	Number	( )	( )	(8)	(8)	(8)	(8)	(8)	175	177	138	115
Classes, minimum-maximum	do								1-5	1-6	1-6	1-6
Classes, most frequent	do								1	1	1	1
Percentage in each class:												
First fleeces [1]	Percent								10	11	9	11
Second, third, medium, and mixed [2]	do								13	17	23	23
Bellies and pieces [3]	do								9	12	11	12
Hoggets and lambs [4]	do								11	17	9	10
Lox [5]	do								2	4	5	3
Short wools [6]	do								51	31	41	37
Backs, rams, etc.[7]	do								4	8	2	4

[1] Extra super combing, combing, fine combing, super combing, strong combing, strong super combing.
[2] Seconds, thirds, mediums, strong mediums, super mediums, strongs, and mixed.
[3] Bellies, combing bellies, pieces, bellies and pieces, long bellies and pieces, and combing bellies and pieces.
[4] Hoggets, lambs, and long lambs.
[5] Lox, long lox, and lox and pieces.
[6] Shorts, super shorts, and fine shorts.
[7] Backs, rams, burry, tender fleeces, skirting, skins, hamels, ewes, and backs and bellies.
[8] Not studied, represents about one-third of the total bales cataloged.

Boere Saamwerk Beperk catalogs.

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Most of the wool classes are about 64 in fineness and, except during the short-wool season, 2 to 3 inches in length. About 10 percent is 70's quality or finer. (70's wool has 16 or 17 crimps per inch and 60's wool, 10 or 11.) Clean yield varies from 35 to 55 percent of grease-wool weight and averages 43 percent.

The average South African clip is approximately 14 bales per farm. This means that in the clip of average size or less, if it is properly classed, there will be one or more classes of wool made up of two bales or less. These so-called "star lots" are sold in a separate auction room, and it is generally believed that star lots sell for a noticeably lower price, grade for grade, than do the larger lots sold in the main auction room. To avoid having star lots, many farmers make less than the proper number of classes of wool, and irregularity of the wool in each class is the result. Because of the extra expense, the solution to the problem does not seem to be reclassification at the markets. A better solution is interlotting, whereby several growers combine their small quantities of well-classed wool to make up sizable quantities of each class. In carrying this out, several cooperating farmers employ one gang of shearers who pass from one farm to the next. Community ownership of shearing and sorting equipment is also possible. Specialization of work among the laborers and collaboration between the farmers contribute to improved classing. Progress in this direction is impeded by lack of uniformity, uncertainty as to the yield of the different wools, and a subconscious feeling on the part of each grower that his wool is better than his neighbor's. But the National Wool Growers' Association is making notable progress in the adoption of standard classes and classing methods. The adoption of interlotting practices may gradually come about in South Africa as it has in other countries. The result will be higher prices to small producers and lower costs of sorting wool at the mills.

METHODS OF MARKETING

Wool is skirted, classed, and pressed into bales at the shearing sheds. The number of classes into which the wool is sorted may be only 3 or 4 in the case of small producers, or it may be as many as 13 in the case of large producers who have enough wool to make full bales of the minor classes. The bales are stenciled with the designation of the producer, the broker, the class of wool contained, and, if quality regulations have been met, the Springbok brand.

The bales vary in weight, but they average about 335 pounds. Low-yielding dust-laden karoo wools weigh much more per bale than do high-yielding wools from the grass-veld areas. Locks (lox) weigh heaviest of all, about 500 pounds per bale. Seconds, often heavy with dust, average about 350 pounds, and top fleeces 320 pounds or less. Minor classes of wool, insufficient to make a bale, are packed in grain bags holding about one-eighth bale. These bags of wool are consolidated into bales when they reach the coastal markets.

The bales of wool are usually hauled to the railroad by spans of 10 to 16 oxen hauling 15 bales per load. Very little wool, except that produced by natives, is sold at interior points. It is nearly all transported by rail for sale at Capetown, Port Elizabeth, East London, or Durban. A small quantity is marketed at Mossel Bay (fig. 24).

All wool is customarily sent to the ports soon after shearing, but in 1930–31, owing to unfavorable marketing conditions, about 11,000,000 pounds of wool were held up in the country and marketed during the following season.

At the port markets the selling brokers maintain large wool warehouses where the producers' consignments are stored awaiting sale and shipment. The selling brokers prepare auction catalogs of the wool to be offered at each sale, and the buying brokers, prior to the auction, pass from one lot of bales to the next slitting them open enough to withdraw some wool for inspection. The buying broker estimates the probable clean yield of the wool, usually between 40 and 50 percent, and judges of its fineness, length, uniformity, tensile strength, and freedom from objectionable matter such as grass seeds or marking paint, and other quality characteristics. On the basis of

FIGURE 24.—Wool arriving at the railroad, Orange Free State, December 20.

his daily advice as to price limits sent him from his overseas office, he marks in his catalog the limit up to which he is willing to bid at the auction.

There are about 67 wool-selling brokers in the Union of South Africa handling about 1,000,000 bales of wool. The principal ones are producers' cooperative organizations which in the aggregate sell about 40 percent of the annual clip. These are the Boere Saamwerk Beperk, the Farmers' Cooperative Wool and Produce Union, and the Kooperatiewe Wolmaatskappy Beperk. They each have $250,000 to $1,000,000 of assets. The selling brokers at each market are organized into an association for the joint use of facilities and the ready exchange of information.

There are about 75 wool-buying brokers in the Union of South Africa, but most of the wool is bought by 15 or 20 of them, usually representing two or more overseas wool firms. Some are French, some German, some Belgian, and some Japanese, but most of them are English. The buying brokers at each market are also organized into an association.

Most of the wool is sold at auction (table 14) although a certain quantity is sold by private negotiation. At Durban the selling brokers maintain a rule that all wool must first be offered at auction but if the highest bid is below the seller's reserve price the wool is declared unsold and may be sold subsequently by private negotiation. At the other markets, especially at East London, a considerable quantity is sold privately without being offered at auction. A movement is now being agitated to require by legislation the adoption of the Durban plan at all markets. Opponents of the proposal claim that specialty wools, for which the number of bidders is sometimes only one or two cannot be sold advantageously except by private negotiation.

TABLE 14.—*Wool: Quantity offered for sale and percentage sold at auction at all markets in the Union of South Africa, 1931–32 and 1932–33*

Year and week ended	Capetown		Port Elizabeth		East London		Durban	
	Bales offered	Percentage sold [1]	Bales offered	Percentage sold [1]	Bales offered	Percentage sold [1]	Bales offered	Percentage sold [1]
1931-32	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
July 25 to June 3	60,070	65	264,293	50	142,794	46	295,985	77
1932-33								
July 25							330	51
Aug. 1							302	75
Sept. 10	770	97	5,182	88				
Sept. 17	3,528	87	10,830	82				
Sept. 24	4,606	76	10,106	73	2,041	67		
Oct. 1	4,934	82	10,215	69	1,492	70	1,600	79
Oct. 8	4,758	80	7,818	70	1,508	78	760	89
Oct. 15	4,515	89	10,061	74	2,701	81	4,637	88
Oct. 22	4,769	87	12,520	72	4,429	72	3,445	91
Oct. 29	5,521	81	12,065	65	6,870	63	6,570	88
Nov. 5	1,361	83	10,211	75	9,784	72	8,733	90
Nov. 12	6,881	85	12,373	75	13,036	70	11,408	87
Nov. 19	5,280	91	11,727	75	13,447	80	12,384	90
Nov. 26	2,377	73	12,824	62	13,148	71	12,080	82
Dec. 3	1,063	78	10,462	62	12,091	66	11,630	89
Dec. 10	289	54	7,948	56	12,272	59	12,850	83
Dec. 17	453	70	5,822	65	8,102	65	12,225	92
Dec. 24	348	97	2,370	71	3,407	63	10,600	93
Dec. 31								
Jan. 7					4,177	81	5,680	90
Jan. 14	933	86	7,282	75	6,703	74	18,950	93
Jan. 21	934	97	8,396	81	8,346	68	18,490	92
Jan. 28			8,111	72	8,538	66	20,490	92
Feb. 4	291	93	8,450	60	7,185	46	19,800	66
Feb. 11	308	72	9,779	59	5,103	52	17,900	85
Feb. 18	330	88	5,367	68	2,740	59	7,410	77
Feb. 25	272	75	2,673	57	601	61	6,250	91
Mar. 4	531	91	3,868	67	1,170	46	6,200	90
Mar. 11	197	68	2,561	54	830	51	2,270	77
Mar. 18	1,247	85	1,580	60	1,290	50	1,170	91
Mar. 25	1,302	66	2,272	60	830	55	2,500	87
Apr. 1	916	90	2,691	71	1,120	50	1,640	90
Apr. 8	1,154	92	2,737	78	1,820	67	1,700	90
Apr. 15	418	93	2,355	74	1,005	60	1,700	88
Apr. 22	470	95	2,081	71	2,529	63	1,342	87
Apr. 29	513	89	4,701	74	5,073	57	2,480	88
May 6	610	100	5,531	82	3,580	72	1,340	95
May 13	252	95	4,791	83	1,350	69		
May 20	292	100	4,134	80	2,512	71	1,109	95
May 27	172	98	3,250	75				
June 3	710	97	3,017	81				
Total	63,559	81	237,052	71	172,364	62	217,457	87

[1] Many bids are privately accepted after each sale, sometimes at a compromise figure.

[2] Mossel Bay, 4,677 bales offered; 95 percent sold.

Department of Agriculture, Union of South Africa.

At Durban there is one place for auctioning the wool but with separate rooms for main lots and for star lots (lots consisting of only one or two bales). The same is true at East London. At Port Elizabeth and Capetown there are two auction places between which the successive sales are alternated. At the appointed minute in the afternoon the auction begins, each selling broker usually selling his concern's list of lots in the catalog and then yielding the hammer to the next selling broker. Each buying broker has his appointed seat. Bidding is done with almost machine-gun rapidity so that a catalog of 500 lots may be sold within an hour. Unless the highest bid price equals or exceeds the seller's reserve price the lot is declared not sold. It is again offered at a later auction unless it is sold by private negotiation following the auction.

The slitted bales, if sold, are sewed up and compressed for ocean shipment. There is always a moderate quantity of sold wool awaiting shipment in the warehouses during the marketing season, but it is usually exceeded by the number of unsold bales of wool.

During the 1930–31 season the South African Wool Brokers' Association, cooperating with the Wool Council, adopted the policy of rationing the market, that is, limiting the quantities that might be offered for sale in each market each week. The purpose was to avoid temporary periods of glutted markets and demoralized prices. In 1931–32 only Durban rationed the marketings, and even then it was only for a short period. The rationing in 1930–31 also involved minimum prices which selling brokers would accept for the important grades of wool.

A small quantity (5,000 to 10,000 bales) of wool from the Union of South Africa is customarily consigned to London for sale at the London auctions without first being offered at South African auctions. There is a gain in moisture content en route to England, but storage charges, handling charges, and the risks of price decline are higher on direct consignments to England. There is no marked tendency for direct sales in London to increase in volume.

COSTS OF MARKETING

The cost of marketing wool from the Union of South Africa as determined during the 1931–32 season was 7.54 cents per pound from the post-auction pressing to the buyer's warehouse in Bradford, England; but of this, 5.15 cents was for foreign exchange at unusually high rates (table 15). With English and South African exchange rates near par, as in 1933, the cost would be only 2½ cents per pound, of which ocean freight is more than half. The margin between the producer and the Bradford warehouse is slightly more than 2½ cents because of the cost of railage to the ports and the cost of selling. The cooperative-selling agencies never charge producers for storage of wool. Some of the private brokers also give free storage, but others charge 3 pence (6 cents) per bale per month after the first month.

In November 1930 the South African Shipping Board obtained a reduction in ocean freight rates to Europe on wool, mohair, hides, and skins. The South African Conference lines reduced rates on grease wool from three-fourths pence (1½ cents), less 7½ percent to one-half pence (1 cent) per pound. The rate on fleece wool is

1¼ cents per pound, that on scoured wool 1½ cents per pound, and for mohair the rate is the same as for grease wool. Ports to which the foregoing rates apply are London, Southampton, Calais, Dunkirk, Antwerp, Amsterdam, Rotterdam, Blumenthal, Bremen, Dalmenhorst, Hamburg, Wilhelmsburg, Liverpool, Manchester, Glasgow, Hull, Avonmouth, Genoa, and Marseilles. When optional ports of discharge are required, an additional rate of one-sixteenth pence (one-eighth cent) per pound is made. This additional charge is made if the options are entered on bill of lading, whether the option is exercised or not. The charge for reconsigning without previously designating optional destination is one-fourth cent per pound. Notwithstanding the foregoing, optional destinations are permitted without additional charge for the ports of Hamburg, Bremen, Blumenthal, Dalmenhorst, and Wilhelmsburg.

TABLE 15.—*Wool: Cost of Marketing, Union of South Africa, 1931–32* [1]

Item	Unit	Rate per unit	Cost at Bradford	
			Total	Per pound
Marketing and shipping expense to Bradford:		*Dollars*	*Dollars*	*Cents*
Pressing and remarking bales	Bale	1.22	71.78	0.33
Wharfage (gross weight)	100 pounds	.16	36.11	.17
Shipping [2]	800 pounds	1.03	30.66	.14
Lighterage	do	.30	8.52	.04
Agency fee	Bale	.12	7.18	.03
Bills of lading, stamps, and entries			2.43	.01
Marine insurance, 6 percent, and stamps			8.05	.04
Ocean freight	Pound	1.01¼	282.12	1.31
		Percent		
Commission for selling		[3]	67.80	.32
Exchange and stamps on 60-day bill		29¾	1,106.91	5.15
Total			1,621.50	7.54
Cost of wool in South Africa			2,179.16	10.14
Total cost of wool at Bradford			3,800.72	17.68

[1] Actual consignment of 59 bales, 21,495 pounds, although the weight varies between successive charges. Conversions at par of exchange.
[2] 800 pounds = 1 shipping ton.
[3] The South African Conference lines charge one-half pence (1 cent) per pound for grease, wool, mohair, and skins; three-fourths pence for scoured wool. Additional charges apply to optional ports not designated in Europe.
[4] Wool buyers at the ports of the Union of South Africa usually represent 2 or more firms and operate on a buying commission of 1½ percent of the first cost of wool.

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If the wool is consigned to London there is a charge of about 0.7 cent per pound for the consolidated charges of the Port of London Authority. This includes landing, wharfage, housing, 12 weeks' rent from breaking bulk of ship, mending, weighing, sampling, supplying landed weights, certificates of damage and survey, warrants if required, taring, piling, unpiling and housing to show floor and piling lots for show, carding, showing, filling in loose wool, breaking down, reweighing, remending, striking down and repiling to lots for delivery, and delivery to land conveyance.

The margins between London prices and South African prices confirm these cost estimates. In March 1932, when the cost of foreign exchange was about 25 percent, the margin between auction prices at

the two places was 7 to 8 pence, clean-scoured basis, or about 3 to 4 pence (6 to 8 cents), grease basis. Wool tops of comparable grade were about 5 to 9 pence above the clean-scoured price of wool. Expressed on a gold basis for clean content of the wool, buyers in South Africa can pay about 15 or 20 cents less than the Bradford price of tops. It is on this basis that buyers determine their South African prices. It follows that a small percentage change in Bradford prices results in a large percentage price change in South Africa.

PRICES

Owing to the fact that about 99⅔ percent of wool produced in the Union of South Africa is exported, wool growers have felt the full effect of the world depression except as they have been subsidized by the Government. Prices fell steadily during the 1931–32 season. Prices were somewhat improved at the beginning of the 1932–33 season but they declined at the height of the season, December, and remained about as low as in the previous year until almost the end of the season. Expressed in depreciated currency, there was a vertical rise of about 40 percent in South African prices when the Union abandoned the gold standard at the end of 1932. This was of enormous advantage to wool growers, especially since the export subsidy of 1931–33 was not discontinued, but on a gold basis prices remained around 20 cents per pound, clean-scoured basis, during most of the 1932–33 season.

Table 16 shows the spread between prices for the various grades of wool throughout two seasons. The prices are converted to clean-scoured basis on the assumption of 45 percent clean yield. They are expressed in American cents. This conceals the vertical rise of 40 percent (South African currency) which occurred when the Union abandoned the gold standard at the end of 1932 (tables 17 and 18).

TABLE 16.—*Wool: Auction prices per pound, Union of South Africa, clean-scoured basis, by new standard types, season 1931–32 and 1932–33*[1]

Year and week ended	FSC[2]	SSC	FC	C	S	LL	CBP	BP
1931–32	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Sept. 19	26	25		24	16–18		20	
Oct. 3	32	26–30	29	24–28	18–20	22	22	16–18
Nov. 7	30	26–28	28	24–27			23	22
Nov. 14	32	28–29	20	27	14–24		24–26	18–20
Nov. 21	30	26–28	28	25–26	16–20	20	22	18–20
Dec. 5	26	21–22	24	20–21	17–24		18–20	16–18
Dec. 12	25–26	20–22	24	19–21	15–24		18–20	16–18
Dec. 19	24	20–22	22	20–21	16–22	18	18–20	16
Dec. 26	24	21–22	23	20–21	16–22		18–20	16
Jan. 9	24	21–22	22–23	20–21	16–22		18–20	18
Jan. 16	26	23–25	24–25	22–23			20	18
Jan. 30	25	22–23	23	21–22	18		20	17
Feb. 6	24–26	21–23	22–23	20–22			18–20	16–18
Feb. 13	24	21	22	20	19		20	18
Feb. 20	24	21	22	20	18		20	18
Feb. 27	24	21	21–22	20	16		20	16½
Mar. 12	24	21	21	20	15		19	16
Mar. 19	24	21	21	20			17–19	16
Apr. 2	24	21	21	20	17–18			14
Apr. 9	24	21	21	20	17–18			14
Apr. 16	20–22	18–20	19–20	17–18	12–14	14	16	14–17
Apr. 23	21	19	19	18	13		14	12
Apr. 30	20–22	19–20	19–20	18–19	14		14–15	12
May 7	20–22	19–20	19–20	18–19	14		15	13

[1] Converted at prevailing rates of exchange.
[2] Fine super combing, 70's warp.

TABLE 16.—*Wool: Auction prices per pound, Union of South Africa, clean-scoured basis, by new standard types, season 1931–32 and 1932–33*—Contd.

Year and week ended	FSC[1]	ESC	SSC	FC	C	FM	CC	S	LL	L	CBP	BP
1932–33	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Sept. 10	27	26	24	26	24	23	20	17	21	17	23	20
Sept. 17	26	25	23	26	------	------	22	22	------	------	23	20
Sept. 24	------	26	23	------	------	------	------	------	20	------	23	20
Oct. 1	------	24	23	------	23	------	21	------	20	17	21	19
Oct. 8	24	23	22	23	22	21	20	------	19	17	21	19
Oct. 15	23	21–22	21	22	------	20–21	------	------	19–20	17	20	18–19
Oct. 20	22	18–22	18–22	21	21	------	------	------	18	16	19	17
Dec. 3	22	20	20	21	19	------	------	------	18	16	19	17
Jan. 14	23	22	21	22	22	20	20	------	20	17	20	18
Jan. 28	24	22	21	22	21	20	19	19	19	18	19	18
Feb. 4	23	22	20	15	20	------	------	------	19	18	19	18
Feb. 11	23	22	21	21	20	------	------	------	------	------	------	------
Feb. 18	------	22	21	21	20	------	------	------	------	------	------	------
Feb. 25	23	21	21	21	20	------	------	------	18	18	19	16
Mar. 25	------	------	------	21	------	------	------	------	17	------	18	16
Apr. 1	------	------	------	------	------	------	------	15	------	------	------	------
Apr. 8	------	------	------	------	------	------	------	15	------	------	------	------
Apr. 15	------	------	------	------	------	------	------	------	------	------	------	------
Apr. 22	------	------	------	------	------	------	------	15	------	------	------	------
Apr. 29	------	------	------	------	------	------	------	16–17	------	------	------	------

[1] Fine super combing, 70's warp.

TABLE 17.—*Wool: Quantity and value of exports from the Union of South Africa, average 1909–10 to 1913–14, annual 1918–19 to 1933–34*

Year ended June 30	Quantity exported				Export value	Average price per pound of grease wool exported
	Grease wool	Scoured wool	Grease wool equivalent as calculated by—			
			Author	South African Department of Agriculture[2]		
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds sterling*	*Pence*[3]
Average 1909–10 to 1913–14	------	------	------	151,942	4,494	7.1
1918–19	------	------	209,806	203,170	14,278	16.8
1919–20	------	------	202,743	198,186	22,585	29.6
1920–21	------	------	133,124	[4] 130,414	5,230	9.2
1921–22	------	------	305,594	[4] 301,155	11,032	8.8
1922–23	155,656	9,045	180,993	178,268	11,465	15.9
1923–24	162,738	7,761	184,479	182,140	14,110	19.0
1924–25	155,012	7,392	175,718	173,492	14,616	20.5
1925–26	212,972	7,892	235,081	232,702	13,612	14.2
1926–27	231,010	6,479	249,159	247,208	14,396	14.2
1927–28	264,875	6,516	273,127	[5] 271,165	18,477	16.6
1928–29	265,992	6,634	283,004	[5] 282,247	16,408	14.1
1929–30	288,144	7,294	307,212	[5] 306,379	11,298	8.9
1930–31	[6] 209,655	[7] 5,206	283,264	[5] 282,670	7,475	6.4
1931–32	287,643	4,760	299,486	[5] 298,943	5,433	4.4
1932–33	320,193	6,455	337,067	336,331	6,800	4.9
1933–34	228,553	6,656	245,952	245,193	10,918	10.8

[1] Scoured wool converted to grease wool at ratio of 1 to 2.6141 in 1928–29 and thereafter as indicated by wool washery figures; previously 1 to 2.8. Scoured wool includes small quantities of washed wool exported, particularly during the earlier seasons.

[2] Scoured wool converted to grease wool by assuming a yield of 40 percent.

[3] Cents per pound are double the pence per pound, or slightly less when South Africa was off gold standard, 1919–25, and since January 1933.

[4] The quantity of wool exported each season closely approximates the production for that season, except for the seasons 1920–21 and 1921–22; because of abnormal market conditions, a considerable quantity of wool was held over from the 1920–21 season and exported the following season.

[5] The estimated production, adjusted for stocks on hand at the end of the season from 1927–28 to 1931–32, is as follows: 274,600,000 pounds; 264,500,000 pounds; 303,000,000 pounds; 292,400,000 pounds; 304,700,000 pounds respectively.

[6] Average weight per bale 324 pounds.

[7] Average weight per bale 214 pounds—usually coarse and colored wool.

Department of Agriculture, Union of South Africa, unless otherwise stated.

TABLE 18.—*Wool: Declared value per pound, Union of South Africa, 1910–33*

GREASE WOOL

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year [1]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	15	15	15	15	14	14	13	14	15	15	16	15	15
1911	14	14	14	14	14	13	13	12	13	13	14	14	14
1912	14	13	13	13	13	12	12	13	14	15	16	15	14
1913	15	15	14	14	15	15	15	15	16	16	18	16	15
1914	14	15	15	14	16	15	16	16	14	14	15	13	15
1915	11	12	13	14	14	19	13	14	14	15	17	17	14
1916	19	19	18	19	19	21	18	17	22	33	30	31	22
1917	31	31	31	31	28	29	30	34	32	34	41	33	32
1918	41	37	37	34	32	32	34	29	28	40	33	44	33
1919	41	35	34	33	36	36	34	37	36	38	54	70	40
1920	74	72	70	66	67	56	62	48	38	28	21	30	50
1921	18	21	17	14	13	13	14	13	14	16	18	17	16
1922	18	22	20	21	21	21	19	19	25	31	33	32	24
1923	33	33	31	33	32	31	32	34	33	35	38	39	35
1924	40	40	39	40	37	34	31	35	38	40	47	46	42
1925	40	41	41	33	28	26	26	25	27	31	33	30	34
1926	28	27	26	26	25	23	22	23	24	31	30	30	26
1927	29	27	27	27	26	24	25	30	35	34	36	33	31
1928	33	34	34	33	31	30	30	29	32	30	30	30	31
1929	26	26	26	25	26	23	22	20	21	21	22	20	24
1930	18	16	16	14	14	15	14	11	17	16	15	13	15
1931	11	11	13	13	11	12	10			11			12
1932	9			7			8			9			8
1933	11			12			18			22			15

SCOURED WOOL

1910	25	29	30	28	32	30	29	31	30	29	29	28	30
1911	29	28	27	28	28	29	28	29	27	27	26	29	28
1912	29	28	29	29	29	29	29	30	27	32	32	34	29
1913	34	37	37	36	35	40	37	40	39	35	35	34	36
1914	38	37	42	35	42	40	39	36	39	32	31	31	37
1915	31	32	33	35	33	36	37	36	39	37	34	36	35
1916	40	39	44	45	42	45	49	49	51	50	52	44	47
1917	64	60	61	60	68	65	67	77	86	81	81	75	74
1918	75	87	89	86	84	97	91	79	77	99	95	71	89
1919	91	80	76	84	85	92	86	91	87	106	98	124	91
1920	104	140	136	131	119	113	96	88	79	76	62	59	111
1921	50	52	49	41	40	36	42	38	40	40	43	35	43
1922	41	46	45	44	44	48	53	46	59	54	68	66	49
1923	57	65	65	71	70	71	72	69	63	70	82	71	68
1924	87	87	87	88	91	85	87	79	98	93	104	93	87
1925	68	83	97	80	92	74	67	67	56	63	78	59	74
1926	64	54	59	55	54	58	52	53	54	50	55	58	57
1927	58	52	53	58	56	51	59	54	53	59	60	62	57
1928	62	68	67	69	66	67	64	61	68	66	58	59	64
1929	61	52	57	60	59	55	55	51	71	48	45	42	53
1930	39	34	31	39	34	31	30	29	26	26	23	22	31
1931	21	17	23	24	24		23			19			22
1932	18			16			16			17			17
1933	22			26			31			41			29

[1] Weighted average.

Customs reports of weight and value of wool exported. Conversions at par.

SEASONAL MOVEMENT OF WOOL IN THE UNION OF SOUTH AFRICA

The wool-marketing season in the Union of South Africa extends from July 1 to June 30. Little wool is received at the markets between July 1 and September 1, but during the 4 months, September to December, receipts are heavy (fig. 25). Weekly receipts reach the highest level around October 15 at Capetown, November 15 at Port Elizabeth, and a week or two later at East London and Durban. Little wool is received from the middle of December to the middle of January. Then the short-wool season begins and receipts reach

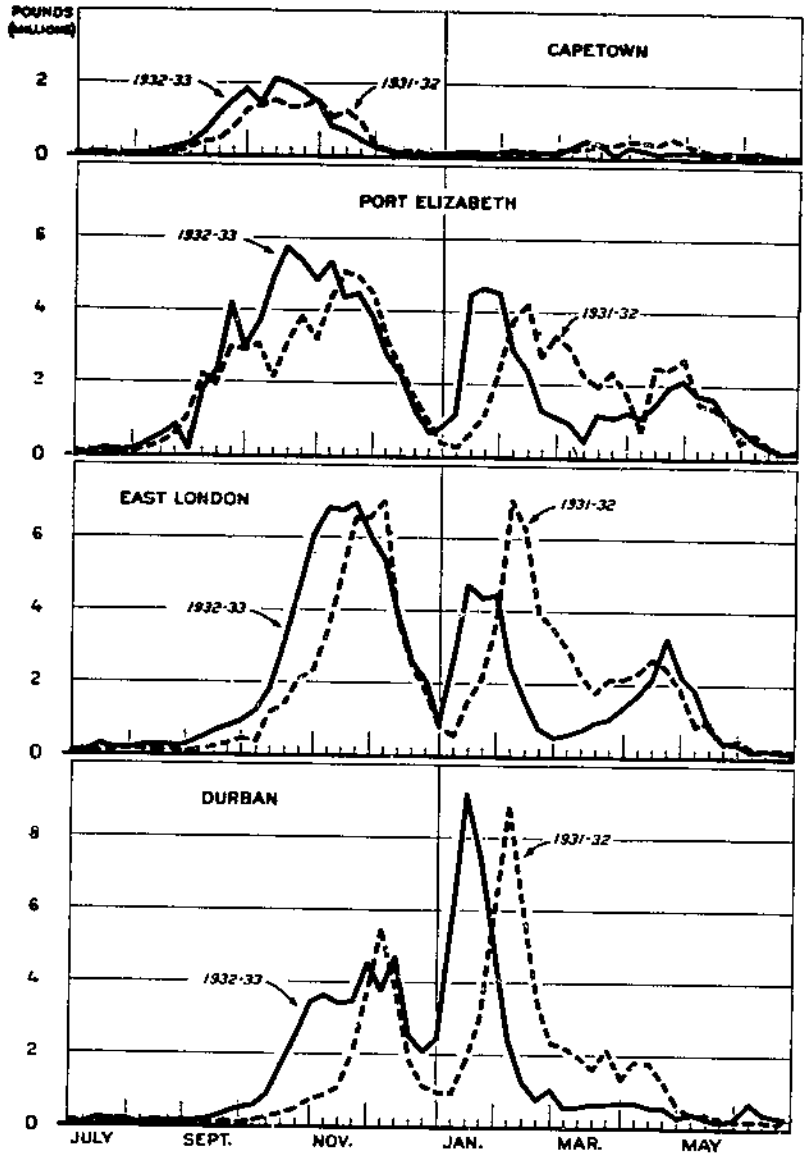

FIGURE 25.—WOOL RECEIPTS, WEEKLY, UNION OF SOUTH AFRICA, 1931-32 AND 1932-33.

Wool is marketed in two distinct seasons, before New Year and after. The season is earliest at Capetown and latest at Durban.

a peak during February and March. A considerable quantity of long wool (12 months' growth) also arrives during this season. By the end of May the weekly receipts are down to a very low level.

The year 1931–32 was abnormal as to the seasonal distribution of receipts because of foreign-exchange uncertainties which affected the price outlook.

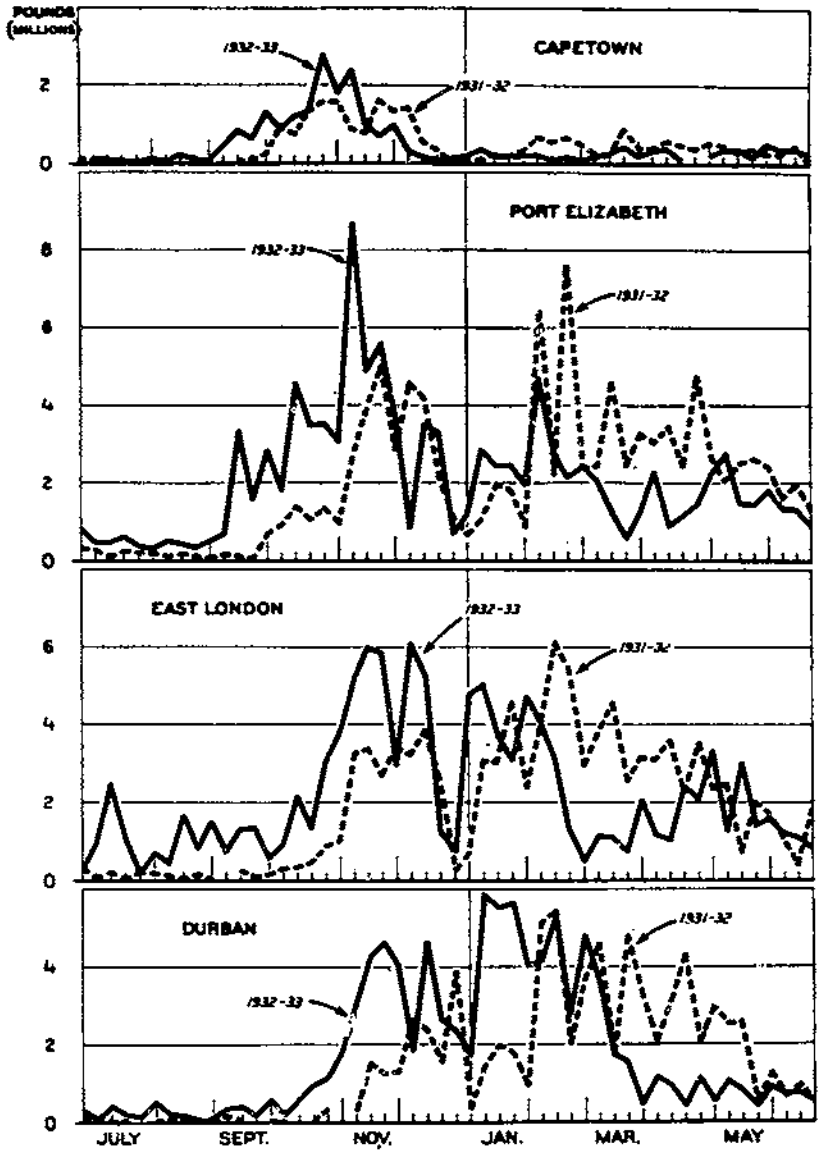

FIGURE 26.—WOOL EXPORTS, WEEKLY, UNION OF SOUTH AFRICA, 1931-32 AND 1932-33.

Wool exports are largest from November to April. The season is earliest at Capetown and latest at Durban.

Wool stocks accumulate during the period September to December or January or, as in 1932, until February. In 1932 over 240,000 bales were at the ports in February. Sales and exports then exceed receipts, and stocks diminish. At the end of June stocks on hand, including sold wool awaiting shipment, are usually down to 25,000 or 50,000 bales, approximately the low level of the year.

Wool exports reach a peak about 1 month later than wool receipts, Capetown earliest and Durban latest (fig. 26). There is a quiet period during early January followed by an important export movement during February, March, and April. This second period is unimportant at Capetown but it is important at the other ports; in 1932 (an unusual season) it was more important than the October to December period.

DESTINATIONS OF WOOL FROM THE UNION OF SOUTH AFRICA

Most of the South African wool is shipped to the continent of Europe—France, Germany, Belgium, and Italy, chiefly (table 19). The United Kingdom receives about one-third as much as the continent of Europe. Until recently, when consignments to France increased, the quantity of wool sent to the United Kingdom from the Union of South Africa exceeded the quantity destined for any other country. The United States has received little wool direct from the Union of South Africa during recent years, but part of the wool shipped to the United Kingdom is reshipped to the United States.

TABLE 19.—*Wool: Exports by country to which exported, Union of South Africa, years ended June 30, 1932–33 and 1933–34*

Country to which exported	Grease wool		Scoured wool	
	1932–33	1933–34	1932–33	1933–34
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United Kingdom	77,160	54,745	2,412	1,080
France	97,710	56,380	436	210
Germany	62,596	51,510	1,693	938
Belgium	39,333	25,855	967	276
Italy	32,895	18,531	326	205
Japan	3,365	5,183	9	25
Spain	2,144	620	----	----
Poland	1,966	4,117	17	----
Sweden	1,892	2,100	----	----
Netherlands	429	776	198	----
Canada	164	150	210	175
United States	572	720	168	375
Other	92	167	44	53
Optional	----	6,709	----	3,259
Total	320,198	228,553	6,450	6,656

South African Department of Agriculture, Division of Economics and Markets.

GOVERNMENTAL ASSISTANCE TO SOUTH AFRICAN WOOL GROWERS

When England abandoned the gold standard in September 1931 the price of wool in the Union of South Africa was adversely affected to a serious degree. The South African Government, to justify its attempt to remain on the gold standard, granted a subsidy of 10 percent on wool exports retroactive to July 1. In January 1932 this was increased, retroactively, to 25 percent. In February 1933 this was changed to a flat 1 penny (2 cents) per pound, and subsidies on wool from Basutoland, Swaziland, and Bechuanaland were discontinued. Total subsidy payments on wool, including anticipations to March 31, 1934, were £3,752,000—more than half of total export subsidy payments.

In August 1930 the Union Government imposed a levy of 1 shilling (24 cents) per bale, of which 1 cent was to cover the official inspector's fee and the remainder was for the creation of a Wool Council and the general improvement of the wool industry. In February 1932 the collection of all but the inspector's fee was suspended. During the period of full collection a sum of $333,000 plus $28,000 of accruals (at par of exchange) was collected. Only a small part of this fund was spent. The nature of the work done is indicated by the list of expenditures, converted at par:

Expenses of deputation to Australian Wool Conference	$7,335
Research work, including scholarships	9,697
Finding further markets	4,155
Wool schools for farmers	646
Native Affairs Department, propaganda work	894
Organization of wool farmers	16,325
Wool association fees	304
Expenses of Wool Council and committees	13,478
Clerical assistance	2,709
Miscellaneous expenses	703

The Union Government has encouraged cooperative organization of farmers, of wool growers among others. The National Woolgrowers' Association in 1933 had 238 locals and a total membership of about 12,000.

A draft bill was prepared under the initiative of the Wool Council for the creation of a National Wool Committee. The proposed legislation was opposed by the South African Wool and Mohair Brokers' Association and by many groups of growers and was not enacted in 1933.

The proposed act provided for the statutory establishment of a National Wool Committee patterned after the Dairy Control Board as specified in the Dairy Industry Control Act. This would give statutory force to the existing Wool Council. The National Wool Committee embracing the Wool Council would have ample representation from the selling trade, whether cooperative or private, but the majority control would rest with producer representatives. The committee would be authorized to take the initiative in any measures aimed at the control of the marketing of the wool clip. The proposed bill provided that the Governor General, on the advice of the National Wool Committee, might make regulations prescribing:

(1) The quantity and description of wool which may be offered at any place or places at any time or during any period which he may determine;

(2) The method or methods under which the sale of wool in the Union shall be conducted and the conditions which shall govern such sale;

(3) (*a*) The conditions under which a wool selling broker may directly or indirectly operate as a buyer or may provide facilities to other persons for the purchase of wool;

(*b*) The conditions under which wool brokers may make or producers accept advances on wool prior to the delivery of such wool;

(*c*) The security to be lodged by a person engaged in the wool-selling trade over and above the amounts specified in the Public Auction and Livestock Act, etc.;

(*d*) The scale of fees which wool brokers may charge producers or wool buyers;

(4) The nature and form of statistical data and information regarding available stocks, market prices paid or ruling as may be deemed necessary from time to time which it shall be compulsory for both sellers and buyers of wool to supply for publication or other special use in the general interests of the industry;

(5) Generally for the proper carrying out of the functions of the National Wool Committee.

The proposed bill made provision for the application of all or any of the provisions to mohair or hides and skins, should the respective interests petition that such application be made.

The legislation was opposed by the South African Wool and Mohair Brokers' Association on several grounds:

(1) It places too much control of the wool trade in the hands of the Minister of Agriculture and this power might be abused.

(2) The majority control of the wool committee is to rest with the producers, with the result that brokers feel they might be held responsible for the adoption of policies which they as a minority group would oppose.

(3) It gives the Government power to require all wool to be offered at auction for sale. A large percentage of the wool shipped from East London, Port Elizabeth, and Capetown is now sold out of hand without first being offered at auction. These out-of-hand sales are deemed necessary by some brokers in the case of specialty wools for which there is a limited number of buyers.

(4) It gives the Government power to determine the quantity of wool that may be sold at any market during any period. The wool trade holds that there is no individual or group of individuals sufficiently informed to be able to use this power safely, and that any accumulation of unsold stocks would exert a persistently depressing influence on wool-price levels.

(5) It enters the Government in the field of wool-marketing control in a way that might lead to even more serious disturbance of wool-marketing organization.

In view of the low prices for wool, the Union Government in September 1931 reduced railage rates on wool 33⅓ percent. Under the reduced rate the cost of railage was 65 cents per 100 pounds on wool shipped from De Aar to Port Elizabeth (339 miles), 75 cents from Bloemfontein to East London (402 miles), 48 cents from Swellendam to Capetown (192 miles), and 67 cents from Bethlehem to Durban (315 miles).

Since 1925 the Union Government has given a 75-percent reduction on railage rates to drought-stricken districts for the purpose of removing livestock to better grazing areas, returning them to the owner's farm, and for the transport of feed. In 1933 the reduction was made 87½ percent.

The 1933–34 budget provides a new form of subsidy to farmers. The Government proposes to pay 1½ percent of the 6 to 8 percent interest charge now being paid on farm mortgages on the condition that mortgage creditors will accept only 5-percent interest for the duration of this subsidy. The farmer's interest rate is thus reduced to 3½ percent.

The Government Land & Agricultural Bank had about £12,000,000 outstanding on mortgages in 1933. The Government then extended to the land bank another £4,000,000 for making additional loans to farmers. Total agricultural credit in the Union is close to £100,000,000.

The funds for subsidizing agriculture come chiefly from gold-mining taxation. Gold mines, chiefly at Johannesburg, supply 50 to 75 percent of the Union's total exports. The gold mines have prospered during the 1931–33 depression and have had to bear a greater share of the cost of aiding agriculture. Land taxes in the Union of South Africa are practically nothing.

MOHAIR

TREND OF PRODUCTION

Mohair production is centered in only three countries—the United States, the Union of South Africa, and Turkey. Total annual production is about 35,000,000 pounds, of which one-half is produced in the United States, one-fourth in South Africa, and one-fourth in Turkey.

A century ago Turkey produced about 1,250,000 pounds of mohair annually. In 1857 Turkish mohair production had more than doubled, and production in the Union of South Africa had made a very small beginning. By 1890 the Union of South Africa was producing over 6,000,000 pounds and had overtaken Turkey. By 1900 South Africa and Turkey were each producing about 12,000,000 pounds, and the United States had entered the picture with about 1,000,000 pounds. Between 1900 and 1912 Turkey continued to produce about 12,000,000 pounds, South Africa stepped up to 23,000,000, and the United States to 4,000,000. During the World War, Turkey dropped below 4,000,000 pounds, and the subsequent increase between 1920 and 1930) scarcely carried production back to 10,000,000 pounds. Since 1912 South Africa has dropped back to about 10,000,000 pounds. On the other hand, production in the United States steadily increased to 19,000,000 pounds in 1931. Total production since 1910 has remained remarkably steady at 30,000,000 to 40,000,00 pounds, except for a short decline during 1916 to 1921, but the production in the Union of South Africa and Turkey has dropped back to about 9,000,000 pounds each, while the United States has become the principal producer.

During 1922–23 the United States imported over 7,000,000 pounds of mohair; about as much as the American production. By 1931–32 mohair imports had dropped to nothing, and a surplus of American production had accumulated, but no American mohair was being exported.

The Union of South Africa's loss of export markets was due partly to the increasing American production and partly to a decline in the European demand for mohair. However, English imports of Turkish mohair have declined much more than imports of South African mohair. A tremendous surplus accumulated in South Africa in 1931 and 1932, so that exports were no indication of production (table 20). Mohair production in South Africa since 1930 is only known approximately. It has apparently decreased as prices have fallen. In 1932 and 1933 many reports were heard of drastic reduction in the numbers of Angora goats.

Angora goats were once numerous in all four of the Provinces. In 1911 Cape Province had 78 percent of the Union's total, Orange Free State 13 percent, Transvaal 6 percent, and Natal 3 percent. In 1930 they were much more concentrated, being 94 percent, 3 percent, 1 percent, and 2 percent, respectively, in the four Provinces.

About 70 percent of the Angora goats of the Union are now concentrated in 10 magisterial districts centering around Jansenville, just west of Port Elizabeth. Elsewhere the number of Angora goats has progressively declined and is still declining (fig. 27). Angora goats are being displaced by Merino sheep, Blackhead Persian (non-

wooled) sheep, and even by common goats. These 10 districts have a very low annual rainfall, but it is fairly well distributed throughout the year, since the districts are located between the summer-rainfall area and the winter-rainfall area.

TABLE 20.—*Angora goats and mohair: Production and exports, Union of South Africa, 1917–18 to 1932–33*

Year ended	Angora goats	Mohair production	Calendar year	Mohair exports		
				Quantity	Total value	Value to United States
	Thousands	*1,000 pounds* [1]		*1,000 pounds*	*Pounds sterling*	*Pounds sterling*
Apr. 30:						
1917–18	[2] 2,731	10,385	1918	19,646	1,641,889	[3] 302,210
1918–20	2,240	8,096	1920	6,290	518,973	22,404
1920–21	2,285	8,440	1921	17,129	583,613	59,156
1921–22	2,272	8,623	1922	25,703	1,12[illegible],470	387,174
1922–23	2,265	9,455	1923	14,088	947,883	121,182
Aug. 31:						
1923–24	2,140	8,009	1924	13,666	1,142,012	150,090
1924–25	2,151	8,051	1925	11,560	836,328	42,731
1925–26	1,841	7,880	1926	11,141	741,715	345,930
1926–27	1,414	5,653	1927	10,681	807,063	61,952
1927–28	1,308	5,268	1928	7,701	724,132	90,152
1928–29	1,578	6,269	1929	10,038	645,032	67,676
1929–30	1,807	7,019	1930	6,874	295,300	25,101
June 30:						
1930–31	1,874	[4] 7,020	1931	5,443	229,001	2,805
1931–32	1,735	[4] 6,443	1932	6,435	95,451	3,524
1932–33	1,563	[4] 10,000	1933	15,743	330,118	42,201

[1] Census enumerations of production are usually slightly low. During the 11 years ended 1928–29 mohair exports exceeded the Union's production by 1,878,000 pounds per year or 31 percent. This cannot all be explained by the inclusion of mohair from Basutoland. Traders' returns for 1932 show only 1,034,000 pounds of mohair exported from Basutoland in that year. Official returns show 1,015,034 pounds of mohair exported from Basutoland in 1932 as against 1,241,743 pounds in 1931.

[2] In 1912 the number was 4,395,000.

[3] Year 1919.

[4] South African Department of Agriculture; 1932–33 represents some old stocks from previous years. Received at ports. Estimated production 1933–34, 8,250,000; 1934–35, 7,500,000.

Union of South Africa, Official Yearbook *(47, no. 18, pp. 556–557, 562, 573)*. Exports include mohair from Basutoland.

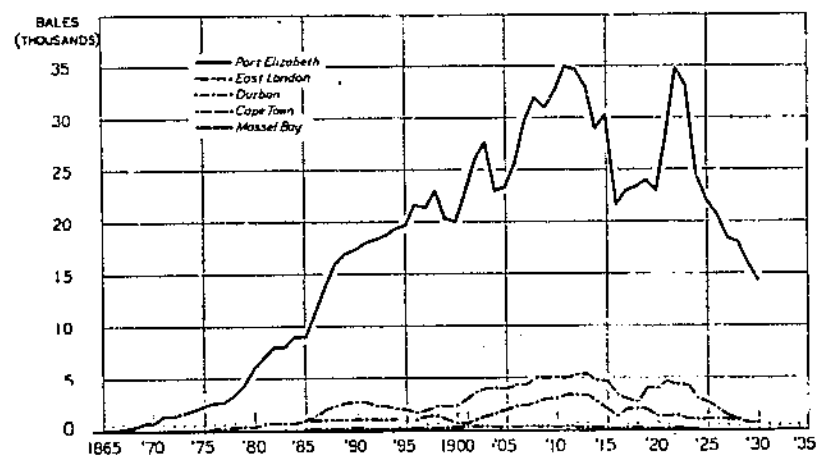

FIGURE 27.—TREND OF MOHAIR EXPORTS BY PORTS, UNION OF SOUTH AFRICA, 1865 TO 1930. (3-YEAR MOVING AVERAGE CENTERED.)

Mohair exports increased rapidly from 1865 to 1912 and then declined erratically. Most of the exports are from Port Elizabeth. Data as reported by the Port Elizabeth Wool and Mohair Buyers' Association.

An analysis of census returns regarding the numbers of Angora goats in the principal mohair-producing districts of the Union for the years 1923 to 1930, inclusive, reveals significant conclusions (table 21).

(1) The decrease between 1923 and 1927 was most pronounced in the western districts of the mohair area.

(2) The increase in numbers between 1928 and 1930 was confined to the center of the area and was not shared proportionately by the border districts on the west or the east.

(3) The number of Angora goats in unimportant districts has not recovered proportionately between 1928 and 1930.

(4) The industry is more than ever concentrated in the districts of Willowmore, Jansenville, and Steytlerville. These three districts in 1930 contained 43 percent of the total for the Union, as compared with 33 percent in 1923. Between 1923 and 1927 Angora numbers dropped precipitously in all districts.

(5) Between 1927 and 1928 increased numbers in the central and western part of the area were more than offset by continued decreases in the eastern districts of the area.

(6) Between 1928 and 1930 the decreases of 1923 to 1928 were more than made up in Willowmore and Uitenhage, and almost made up in Steytlerville, Jansenville, and Somerset East.

(7) Since 1928 Angora numbers have increased in the 10 principal Angora districts at about the same percentage rate as wooled sheep and nonwooled sheep—in the border districts less rapidly and in the central districts more rapidly.

(8) Angora numbers are more sensitive to drought than to price influences.

Mohair is marketed in bales weighing approximately 500 pounds. A small percentage of the mohair arrives at the South African markets in bags weighing about one-eighth as much as a bale of mohair.

There are two clips of mohair each year. Winter hair arrives during August to December; summer hair during April, May, and June. The two seasons blend into one another, and some mohair is received even during the off seasons around January and February and in July. The rail receipts and exports at four ports are shown in table 22.

METHODS OF MARKETING

Most of the mohair farmers in the Union of South Africa are small producers who shear only a few bales at a time. They usually sell to local buyers and speculators, but some, usually the larger producers, consign their clips to one of the cooperatives or to a private broker at the port. Occasionally a grower consigns his mohair to England to be sold for his own account. Mohair from Basutoland (Basuto hair) is traded by the natives to local traders who sell in one of these ways.

All of the South African mohair production is exported. Mohair is marketed chiefly at Port Elizabeth but to some extent (chiefly Basutoland mohair) at East London and Durban (table 22). It is sold by wool brokers, some of whom specialize in mohair. All mohair is sold by private and usually secret negotiation—never at auction. In 1932 a cooperative mohair-marketing association was organized—the South African Bokhaar Boere Koopertiewe Maatskappy (Sabkom)—but since the principal wool-selling concerns were also cooperative and also sold mohair, the need for the new association was not altogether obvious. The members represented only about one-sixth of the total mohair production. The associa-

tion acts only as selling agent, and sales are actually executed through brokers at the ports; but only one of the old cooperatives agreed to the conditions, and the association became sole selling agent for the new cooperative. The Government granted the new association a £75,000 loan with which to make advances to members against mohair delivered. The broker must rebate to the new association 0.75 percent (half of the commission) and the member must pay one-fourth penny per pound. Authority to sell as to time and price rests with the new cooperative.

TABLE 21.—*Angora goats and sheep: Numbers in principal goat-raising districts, Union of South Africa, 1923 to 1930*

District [1]	1923	1924	1925	1926	1927	1928	1929	1930
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Beaufort West:								
Angora goats	60	59	50	55	16	25	42	23
Wooled sheep	289	292	327	302	136	254	345	437
Nonwooled sheep	126	121	110	79	29	68	90	111
Aberdeen:								
Angora goats	181	188	191	153	79	66	113	125
Wooled sheep	61	89	99	99	62	101	187	231
Nonwooled sheep	78	74	61	51	32	65	51	62
Willowmore:								
Angora goats	214	202	211	189	123	141	187	257
Wooled sheep	41	42	49	49	32	41	51	103
Nonwooled sheep	73	55	46	31	30	34	48	81
Jansenville:								
Angora goats	303	304	323	239	201	215	254	290
Wooled sheep	16	19	32	27	23	39	51	66
Nonwooled sheep	55	59	56	47	42	46	63	75
Steytlerville:								
Angora goats	246	197	219	162	150	150	191	224
Wooled sheep	22	16	24	21	25	28	38	49
Nonwooled sheep	47	43	37	25	30	30	32	39
Pearston:								
Angora goats	112	110	106	91	72	53	71	82
Wooled sheep	40	43	52	56	61	64	89	92
Nonwooled sheep	38	36	31	33	33	27	29	34
Somerset East:								
Angora goats	195	153	197	171	134	106	133	160
Wooled sheep	186	211	227	243	259	274	299	353
Nonwooled sheep	110	89	73	64	57	50	66	79
Uitenhage:								
Angora goats	80	76	91	69	71	68	81	97
Wooled sheep	27	25	33	40	50	52	63	68
Nonwooled sheep	22	21	19	15	18	23	30	38
Cradock:								
Angora goats	102	80	74	92	67	40	37	40
Wooled sheep	207	189	234	294	331	381	416	480
Nonwooled sheep	126	113	97	115	100	68	65	81
Bedford:								
Angora goats	59	45	43	40	37	24	27	20
Wooled sheep	188	118	202	230	229	187	217	244
Nonwooled sheep	32	33	18	20	20	20	22	26
Total 10 districts:								
Angora goats	1,552	1,457	1,505	1,260	960	883	1,136	1,327
Wooled sheep	1,077	1,114	1,279	1,361	1,208	1,421	1,756	2,123
Nonwooled sheep	717	644	548	480	391	431	496	626
Other districts: Angora goats	719	670	632	565	448	414	436	474
Total, Angora goats	2,271	2,127	2,137	1,825	1,408	1,302	1,572	1,801

[1] From west to east.

Union of South Africa. Agricultural census reports.

There are only about 15 mohair-buying agents in the Union of South Africa. These agents represent overseas buyers, either spinners or independent buyers. There are only about a dozen mohair spinning and weaving firms in England. Of the agents in the Union of South Africa, two shipped most of the mohair exported in 1931–32. However, the big buying coup of 1933 was engineered

by another company. By a mammoth purchase in May 1933 a large part of the accumulated stocks were disposed of at very low prices.

South African mohair is commonly blended with Turkish mohair according to blends which are jealously guarded trade secrets. Turkish mohair is said to have more luster and more curl than the South African. South African mohair contains more yolk, sand, and dust. It is best suited for plushes and pile fabrics, whereas Turkish mohair is preferred for linings and fine dress goods. Most spinners say they like at least a blend of Cape mohair in their Turkish mohair yarns.

Kids, whether from the Union of South Africa or Turkey, are used for the lining trade. Winter hair, constituting a large part of the clip, is used for thick yarns.

Because of depressed conditions, it is claimed that less care is being given to the breeding and supervision of flocks in the Union of South Africa, so that there is an apparent tendency for the mohair to lose its fineness.

Basuto hair is the poorest mohair known. It is finer in quality than Cape mohair, but it is kempy, dirty, and ungraded. The fleeces are tied together with horse hair, which is difficult to eliminate completely from the bluish-tinted Basuto hair. It is irregular in length, owing to the fact that Basutoland natives seem to clip at irregular intervals and at any time of year.

MOHAIR GRADES

The relative importance of the various grades of mohair handled at Port Elizabeth is indicated by reports issued by the Port Elizabeth Wool and Mohair Buyers' Association (table 23).

PRICES

The stagnation of the mohair market during 1932 caused a tremendous accumulation of unsold mohair, and prices fell to the lowest level on record. At the end of June 1932, trade reports showed 16,524 bales on hand at Port Elizabeth besides small quantities at East London and Durban. This figure was 6,561 bales more than in June 1931 and represented almost 2 years' production—actually more than 2 years' production of certain grades. The sudden and secretive purchase of about 4,000,000 pounds in May 1933, however, started a buying movement that reduced stocks and increased prices. The Government issued an official statement showing 9,310 bales of sold mohair and 6,064 bales of unsold mohair at all ports on June 30, 1933.

The average export price for mohair in April 1933 was 3 pence per pound, and for the season July to April, 3.4 pence per pound as against 6.3 pence and 7.8 pence for the same periods of 1931–32 and 1930–31 (table 24). The sudden activity of May and June 1933 caused the June average to rise to 4 pence per pound. This was followed by subsequent increases so that August exports averaged 5.9 pence per pound.

The price trend over the entire period of production and exportation in the Union of South Africa shows that mohair prices were never below 7.5 pence per pound until recently and that in some years they averaged as high as 27.9 pence (table 25).

TABLE 22.—*Mohair: Receipts by rail at ports, and exports, Union of South Africa, by months, 1929–30 to 1932–33*

MOHAIR RECEIPTS [1]

Month	Port Elizabeth				East London			Durban			Cape-town
	1929-30	1930-31	1931-32	1932-33	1930-31	1931-32	1932-33	1930-31	1931-32	1932-33	1932-33
	Bales and bags	*Bales and bags*	*Bales and bags*	*Bale equiva-lent*	*Bales and bags*	*Bales and bags*	*Bales and bags*	*Bales and bags*	*Bales and bags*	*Bales and bags*	*Bales and bags*
July	260	158	207	[2] 360	31	46	38	1	4	.....	10
August	959	761	606	[2] 1,014	97	14	76	.....	148	1	.....
September	3,082	3,764	1,787	1,040	217	35	93	42	3	19	2
October	7,194	2,555	2,374	3,534	338	133	185	140	21	147	3
November	1,012	1,451	1,716	1,583	164	145	146	190	100	171	6
December	748	611	797	734	44	108	84	105	88	69	2
January	213	249	377	795	52	24	114	23	78	120	.....
February	242	288	369	749	55	78	47	43	101	98	.....
March	1,401	1,262	650	1,203	35	41	26	35	19	31	.....
April	4,362	3,594	2,900	1,922	108	12	39	72	7	301	.....
May	3,251	4,038	1,744	2,644	30	20	27	33	4	126	82
June	716	770	953	1,933	8	3	192	21	.....	332	.....
Total	24,140	19,435	14,549	18,326	[3] 1,217	[4] 659	1,068	717	571	1,413	108
Total bale equivalents [3]	20,000	16,000	12,000	18,000	1,000	550	900	600	500	1,200	100

MOHAIR EXPORTS

	Bales	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*
July	193	597	82	1,485	.....	.....	.....	.....	.....	.....	.....
August	416	367	214	1,371	.....	.....	.....	.....	.....	.....	.....
September	1,983	330	200	1,764	.....	.....	.....	.....	.....	.....	.....
October	1,783	674	992	2,284	.....	.....	.....	.....	.....	.....	.....
November	3,160	1,825	1,122	770	.....	.....	.....	.....	.....	.....	.....
December	1,502	658	262	607	.....	.....	.....	.....	.....	.....	.....
January	818	383	354	2,077	.....	.....	.....	.....	.....	.....	.....
February	316	630	140	1,889	.....	.....	.....	.....	.....	.....	.....
March	34	1,315	262	1,364	.....	.....	.....	.....	.....	.....	.....
April	377	2,292	1,295	760	.....	.....	.....	.....	.....	.....	.....
May	4,232	1,106	258	2,206	.....	.....	.....	.....	.....	.....	.....
June	2,197	462	503	2,808	.....	.....	.....	.....	.....	.....	.....
Total	17,197	10,715	5,684	19,475	[4] 708	[4] 377	2,057	608	413	2,102	82

[1] Railway receipts are about 20 percent higher than actual bale equivalents (excepting at Port Elizabeth, since Sept. 1, 1932) because bags were counted as bales although it requires about 8 bags to make 1 bale.

[2] The secretary of the East London Wool Exchange, Ltd., reports mohair receipts as follows: 1928–29, 184 bales; 1929–30, 700 bales; 1930–31, 1,182 bales; 1931–32, 583 bales. These figures for the last 2 years are slightly lower than otherwise reported.

[3] Approximate.

[4] The secretary of the East London Wool Exchange, Ltd., reports mohair shipments 1929–30, 722 bales; 1930–31, 780 bales; 1931–32, 377 bales.

PORT ELIZABETH WOOL AND MOHAIR BUYERS' ASSOCIATION. WOOL AND MOHAIR TRADE OF THE UNION OF SOUTH AFRICA. Statis. Rev. 3 (July 1932)–4 (July 1933). [Mimeographed.]

TABLE 23.—*Mohair: Exports and unsold stocks, by grades, at Port Elizabeth, 1931–34*

Grade	Exports, July to June			Unsold stocks, June 30			
	1931-32	1932-33	1933-34	1931	1932	1933	1934
	Bales	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*
Winter kids	477	772	1,119	526	1,117	422	800
Winter hair	1,294	6,967	5,042	372	2,531	951	1,666
Summer kids	234	707	659	547	1,068	540	609
Summer firsts	1,693	5,757	7,183	6,920	8,072	2,694	4,241
Mixed hair and seconds	671	2,197	2,681	541	1,524	294	613
Basuto hair [1]	357	1,446	2,892	344	1,860	370	493
Locks	958	1,629	1,294	613	352	229	111
Total	5,684	19,475	20,870	9,963	16,524	5,410	8,533

[1] Basuto hair is mohair from native-owned Angoras in Basutoland. It is bluish in color and of inferior quality.

PORT ELIZABETH WOOL AND MOHAIR BUYERS' ASSOCIATION. WOOL AND MOHAIR TRADE OF THE UNION OF SOUTH AFRICA. Statis. Rev. 3. July 1932. [Mimeographed.]

TABLE 24.—*Mohair: Price per pound, by grades, Union of South Africa, 1932–33*

Month	Average winter kids	Good average winter hair	Summer kids	Summer firsts	Good average Basuto hair	Locks
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
July		5		6		2
August	8	5–6	10	6		
September	10	5½	16	7	4–7	2
October	12	4½–5	20	6	5	1½
November		5		5		
December		4½–5				
January [1]		3		3	3	1
February				3		
March						
April						
May	9	4	16–24	7–8	5–7	2–3

[1] The Union of South Africa abandoned the gold standard, and exchange rates moved to par with British sterling.

TABLE 25.—*Mohair: Exports and price per pound in the Union of South Africa, 1857 to 1931*

Calendar year	Quantity	Average price per pound		Calendar year	Quantity	Average price per pound	
	Pounds	*Pence*	*Cents* [1]		*Pounds*	*Pence*	*Cents* [1]
1857	870	27.6	56	1895	11,090,449	15.4	31
1858				1896	10,001,028	13.7	28
1859	602	12.0	24	1897	12,583,601	12.9	26
1860	395	7.5	15	1898	10,876,014	14.3	29
1861	784	18.7	38	1899	12,777,306	14.6	29
1862	1,036	12.5	25	1900	9,027,301	13.0	26
1863	1,354	13.0	26	1901	10,813,239	11.2	23
1864	8,104	18.0	36	1902	17,626,021	10.5	21
1865	6,992	12.6	26	1903	14,174,315	11.0	22
1866	21,105	11.2	23	1904	14,038,780	10.5	21
1867	50,832	9.3	19	1905	10,837,082	12.6	26
1868	102,570	9.4	19	1906	14,006,110	13.1	27
1869	260,932	13.6	28	1907	17,599,035	11.5	23
1870	403,153	15.9	32	1908	16,878,092	9.4	19
1871	536,292	19.3	39	1909	18,332,093	10.6	21
1872	870,861	15.9	32	1909 [2]	19,640,053	10.5	21
1873	765,719	14.4	29	1910	17,817,219	12.2	25
1874	1,036,570	24.8	50	1911	21,006,826	10.5	21
1875	1,147,453	27.9	57	1912	23,479,729	9.9	20
1876	1,323,039	20.7	42	1913	17,355,882	12.1	25
1877	1,433,774	19.5	40	1914	18,805,743	10.6	21
1878	1,358,395	19.1	39	1915	16,304,378	10.1	20
1879	2,288,110	13.7	28	1916	17,374,068	15.4	31
1880	2,590,232	19.1	39	1917	3,690,828	18.2	37
1881	4,146,128	15.2	31	1918	19,645,664	20.1	41
1882	3,776,057	16.1	33	1919	16,942,021	23.4	47
1883	4,443,971	14.7	30	1920	9,289,888	19.8	40
1884	4,329,355	13.3	27	1921	17,128,915	8.2	17
1885	5,251,301	9.3	19	1922	25,792,749	10.7	22
1886	5,421,006	10.3	21	1923	14,987,851	15.2	31
1887	7,153,730	9.0	18	1924	13,666,125	20.1	41
1888	9,598,768	7.6	15	1925	11,560,405	17.4	35
1889	9,442,213	8.9	18	1926	11,140,909	16.0	32
1890	9,235,349	8.8	18	1927	10,681,290	18.2	37
1891	9,953,348	8.6	17	1928	7,703,816	22.0	46
1892	10,516,837	8.5	17	1929	10,038,287	15.4	31
1893	9,457,278	13.4	27	1930	9,873,636	10.3	21
1894	10,003,173	10.1	20	1931	5,442,883	5.4	11

[1] Converted at par.
[2] Trade and Shipping.

DE TOIT, F. J. THE FUTURE OF MOHAIR. (Manuscript filed with the Foreign Agricultural Service Division, Bureau of Agricultural Economics.)

DESTINATION OF MOHAIR EXPORTS

Nearly all the mohair is exported to the United Kingdom. France takes 3 or 4 percent and other European countries and Japan take smaller quantities. The United States formerly took a fair quantity, over 25 percent in some years, but has taken almost none recently (table 26).

TABLE 26.—*Mohair: Exports from the Union of South Africa, by countries, 1930–31 to 1933–34*

Country to which exported	Year ended June 30—			
	1930–31	1931–32	1932–33	1933–34
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United Kingdom	5,650	3,279	10,909	9,463
France	257	129	431	283
Spain	6	7	105	(1)
United States	237		98	2,036
Japan	10	7	74	68
Germany	14		78	(1)
Holland			62	(1)
Belgium	31		25	(1)
Optional				117
Total	6,205	3,422	11,842	11,967

[1] Included with optional.

South African Department of Agriculture, Division of Economics and Markets.

GOVERNMENT AID

When England abandoned the gold standard in September 1931 it caused exchange rates to move 25 to 30 percent against the Union of South Africa. This was immediately reflected in the prices obtainable there for mohair. The Government soon granted a 25-percent export subsidy, retroactive to July 1. This was changed to a flat rate of 1 penny per pound on February 11, 1933, but this continued to be about 25 percent, more or less, according to grade. It was not successful in making mohair salable during the depression at profitable prices.

The Government also aided the mohair producers by promoting cooperative organization and by granting loans for advances on mohair delivered.

Mohair producers shared in the 33⅓-percent reduction in railage rates in 1931, but mohair production has remained one of the Union's most depressed industries.

CATTLE

INTERNATIONAL SIGNIFICANCE OF CATTLE IN SOUTH AND EAST AFRICA

The 11 British and 2 Portuguese countries in south and east Africa, from Uganda southward, have a total area equal to that of the United States. An insignificant part, as compared with the enormous expanse of grazing land, is in crops. With the exception of the Union of South Africa, none of these countries is suitable for

wooled sheep, barring small isolated areas. The land is preeminently suited for cattle grazing. Cattle in these 13 countries already number close to 30,000,000 head, of which about 9,000,000 are owned by the 2,000,000 European (white) population and about 20,000,000 by the 30,000,000 natives and Asiatics to whom cattle commonly represent their wealth and their major medium of exchange (table 27). Cattle are replacing wild game, and the time may come when these countries will contribute materially to the world's supply of beef. At present there is only one head of cattle for every 65 acres of land, although in Southern Rhodesia, where the cattle industry is fairly well established, the density of cattle numbers is about twice as great and is still increasing. A close study of potential competition from these countries is of great importance to American cattlemen and to those concerned with the formulation of a safe agricultural production policy.

TABLE 27.—*Cattle: Number in relation to land area in 13 south and east African countries, 1930*

Country	Land area	Cattle			Area per head
		Owned by Europeans	Owned by natives	Total	
	1,000 acres	*Number*	*Number*	*Number*	*Acres*
Union of South Africa	302,027	6,668,092	3,905,777	10,573,869	29
Basutoland [1]	7,498	6,251	574,415	[2] 580,666	13
Swaziland	4,291	65,200	268,400	333,600	13
Bechuanaland [1]	170,000	68,718	426,344	[3] 495,062	356
South-West Africa	206,332	549,912	[4] 105,348	655,260	315
Southern Rhodesia	96,227	910,343	1,558,075	2,468,418	39
Northern Rhodesia	184,320	103,201	362,768	465,969	396
Nyasaland	25,600	19,556	151,204	170,760	150
Mozambique	190,483	(?)	(?)	491,000	388
Angola	310,254	(?)	(?)	1,423,000	218
Tanganyika [5]	233,600	(6)	5,170,162	5,170,162	45
Kenya	144,000	226,861	4,965,963	5,192,824	28
Uganda	60,160	(6)	1,984,703	1,984,703	30
Total [7]	1,940,792	8,618,134	19,473,159	30,005,293	65

[1] 1927.
[2] Basutoland agricultural officer, Maseru, in correspondence, estimates the 1931 total to be only 500,000 head.
[3] Estimated total 625,000 in 1925.
[4] Including cattle owned by colored people.
[5] Estimate.
[6] Number insignificant.
[7] Not reported separately.
[8] Approximate.

Official sources.

The number of cattle in the United States was 67,000,000 as of January 1, 1934. The beef and dairy output from this number is very much greater than from the 30,000,000 head in these countries because a large part of the latter are owned by natives and are not looked upon as sources of income. Furthermore, considerable numbers, about 2,000,000 head in the Union of South Africa and smaller numbers elsewhere, are used for draft purposes instead of horses or mules. From this it follows that any material increase in numbers or a conversion of the native attitude to a semicommercial opinion of their cattle would multiply the output for international trade many times.

The number of cattle in Argentina in 1930 was 32,000,000 and the number in Australia in 1932, 12,000,000, and the total in the world approximately 650,000,000. In comparison with those countries, these African countries are producing only a small fraction of their possible output of cattle and cattle products.

The number of cattle in these African countries will be greatly increased if and when (1) certain serious or deadly cattle diseases are brought under complete or partial control by veterinary research and scientific ranching methods, (2) the feed problem during the dry winter months is solved, (3) mineral deficiencies in the grass are overcome by supplementary feeding, (4) watering places are provided closer together, (5) predacious animals are more nearly eliminated, (6) improved breeding provides a more marketable product, and (7) transportation and marketing handicaps are overcome by the building of more railroads and the improvement of marketing facilities.

UNION OF SOUTH AFRICA

The potentialities of cattle production in the Union of South Africa can best be understood by comparing that country with the southwestern areas of the United States, to which it is very similar (table 28). The Union is equal in area to the 3 States—Texas, New Mexico, and Arizona. It is also equal in area to the 4 States—California, Nevada, Utah, and Arizona. In each case the population is about the same. The cropping practice of the Union occupies an intermediate position between that of these two groups of States. The Union has much less cotton, wheat, and grapefruit than the Texas group but more tobacco, sugar, oranges, and grapes. As compared with the California group the Union has less cotton and fruit but more corn, sugar (as cane sugar), and tobacco. The Union has a smaller crop area than the Texas group but slightly more than the California group. In each case the Union has much less irrigated land, and yields are lower. With respect to cattle, the Union has more than the Texas group and many more than the California group, but the production of butter is only about one-third as much as in either group. The number of sheep in the Union is about five times as great as that in either group of States.

Considerations to be discussed later point to the conclusion that the Union will remain a grazing country, with cattle gaining in importance as compared with sheep, and that dairying will become fairly important in relation to beef. The value of grazing used by cattle, in terms of output, is already greater for cattle than for sheep and practically equal to that for sheep, goats, horses, mules, and donkeys combined (table 29). The value of grazing in terms of dairy production is still small in relation to the value for ox labor, beef, and hides, but butter production has increased rapidly since 1925.

The grassland area of the Union is confined to the eastern part, where summer rainfall is above 20 inches per year, roughly to a triangle lying east of a line running north from Port Elizabeth (fig. 28). The cattle occur in this grassland area where grazing capacity may be increased. West of this grassland area, little can be done to enhance the carrying capacity of the karoo-bush sheep-grazing

lands (table 30). In the grassland area which supports both cattle and sheep there is a strong probability that, especially with improving prices for wool, lamb, and beef, more intensive methods of grassland management will be adopted, and the output even at present prices may be increased $15,000,000 or $20,000,000 per year, about 10 or 15 percent.

TABLE 28.—*Agricultural characteristics: Comparison of the Union of South Africa with selected Southwestern States, 1930*

Item	Unit	Union of South Africa	Texas, New Mexico, and Arizona	California, Nevada, Utah, and Arizona
Area	Square mile	471,917	492,486	467,943
Population:				
European	Number	1,827,166	...	...
Non-European	do	6,215,050	...	...
Total	do	8,042,216	6,684,321	6,701,405
Farms	do	90,940	541,426	180,450
Farm area	Acre	204,614,549	166,050,000	50,603,000
Crop area	do	13,120,986	37,214,000	11,028,000
Irrigated area	do	887,627	1,020,378	7,110,339
Total cattle	Number	10,573,869	8,102,000	3,498,000
Total sheep	do	48,358,349	9,994,000	8,518,000
Creamery butter	Pound	18,222,000	28,068,000	87,856,000
Farm butter[1]	do	9,538,000	57,819,000	7,762,000
Wheat	Acre	1,151,533	2,822,000	834,000
Do	Bushel	10,614,911	31,479,000	18,091,000
Corn	Acre	[2] 6,396,774	5,197,000	153,000
Do	Bushel	79,916,607	95,771,000	4,737,000
Cotton	Acre	35,935	17,882,000	485,000
Do	Bale	11,628	4,360,000	410,000
Sugar (cane and beet)	Acre	309,919	...	114,000
Do	Ton	[3] 2,644,000	...	1,328,000
Tobacco	Acre	22,099	...	...
Do	Pound	12,269,000	...	...
Oranges	Box	[4] 2,865,000	192,000	32,910,000
Grapefruit	do	[5] 125,000	1,035,000	1,628,000
Lemons	do	[5] 10,000	...	7,020,000
Grapes	Short ton	[4] 131,000	3,335	2,094,782
Peaches	do [6]	[5] 9,400	22,225	831,725
Pears	do [6]	[4] 21,000	9,850	239,150
Apples	do [6]	[5] 7,000	16,675	322,275

[1] 1931.
[2] 1924.
[3] European only—represents 77 percent of corn production.
[4] 1929.
[5] Estimate.
[6] 40 bushels per ton.

Official sources.

TREND OF PRODUCTION

Cape Province is in large part suited only for grazing sheep, but owing to its large size and favorable cattle-grazing conditions in the eastern districts it has more cattle than any other Province. Transvaal ranks second, Natal third, and Orange Free State fourth. The relative ranking of the four Provinces has remained unchanged during the expansion of the last 20 years, but cattle have increased much more rapidly in Natal than elsewhere. This situation is illustrated in table 31. During 5 years ended in 1930 sheep were increasing rapidly in the marginal sheep and cattle area of Orange Free State, and work oxen were being temporarily replaced by tractors. There is evidence to indicate that cattle numbers are again increasing in all Provinces and that Natal is maintaining its rank as an important dairy- and beef-producing area.

TABLE 29.—*Value of grazing in the Union of South Africa during 1931*

Item	Produced on pastures		
	Quantity	Value [1]	
		Per unit	Total
	Number	*Dollars*	*1,000 dollars*
Cattle slaughtered	600,000	43.80	26,280
Ox labor	2,000,000	14.60	29,200
Hides, export			6,570
Hides, local use			3,407
	Pounds		
Butter [2]	25,600,000	.2433	6,228
Cheese [2]	6,600,000	.2433	1,606
	Number		
Annual cattle increase	50,000	24.33	1,216
Total cattle			74,507
	Bales		
Wool	1,000,000	31.63	31,630
Sheepskins			8,079
	Number		
Sheep slaughtered	2,600,000	4.26	11,076
Annual sheep increase	2,000,000	3.04	6,080
Total sheep			56,865
	Pounds		
Mohair	10,000,000	.365	3,65
Goatskins			1,703
Annual goat increase			730
Total goats			6,063
	Number		
Horse labor	600,000	36.50	14,600
Mule labor	130,000	36.50	[3]
Mules bred	13,000	34.07	443
Donkey labor	300,000	4.87	1,461
Annual donkey increase	10,000	4.87	49
Total, horses, mules, and donkeys			16,553
Total value of grazing			154,008

[1] Values converted at par.
[2] Milk not included because a large quantity is produced in cities and because butter and cheese, included here at full value, are not products of grazing land only.
[3] Not grazed on natural pastures.

A. J. Beyleveld, Department of Agriculture, Union of South Africa.

TABLE 30.—*Approximate distribution of annual rainfall, Union of South Africa*

Average annual rainfall (inches)	Cape Province	Orange Free State	Transvaal	Natal	Union
	Square miles	*Square miles*	*Square miles*	*Square miles*	*Square miles*
Under 5	6,501				6,501
5.1–15	177,677	573			178,250
15.1–25	60,817	32,660	76,764		170,241
25.1–35	21,771	17,156	33,632	23,231	95,790
35.1–50	4,071		5,536	14,060	23,667
Over 50	129		518		647
Total	276,966	50,389	110,450	37,291	[1] 475,096

[1] Error in source: The Union has 472,347 square miles, according to Official Yearbook (*47, no. 13, p. XII*).

Grassland Research Committee, The Grasslands of South Africa (*11*).

During the 5 years ended in 1930 the total number of cattle owned by Europeans decreased steadily, whereas the number owned by natives steadily increased, especially on the native reserves where compulsory dipping and the control of tick-borne diseases have reduced death losses to such an extent that the reserves have become overstocked and the grazing lands have deteriorated.

Less than 5 percent of the area of the Union is in cultivated land, orchards, or wattle plantations. By far the greater part of the area is grazing land, either grassland or karoo bush, and because of insufficient rain and the high proportion of infertile stony soil, grazing

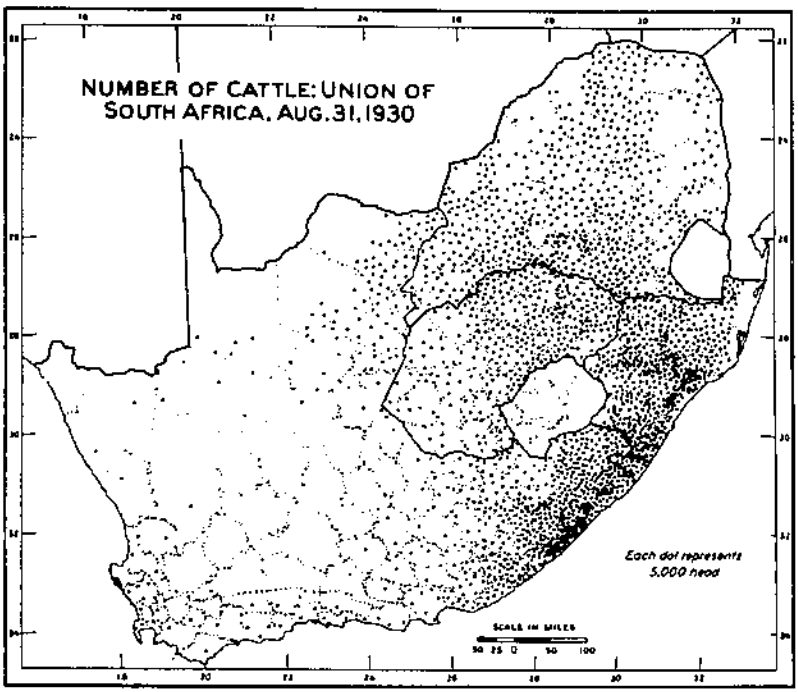

FIGURE 28.—Cattle are chiefly native-owned between East London and Swaziland, largely native owned in northern and western Transvaal Province, and many are owned by native squatters on European farms except in western Cape Province.

land will always predominate to almost the present extent. Most of the rain falls in the summer months, often in light showers of doubtful value or in torrential storms. Loss of moisture from run-off and evaporation is exceptionally high.

Cattle raising in the Union of South Africa is markedly inefficient. One might expect that, with 10,500,000 cattle in the Union including about 3,650,000 cows, producing about 1,500,000 calves per year, the annual slaughterings would reach about 1,000,000 head. Actually only about 600,000 head are slaughtered annually. The calf crop is only about 50 percent among European-owned cows and even less among native-owned cows (table 32). Even worse, the calves needed to replace death losses represent almost half of the calves produced by European-owned cows and from one-half to two-thirds of the

calves produced by native-owned cows. By improving the calving percentage and by selling the cattle before they die the beef and dairy output can be increased 100 to 200 percent without increasing the total number of cattle grazed in the Union. The United States, with 6 times the number of cattle, slaughters 35 times as many cattle and calves.

TABLE 31.—*Cattle: Number in the Union of South Africa, 1904 to 1930*

Year	Province				Total Union	Cattle owned by—		
	Cape	Natal	Transvaal	Orange Free State		Europeans	Natives	
							On farms owned by Europeans	On native reserves, etc.
	Number	*Number*	*Number*	*Number*	*Number*	*Number* [1]	*Number* [1]	*Number* [1]
1904	1,054,390	660,903	515,956	303,204	3,500,453			
1911	2,715,330	456,087	1,339,208	1,286,234	5,796,949			
1918	2,410,931	977,252	1,588,443	1,575,205	6,851,924			
1919	2,503,603	1,111,138	2,083,525	1,744,600	7,532,956			
1920	2,573,591	1,209,717	2,427,159	1,721,803	7,932,270			
1921	2,810,993	1,152,017	2,561,618	1,732,551	8,357,089			
1922	2,976,168	1,566,232	2,762,044	1,896,225	9,200,669			
1923	3,212,225	1,789,471	2,743,518	1,802,122	9,607,336	5,365,736	1,246,132	2,703,314
1924	3,323,651	1,892,848	2,832,620	1,849,309	9,898,428	5,369,770	1,294,289	2,942,215
1925	3,238,272	1,962,777	2,963,993	1,865,449	10,030,491	5,316,516	1,343,537	3,078,261
1926	3,351,269	2,152,160	3,055,140	1,955,772	10,514,281	5,545,637	1,475,390	3,316,147
1927	3,335,179	2,282,480	3,038,021	1,933,893	10,589,573	5,450,781	1,494,262	3,467,423
1928	3,216,109	2,379,963	3,088,962	1,935,419	10,650,303	5,377,895	1,503,521	3,501,870
1929	3,307,175	2,455,410	3,130,871	1,801,345	10,695,091	5,264,340	1,508,430	3,745,214
1930 [1]	3,358,259	2,484,801	3,088,734	1,641,985	10,573,869	5,172,310	1,395,782	3,905,777

[1] Excluding livestock in towns.

Union of South Africa, Official Yearbook (*47, no. 13*), and Agricultural Census Reports.

Slaughter statistics show significant trends (table 9). In the Union very few cattle are slaughtered excepting in abattoirs or at slaughter poles—practically none by the natives except for religious ceremonies. Abattoir slaughterings of cattle increased rapidly between 1919 and 1929, but since that time they have decreased, whereas sheep slaughterings have increased. This is an additional reason for believing that the number of cattle is increasing more rapidly at present.

Cattle production is likely to expand in the Union of South Africa during the next few years as a result of certain influences now at work: (1) Improvement of grassland and cattle-management methods, (2) continued progress in the control of tick-borne diseases, (3) conversion of native cattle owners to a semicommercial point of view, (4) substitution of work oxen for tractors under prevailing price conditions, (5) relatively higher prices obtainable for cattle than for wool, and (6) development of an export trade in chilled beef.

Expansion in the livestock industry in the Union of South Africa is more likely to occur in the beef-cattle industry than in the sheep-and-wool industry, because the grasslands are subject to more improvement and heavier stocking than are the dry karoo lands, which are now fully used for sheep. The cattle population of South Africa is likely to increase from 10,500,000 to 15,000,000 before the sheep

population increases from 50,000,000 to 60,000,000. In terms of animal units, one would expect an increase of 5,000,000 units of cattle sooner than an expansion of 1,500,000 units of sheep. After the grass lands of the northern Transvaal have been more heavily grazed for a few years and improved by certain methods of pasture management, the composition of the veld grasses may be changed sufficiently to warrant the expansion of sheep in this area, but this will be a remote and secondary development.

TABLE 32.—*Cattle: Approximate classification in the Union of South Africa, 1933*

Designation	Cattle owned by—		
	Europeans	Natives	
		On farms owned by Europeans	On native reserves, etc.
Class of cattle:	*Number*	*Number*	*Number*
Cows milked	750,000	(1)	(1)
Other breeding cows	1,000,000	500,000	1,400,000
Calves raised (equals annual disposals)	800,000	225,000	670,000
Yearlings	700,000	200,000	560,000
Work oxen	1,450,000	[2] 250,000	[2] 500,000
Other cattle and bulls	300,000	325,000	870,000
Total	5,000,000	1,500,000	4,000,000
Annual disposals:			
Slaughtered in abattoirs [3]	345,000	75,000	145,000
Slaughtered on farms or reserves	[4] 65,000		
Reserved to replace deaths	[5] 390,000	[6] 150,000	[6] 375,000
Reserved to increase herds			150,000
Total, indicating the annual calf crop [7]	800,000	225,000	670,000

[1] Typically, 2 cows per native family produce 1 quart of milk per day.
[2] Including bulls worked.
[3] 625,000 total; 565,000 not imported.
[4] Census enumerated 80,954 in 1924–5, 62,601 in 1929–30.
[5] Census enumerated 249,237 cattle died in 1925–26; 388,936 in 1927–28; and 242,372 in 1929–30; but these figures are probably too low.
[6] Census reports (about 70,000 on European farms and 200,000 on native reserves) too low on account o disadvantage to native of reporting dead cattle, which must be burned instead of eaten as meat.
[7] Calculated from census enumerations of slaughterings, deaths, and changes in numbers on hand, the total calf crop was 1,411,629 in 1924–25 and 1,076,737 in 1929–30, but these figures are probably too low.

Based upon the classification in the 1930 agricultural census and the actual classification in Southern Rhodesia.

Improved grasses such as kikuyu, Paspalum, Rhodes' grass, and certain finger grasses are being introduced in the better areas to supplement the natural veld during the rainy summer months, October to April. During the dry winter months other grasses which remain green throughout the winter, such as cocksfoot, ryegrass, tall oatgrasses, tall fescue, Phalaris bulbuosa, and Yorkshire fog, are recommended.

By subdividing the pastures into smaller fields and by rotational grazing, it is hoped to avoid grazing pastures at the wrong time in their stage of growth. Pastures set aside for winter grazing may be cut once or twice for hay or grass silage if cut not later than February. Feed shortage during the dry winter months can thus be avoided and an enormous quantity of summer grass now wasted, conserved.

With an application of 400 pounds of pasture fertilizer costing $6 or $7 per acre per year, it is not likely that fertilization will pay except on the best cultivated grasslands where rainfall is highest and where the more valuable products, such as milk and butter, are produced.

A surprising increase in growth of cattle and elimination of the disease, lamsiekte, follow the feeding of bone-meal supplements to cattle, especially in the northeastern districts of Cape Province where cattle numbers are expanding rapidly. Investigations now being conducted by Government veterinarians indicate that phosphorus deficiency is general throughout the Union. An experiment conducted between 1925 and 1929 showed that 3-year-old animals which had been fed 3 ounces per day of bone meal averaged 1,194 pounds live weight on the ranch, and dressed at the market 597 pounds, whereas control animals without bone meal weighed 737 pounds on the ranch, and dressed only 339 pounds. None of the cattle received any supplemental feeding. The increased weight of the hide, 71 pounds, as compared with 48 pounds, almost paid for the cost of the bone meal fed over a period of 2¼ years. The bone-meal-fed animals averaged £9 6s. 4d. ($45.34) per head, while the others sold for only £3 13s. 5d. ($17.86) per head. This striking discovery is playing a significant part in the expansion of cattle production in Bechuanaland districts and a few others.

Cattle diseases have played an important part in slowing down the development of the cattle industry. At the end of the last century rinderpest swept southward, decimating the herds. Trypanosomiasis, transmitted by the tsetse fly (Glossina morsitans), is now a limiting factor in a few areas. An outbreak of foot-and-mouth disease occurred in 1933. East-coast fever and other tick-borne diseases are constant sources of death losses despite compulsory dipping at weekly intervals. Some declare that the veterinarians hold the key to the success of the South African cattle industry.

Remarkable progress is being made by research and in the activities of extension veterinarians. In the future death losses will undoubtedly be less severe, especially if, by better feeding, the cattle at the end of the dry winter months are in a less weakened condition. The elimination or material reduction of tick-borne diseases will also hasten improvement along breeding lines because cattle growers will feel less need to raise the hardier native cattle, which are more resistant to tick-borne diseases. Five or ten years hence there should be a marked decrease in cattle-disease losses and a corresponding increase in the number and improvement in the quality of the cattle.

The number of native-owned cattle in the Union has increased much more rapidly than the number of European-owned cattle, largely as a result of ending tribal wars and of rigid control of compulsory dipping of cattle, and they now out-number European-owned cattle. The rapid increase in the number of native-owned cattle is clearly reflected in the official statistics of cattle registered in the most important native cattle-producing area. There has been an uninterrupted increase in the number of such cattle from 535,000 in 1918 to 1,614,000 in 1931, largely as a result of compulsory dipping. Important native areas are becoming seriously overstocked. In some places the lands are becoming eroded, and Government officials are

making vigorous efforts to induce the natives to sell some of the annual increase.

One of the obstacles that has prevented improvement of cattle in the native areas of the Union of South Africa is the indisposition of the natives to sell their cattle. To the natives, cattle are measures and evidences of wealth, to be accumulated as much as possible, with the result that pastures have been overstocked and soil erosion has been increased. To meet this situation the Department of Native Affairs is sponsoring and organizing auction sales of native cattle, patronized by cattle traders.

If the overstocking of the grazing land in the native reserves can be corrected, the grass will recover so that the output of meat will be considerably increased. If, in addition, natives take an interest in selling their stock instead of accumulating them, the quality of the cattle may be improved.

Apparently some progress is being made in inducing natives to look upon their cattle as sources of cash income rather than as measures and evidences of wealth, the primary use of which is to pay for wives.

The number of cattle and sheep raised in the native areas would be greater except for the large numbers of donkeys, which are of little or no value. The 1930 census reported 170,417 donkeys in native reserves in the Union. The Government is taking action to limit the number of donkeys to alleviate the condition of overstocking.

It has been estimated that a farm tractor displaces 50 work oxen on a Transvaal or Free State corn farm. Perhaps this helps to explain the reduction in cattle numbers and the increase in sheep numbers in the corn belt between the years 1927 and 1930 for it was during those years that tractor imports reached significant numbers. The recent decline in the number of tractors imported and the financial difficulty of buying fuel for tractors already on the farms during the period of low agricultural prices may be expected to result in the increase in the number of cattle in the corn belt (table 33).

TABLE 33.—*Tractors imported and on farms, Union of South Africa, 1918 to 1932*

Year	Imports			Tractors on farms [3]	Year	Imports			Tractors on farms [3]
	Quantity [1]	Value [1]	Average value per tractor			Quantity [1]	Value [1]	Average value per tractor	
	Number	*Pounds sterling*	*Dollars*	*Number*		*Number*	*Pounds sterling*	*Dollars*	*Number*
1918				231	1926	230	49,804	1,054	1,302
1919	204	53,312	882	.....	1927	481	90,722	979	.....
1920	736	109,628	1,330	.....	1928	1,300	275,635	1,025	.....
1921	72	15,897	3,102	.....	1929	2,096	532,724	962	.....
1922	15	7,727	.....	.....	1930	626	162,505	1,263	3,884
1923	12	1,530	.....	.....	1931	111	55,230	2,358	.....
1924	167	31,602	921	.....	1932	71	33,203	2,276	.....
1925	199	42,998	1,052	.....	1933	74	45,354	2,571	.....

[1] Union of South Africa, Trade and Shipping.
[2] Agricultural census reports.
[3] Approximated from reported value.

The relation between prices obtainable for wool and for cattle has been distinctly in favor of cattle since 1928 (fig. 29). This is a strong inducement for farmers in the border zone between the sheep and cattle areas to increase the number of cattle and decrease the number of sheep. This is especially true since the more favorable price relation of cattle has persisted for 4 years and since farmers have found an increased demand for trek oxen and for chilled beef for the newly established chilled-beef trade.

Any further expansion of the cattle industry in the Union of South Africa must depend upon foreign markets, particularly since the marketable output is increasing annually. The principal handicap in marketing South African beef in the United Kingdom is the low quality of the beef. This low quality is due in part to inferior breeding and in part to inferior feeding methods. There are a

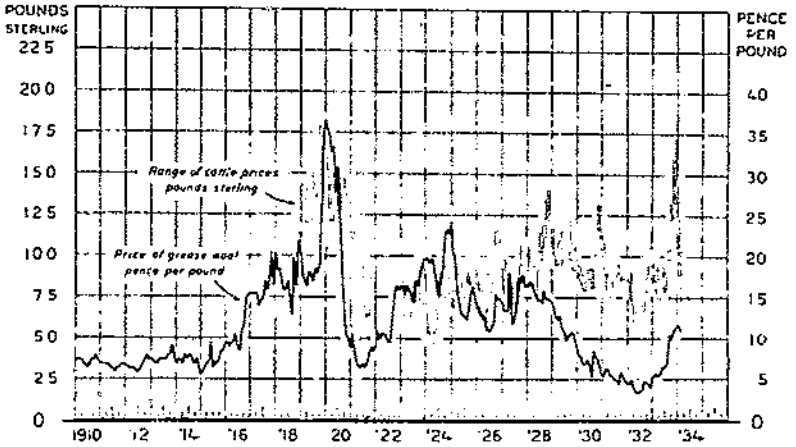

FIGURE 29.—RANGE OF PRICES OF MEDIUM CATTLE AT JOHANNESBURG AND PRICE OF GREASE WOOL AT PORTS.

Between 1928 and 1932 wool prices were relatively lower than cattle prices.

few well-bred and well-fed cattle in the Union of South Africa, but not enough to establish a large trade with the United Kingdom. Producers hesitate to produce the quality of cattle that would be suitable for export trade because if they are sold in the Union the premium is not sufficient to cover the cost of production of this superior quality. Back of this observation lies the fact that there is a large demand for the lowest grade of "compound" beef, which is bought by the mine commissaries for feeding the natives in the native compounds. It has been the habit of butchers who hold the contracts for supplying these mines with compound beef to remove the best cuts of meat from these carcasses and market them through their retail stores to the European population in the Union. This has the effect of increasing the value of compound animals and decreasing the value of well-bred and well-finished cattle to a point at which the spread between these two grades is not commensurate with the difference in production costs. Attempts are now being made to prevent by legislation or otherwise the sale of selected cuts

(sometimes the entire hindquarters) from compound animals to the European customers. If successful, this will have the effect of lowering the value of compound animals, improving the quality of meat supplied to the native laborers at the mines, and increasing the prices of best-quality beef animals. This will help to make it profitable to practice better breeding and feeding and will place the Union in a more favorable position to participate in the beef market of the United Kingdom.

METHODS OF PRODUCTION

The carrying capacity of the veld is normally 10 to 20 acres per head per year in the principal cattle-grazing areas of the Union. However, there is a conspicuous lack of uniformity. In some districts less than 10 acres per head are required, while in areas of inferior soil or rainfall more than 20 acres per head per year are required. The carrying capacity of the veld depends upon the character of the covering of grass. The sweet grasses, chiefly Buffelgras, Kalkgras (*Eragrostis truncata*), and Krulgras (*Brachiaria nigropedata*) have the advantage of being both palatable and nutritious during the dry winter months when the sour grasses are unpalatable and lacking in nutritive value. The mineral deficiency in sour grasses in the winter months is chiefly responsible for their lack of nutritive value. But as the sour grasses during the summer months are earlier, more abundant, less washy, and more drought-resistant than the sweet grasses, they have a definite place in the grazing program. There are a few edible trees and shrubs which also contribute to the carrying capacity of certain areas.

The cattle ranches are often divided into camps or fields with reference to the different kinds of sweet grasses and sour grasses that occur on their different parts, due consideration having been given to the access to water. The problem of locating the boundaries of camps or grazing areas is simplified if wells are drilled to provide water where it is wanted, without reference to the streams.

Ranchers estimate that at the beginning of the summer rainy season the weaners usually weigh about 400 pounds, a year later 600 to 700 pounds, 2 years later 800 to 900 pounds, and 3 years later, as "long threes", 900 to 1,100 pounds. This estimate is substantiated by the experimental evidence recently gathered at Messina in northern Transvaal near the Rhodesian border. Figure 30 shows the rate of growth for five lots of grade calves of different breeds. This experiment, based on weights of 52 calves dropped in April or May 1929, is illuminating. It shows (1) that the loss in weight of young cattle during the dry winter months is negligible, (2) that the cattle can be brought to weigh around 1,100 pounds as long threes, and (3) that the logical time to expect grass-fed cattle to be marketed from the Transvaal is from June to September. These cattle were raised entirely on pasture without any supplementary feeding. The quality of the grazing had been below average during this period owing to drought and quarantine restrictions along the Rhodesian border. These results may be taken as typical of what may be expected in northern and western Transvaal and in the Bechuanaland districts of northern Cape Province, which are important cattle-producing areas.

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A visit to a typical cattle ranch reveals interesting details of ranch management in north-central Transvaal. The soil is partly a red sandy loam and partly an unusual black turf which is extremely light and fluffy when dry but very sticky when wet. Cattle ranching is supplemented by the growing of corn, peanuts, and mamma (millet). Rainfall averages only 20 to 25 inches per year, and practically all of this comes during the summer months, October to March. The rainfall is erratic, and both crop production and grazing are subject to serious droughts.

The 23,000-acre ranch carries 2,300 head of Hereford cattle graded up from native stock—800 cows, 500 calves, and 1,000 head of 1-year-olds, 2-year-olds, and 3-year-olds (fig. 31). From 300 to 400 head are sold per year, weighing perhaps 1,200 pounds and bringing at

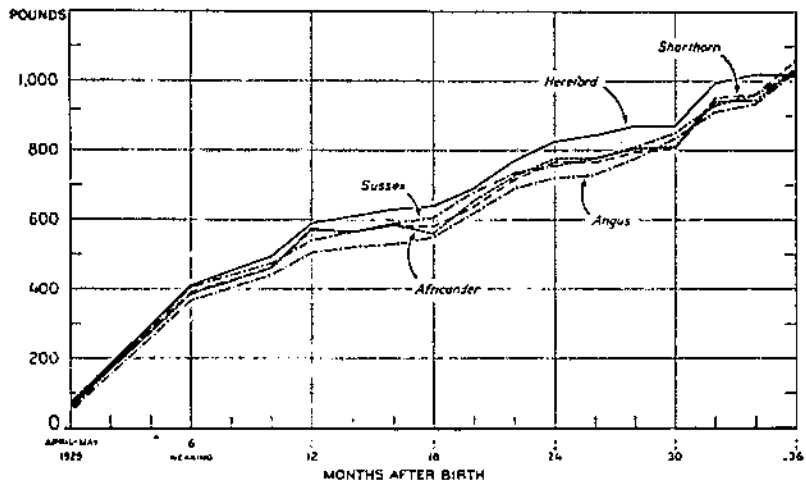

FIGURE 30.—GROWTH CURVE OF FIRST-CROSS CALVES FROM NATIVE COWS, MESSINA EXPERIMENT STATION, 1929-32.

Calves weighing 400 pounds at 6 months of age weighed 1,050 pounds at 36 months of age.

1932 prices about £5 ($24) per head. In addition there are about 700 cattle owned by the 75 or more native families who work on the ranch. There are two outlying pieces of land, consisting of about 14,000 acres, which are kept in reserve, so that the ranch is stocked at the rate of about 8 head of cattle per 100 acres, as compared with an average of 5 to 7 head in the district as a whole. The investment represents the purchase of land at about $1.25 per acre and the investment of almost as much more for about 100 miles of fencing and 14 drilled wells 150 to 200 feet deep. The ranch is fenced into 13 camps, and by further fencing the number of camps will be doubled to permit controlled grazing, to prevent overgrazing, and to allow denuded areas to reseed. Death losses from contagious abortion, paratyphoid, and drought have been rather heavy on this ranch. The cattle have to be dipped weekly, except at calving time or at the end of winter, in order to keep ticks under control. The

area is suitable for the raising and fattening of cattle for the chilled-beef export trade recently inaugurated. The ranch produces 400 acres of corn, 120 acres of peanuts, and about 200 acres of cowpeas, millet, and Sudan grass. Part of the corn is fed as silage. In 1932 these crops were almost complete failures on account of drought, the worst drought on record in this area. Even in good years practically no hay is saved on this farm, although during the midsummer months the grass grows more rapidly than the cattle can use it. Mowing would be difficult on account of the scattered thorn bush which covers this area. Nevertheless it is planned to clear away scattered thorn trees on low-lying "vleis" and mow the grass for the purpose of saving hay and improving the value of the grazing

FIGURE 31.—Grade Hereford cattle on a 23,000-acre ranch in northern Transvaal.

after mowing. Under present methods it is necessary to burn the tall, dead grass at the end of winter to provide early grazing and to check the spread of small thorn bushes.

The cattle are in the best condition for market at the end of the rainy summer season, but the best prices are to be obtained (just as in the United States) at the end of the winter season, when grass-fat cattle are scarce. Animal husbandrymen, therefore, recommend that hay, silage, kafir, and corn be used in moderation during the winter months in order that the cattle may be sold in good condition at the end of the winter months, when prices are best. The corn belt, where feeding operations might be carried on, extends 100 miles east and west of Johannesburg and southward to form a triangle with its point in the center of Orange Free State. The area in which kafir, hay, and silage crops might be similarly used includes the same area but extends northward. There is also a secondary corn belt in Natal Province in which cattle might also be fed for the late-winter market. The limiting factor in the rapid extension of better feeding is the narrow spread between the inferior and the better grades of cattle.

The pastoral future of the Union of South Africa is largely dependent on technical factors, rate of growth, and costs. In the Transvaal, for instance, the ability to produce 1,000 pounds of beef within 3 years on land that carries 4 or 5 head per 100 acres and is worth only $2.50 per acre suggests permanency and expansion in the cattle industry (figs. 32 and 33).

COSTS OF PRODUCTION

It is generally considered that the maximum charge which could be made with profit for grazing cattle in the Transvaal is $1.25 per head per year. From this it is calculated that for the land necessary to carry one animal no more than $15 to $20 can be paid,

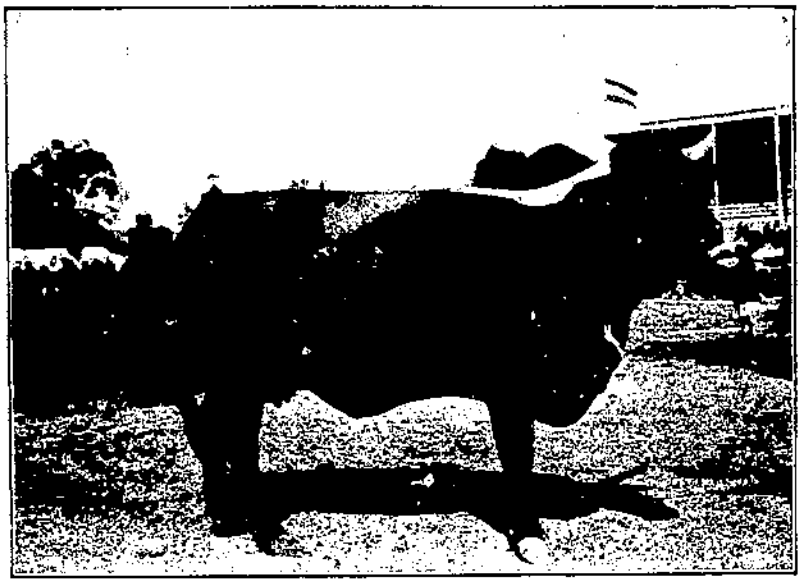

FIGURE 32.—Prize-winning Africander cow, a hardy and popular breed in South Africa.

so that if 15 acres per head are necessary, no more than $1.25 per acre could be paid for the land. Much cattle-ranching land in the northern Transvaal has been bought at prices higher than this, partly because of mineral possibilities and partly because of the possibility of producing cotton, tobacco, or corn, either with or without irrigation, on some of the best lands of these estates.

Estimates of cattle-production costs in the Union of South Africa have been made by the Division of Economics and Markets of the Union Department of Agriculture (table 34). The figures are based upon an investigation of livestock farming in northern Transvaal. They show that the cost of producing a 3-year-old animal on the high veld is $16.95 (conversion at par of exchange) as compared with $9.70 in the low veld, where grain for finishing cannot be grown. This assumes that the cows are milked and that the value of milk and cream is $6.08 at par or $4.87 per cow per year. If these

credits were omitted the steer costs would be increased to $27.09 and $19.06, respectively. Grazing is the chief cost, of course. With land valued at $14.60 and $2.43, respectively, it represents 69 percent and 54 percent, respectively, of the total costs of production. Hence the value placed on the land is the chief variable in production costs. Declining prices for beef would be met with lower values placed on the land.

The cost of fattening for 2 months on the high-veld ranches is $12.52 in addition, making the total cost $29.47, which is approximately the same cost as it would be if the cattle breeder bought his feeders from the low veld at $18, including transportation costs to the farm.

FIGURE 33.—A prize-winning Sussex bull used for improving the quality of the South African cattle.

COSTS OF MARKETING

The expansion of the cattle industry in the Union depends upon the possibility of developing an overseas market for the additional supplies since the Union can consume only slightly more than 500,000 head per year. This calls for an analysis of the cost of exporting the most promising product—chilled beef. The following tabulation shows that in 1932, when English currency was depreciated 25 percent below South African, it cost $20.77 (conversion at par) to market a 700-pound carcass from the farm to the Smithfield, England, merchant; that is, 3 cents per pound of beef. The net cost, after deducting credit for hide and offal, was $17.13 or 2.45 cents per pound. On this basis the northern Transvaal rancher must realize $47.55 (6.8 cents per pound) in England (conversions all at par) in order to cover cost of production.

TABLE 34.—*Cost of production of a 3-year-old beef animal in 2 areas of the northern Transvaal, 1932*

Item	High veld, grazing and grain		Low veld, grazing only	
	Per head	Total	Per head	Total
Original investment:	*Dollars*	*Dollars*	*Dollars*	*Dollars*
50 cows	29.20	1,459.80	24.33	1,216.50
1 bull	97.33	97.33	97.33	97.33
Grazing land		[1] 2,977.99		[2] 1,240.83
Dairy implements		36.49		31.63
Working capital		60.83		46.23
Total		4,632.44		2,632.52
Cost of cows and bull, 1 year:				
Risk and depreciation		119.72		98.29
Labor		84.79		73.00
Feed, dip, medicine, etc.		67.16		35.04
Interest at 5 percent		231.62		131.63
Total		503.29		337.96
Credit for milk and cream		304.14		243.31
Net cost		199.15		94.65
First-year cost of calves: [3]				
Labor		7.79		7.30
Running expenses		5.84		5.48
Grazing land at 5 percent		[4] 23.36		[5] 7.30
Total		36.99		20.08
Second-year cost of young cattle: [6]				
Labor		7.55		6.82
Running expenses		7.55		6.82
Grazing land at 5 percent		[4] 90.51		[5] 34.03
Interest on remaining number		20.74		17.03
Total		126.35		64.73
Third-year cost of young cattle: [7]				
Labor		7.30		6.33
Running expenses		14.60		6.33
Grazing land at 5 percent		[4] 87.59		[5] 31.63
Interest on remaining number		36.52		28.47
Total		146.01		72.76
Total cost of 3-year-old cattle [7]	16.95	508.50	9.70	252.22
Cost of 60-day fattening:				
Crushed corn, 15-pounds per day	7.65			
Hay, 6 pounds per day	2.20			
Silage, 20 pounds per day	2.19			
Salt and bonemeal, 4 ounces per day	.24			
Labor	.24			
Total	12.52			
Cost including fattening	29.47			

[1] 8.5 acres per head at $14.60 per acre.
[2] 21.16 acres per head at $2.43 per acre.
[3] Basis of 32 calves saved in the high veld and 30 calves saved in the low veld.
[4] 6⅜ acres at $14.60 per acre; 2.12 acres per head at $14.60 per acre.
[5] 12⅞ acres at $2.43 per acre: 4.23 acres per head at $2.43 per acre.
[6] Basis of 31 head remaining in the high veld and 28 head remaining in the low veld.
[7] Basis of 30 head remaining in the high veld and 26 head remaining in the low veld.

Farming in South Africa, August 1932: values converted at par of exchange.

COST OF MARKETING CHILLED BEEF TO ENGLAND, PER 700-POUND CARCASS, 1932

Cost in the Union (conversion at par):	
Railway charges for live animal, Pietersburg to Johannesburg at half rate	$1.26
Slaughtering charges at Johannesburg (fees, slaughtering, chilling, and loading charges)	4.05
Railway charges of meat to Capetown at 73 cents per 100 pounds, not including ice costing $6.98 per 2,000 pounds	5.11
Total	10.42
Cost overseas (gold at 25-percent exchange):	
Freight at 1⅛ cents per pound plus 10-percent surcharge	6.57
Insurance at $1.82 per £100 value	.18
Shrinkage, 1 percent	.53
Dock dues, cartage, pitching, and toll at 0.36 cent per pound	1.72
Brokerage at 2 percent	1.05
Interest for 1 month at 7 percent	.30
Total	10.35
Grand total	20.77

The Johannesburg municipal abattoir offered, in 1932, to slaughter, chill, and handle beef on behalf of the producers who might wish to export on their own behalf. Such charges per head (conversions at par) are as follows:

	s.	*d.*	*Dollars*
Abattoir entrance fee (subject to the rebate of 1 shilling (24 cents) per head for all cattle actually exported)	2	6	(0.61)
Lairage per day after first 24 hours		6	(0.12)
Inspection fee		8	(0.16)
Chilling for 6 days (reduced one-half for 3 days)	6	0	(1.45)
Slaughtering	5	0	(1.22)
Handling, quartering, loading	2	0	(0.49)
Total charges at Johannesburg	16	8	(4.05)

Hides, offal, and condemned meat to be sold for the producer at 4-percent commission.

The net prices c. i. f. Southampton realized by the Imperial Cold Storage & Supply Co. for an equal number of fores and hinds in one of its first shipments in 1932 shed additional light on the question of chilled-beef costs and returns:

Returns:	*Dollars, converted at par*
Chilled beef per 100 pounds	8.79
Less exchange 23 percent	2.02
Gross after exchange	6.77
Cost:	
Freight	1.39
Shrinkage 1 percent	.09
Insurance	.03
Brokerage 2 percent	.18
Interest 1 month	.05
Total charges	1.74
Less 23 percent	.40
Net charges	1.34

Cost—Continued.	Dollars, converted at par
Net proceeds per 100 pounds	5.43
Add credit hides and offal	.69
Total proceeds	6.12
Less preparation charges ½ penny per pound	1.01
Balance per 100 pounds	5.11

To this figure must be added the amount of the export subsidy which is 20 to 35 percent of the f. a. s. (free alongside ship) value of the beef and 10 percent export subsidy on the f. a. s. value of the hides. The balance including the export subsidy would be 25 shillings to 28 shillings ($6.08 to $6.81) per 100 pounds.

In 1932 when chilled-beef exports were inaugurated, English prices, on account of the foreign-exchange loss of about 25 percent, were not high enough to net Johannesburg prices to producers. The Government, therefore, established a system of export subsidies which were only slightly reduced after South African currency depreciated in 1933 to parity with English sterling. In 1932 the subsidy rate was on a sliding scale varying from 25 to 35 percent by steps of one-half or three-fourths percent in the ratio that the f. a. s. value varied by steps of 6.1 cents from the $6.06 minimum to the $7 level. Thus, the subsidy varied from $1.52 to $2.45 per 100 pounds. The net result in 1932 was that chilled-beef exports netted producers about as much as Johannesburg prices, but neither was quite equal to estimated costs of production. In 1933, however, with foreign-exchange losses stopped and subsidy payments continued, the returns were favorable to producers even though overseas prices had declined. The first 800 cattle exported as chilled beef netted producers about £10 per head.

If and when currency disparities and subsidies are both eliminated, the Smithfield prices must be 3 or 3½ cents per pound higher than Johannesburg prices to make the exporting of chilled beef attractive.

The Cattle Breeders and Feeders' Association made almost monthly shipments of chilled beef during 1932 and 1933. Its October 1932 shipment of chilled beef consisted of 239 hinds and an equal number of fores. The hinds averaged 170 pounds in weight and 6.02 pence in price per pound. The fores averaged 161 pounds in weight and 3.48 pence in price per pound, English sterling. The loss on foreign exchange was 30½ percent of the net overseas returns and the South African export subsidy was 35 percent of the f. a. s. value of 28 shilling 9 pence ($7) per 100 pounds. In actual amount these two items were almost exactly equal. The local charges for railage, abattoir, killing, and chilling and for ice, salt, railage of meat, and wharfage were £2 9 shillings 5 pence ($12.02) per head. The net return on farm per 100 pounds, dressed weight basis, was 28 shillings 7 pence ($6.96) South African currency, of which 35 percent was export subsidy. The average dressed weight per animal was 644 pounds and the net return per animal £9 9 shillings 9 pence ($46.17). At the time these cattle were sold overseas prime cattle were bringing 27 to 29 shillings 6 pence ($6.57 to $7.18) per 100 pounds dressed weight basis on the Johannesburg market. The price on the farm was 2 or 3 shillings (49 or 73 cents) less than this.

A detailed itemization of costs and returns in 1932 was prepared by the Division of Economics and Markets of the South African Department of Agriculture. The net return from this experimental shipment was 3.176 pence (6.44 cents) per pound. The average dressed weight per animal was 713 pounds, which returned £9 8 shillings 4 pence ($45.83) on the farm.

EXPERIMENTAL SHIPMENT BY CATTLE BREEDERS' AND FEEDERS' ASSOCIATION

	£	s.	d.
Gross return:			
83 hinds 15,334 pounds at 5.820 pence per pound	371	16	6
83 fores 14,250 pounds at 2.645 pence per pound	157	2	7
Total return	528	19	1
Overseas charges:			
Freight	76	19	1
Cartage	6	18	5
Market dues	3	18	3
Printing cards		17	8
Photographs	3	8	10
Commission, 3 percent	15	17	4
Total overseas charges	107	19	7
Net return overseas	420	19	6
Less exchange, 22 percent	117	17	5
Net return overseas (South African currency)	303	2	1
41½ hides and offal at £1 each sold locally	41	10	0
Total returns	344	12	1
Local charges:			
Railage live animals at half rate	8	9	6
Abbatoir charges	5	13	6
Slaughtering and loading	16	16	3
Cold storage	13	0	9
Wrappers and ice	16	2	0
Railage on meat	43	1	2
Total local charges	103	3	2
Net return on farm (without subsidy)	241	8	11
Add subsidy (35 percent on f. a. s. value 28 shillings 9 pence per 100 pounds)	150	3	9
Net return on farm	391	12	8

Returns and charges per pound:	Pence
Gross return	4.291
Overseas charges	.876
Net return overseas	3.415
Less exchange	.956
Net return overseas (South African currency)	2.459
Add value hide and offal	.336
	2.795
Local charges	.837
Net return (without subsidy)	1.958
Add subsidy	1.218
Net return on farm	3.176

The value of the subsidy is paramount in maintaining chilled-beef exports at prices as low as those in England in 1933.

The Imperial Cold Storage & Supply Co. in a recent court case claimed a 10-percent subsidy on the value of the cattle in the open market at the ports of shipment. The Government claimed that the subsidy must be calculated on the values to the exporter, which, in this case, proved to be only half the value on local markets. In the case of low overseas prices this point is likely to affect the attractiveness of export consignments.

GOVERNMENT AIDS

The Meat Trade Control Act (Act No. 29 of 1932), to regulate supplies and prices on Union markets, was only a temporary measure to serve until a more comprehensive livestock and meat industry control act could be enacted in 1934.

The new legislation contains three essential features: (1) The elimination of scrub bulls; (2) the correction of local marketing defects; and (3) a livestock levy for paying additional subsidies on overseas exports of livestock and meat.

With reference to the elimination of scrub bulls, it is provided that 25 cattle farmers in any district shall request the local magistrate to convene a public meeting of cattle farmers, and, if a majority at such a meeting vote in the affirmative, it may be made illegal to maintain any bulls over 12 months of age in the area which are not approved and branded or marked by a Government inspector, from 12 to 18 months being allowed to effect the change. A cattle farmer is defined as an owner or lessee of a farm on which there are at least 30 head of cattle, of which at least 15 are breeding stock.

With respect to local selling methods, the act provides that (1) the Government may require that cattle sold at certain markets must be sold on a weight basis instead of per head; (2) Government money may be loaned to cooperative associations or expended directly for constructing cold-storage facilities or meat extract or canning factories; (3) certain meat shall be graded; and (4) certain condemned practices of buyers and butchers of livestock shall be illegal; for instance, collusion in price-fixing or refusal to trade on customary terms. The control of local livestock supplies as provided in the Meat Trade Control Act of 1932 was reenacted.

With respect to the export levy, a levy of 2 shillings per head has been made since August 15, 1934, on all cattle slaughtered at abittoirs or recognized slaughter poles, with levies of 6 pence for calves under 6 months old, and 3 pence for sheep and for goats. The cattle funds are to be used for paying bounties (varying according to grade) on cattle or beef exports, and the sheep and goat funds are to be used for paying export subsidies on sheep or mutton. A levy of 2 shillings (49 cents) per head will provide over £50,000 ($243,000) for export subsidies on cattle, and since the number of cattle now exported overseas in the form of meat is only 40,000 to 50,000 head, it is apparent that a subsidy fund of this size should be moderately effective until exports have increased to 100,000 to 150,000 head of cattle per year.

A board of 11 members has been appointed to administer these provisions. They represent various groups: Producers of livestock, 4; of pedigree stock, 1; of meat exporters, 1; of butchers, 1; of auctioneers, 1; of municipal authorities, 1; of the chamber of commerce, 1; and the Secretary for Agriculture. The Director of Native Agriculture serves ex-officio.

Under the terms of the agreement reached at the Imperial Economic Conference at Ottawa in 1932 (for the consideration of preferential tariffs within the British Empire), the British Government has undertaken to consider a scheme for the quantitative regulation of imports of mutton, lamb, and chilled beef, and provision will be made for the importation of these commodities from South Africa. Chilled beef is not expressly mentioned in the agreement but is included by an exchange of notes in accordance with which the United Kingdom Government undertakes to encourage the marketing of South African beef in Great Britain. The Minister of Finance expresses the belief that the quantitative regulation of these imports into the United Kingdom must necessarily reflect favorably on price levels of this commodity in South Africa and that a substantial meat trade with Great Britain will be built up.

Under the Ottawa agreement Great Britain undertook to curtail foreign imports of mutton, lamb, and frozen beef 10 percent during the quarter ended March 31, 1933, and by additional quantities reaching 35 percent curtailment during the quarter ended June 30, 1934. Imports of foreign chilled beef were to be limited to the quantities imported in 1931–32. In putting these agreements into operation, meat from the Union of South Africa could be admitted and, in addition, the marketing of chilled beef from the Union was encouraged.

The Government of Northern Rhodesia in June 1932 prohibited the importation of meat from animals below a certain weight. This has the effect of helping Northern Rhodesia greatly and injuring South Africa slightly in the marketing of cattle. The South African Government published the following notice:

> It is hereby notified for general information that in terms of Article VII of the Customs Agreement between the Government of the Union of South Africa and the Government of Northern Rhodesia, the latter Government has decided to prohibit the importation into Northern Rhodesia of meat from animals which, at the point of despatch, are below the weight of 1,050 lb. in the case of an ox, and of 790 lb. in the case of a cow.
>
> In order to permit of meat which complies with the above requirements being exported to that territory, it is necessary for the consignor to obtain a certificate from the Department of Agriculture to the effect that the animals were above the above limit weights.
>
> No definite scheme has as yet been worked out as to the procedure to be adopted for the issue of the necessary certificates, but in the meantime persons who contemplate exporting meat or cattle to Northern Rhodesia should give timely notice thereof to this Department, when steps will be considered to have the certificates issued to them.

EXPORTS

In connection with the Union's increasing interest in the question of exporting chilled beef and live cattle, it must be observed that the Union of South Africa has exported large quantities of frozen beef

since 1915. Prior to that time the Union was a large importer of beef. The high point in exports was reached in 1917, during the World War, when 50,000,000 pounds of beef were exported. After the World War exports dropped as low as 1,500,000 pounds in 1923. Since 1925 the annual exports have ranged between 15,000,000 and 35,000,000 pounds (table 35). In 1932 exports of 16,291,713 pounds were less than those during the 3 preceding years, probably because Rhodesian cattle could not be shipped to the Union for slaughter on account of the outbreak of foot-and-mouth disease. Most of the beef exported was on contract to supply the Italian Army (table 36). It represented a low-quality beef from inferior cattle. It is safe to estimate that this quantity of beef represented 30,000 to 35,000 cattle. In addition about 300,000 pounds of fresh meat of all kinds were exported to Northern Rhodesia (chiefly), Southern Rhodesia, and South-West Africa in 1932 as against about 500,000 pounds in 1931 and only 35,000 pounds in 1930.

TABLE 35.—*Beef: Imports and exports, overseas trade, Union of South Africa, 1910 to 1933*

Year	Imports			Exports of South African produce [1]		
	Weight	Declared value [2]		Weight	Declared value [2]	
		Total	Per 100 pounds		Total	Per 100 pounds
	Pounds	*Dollars*	*Dollars*	*Pounds*	*Dollars*	*Dollars*
1910	2,959,044	148,073	4.97	5,027	477	9.49
1911	8,012,316	350,967	4.45	220,398	23,571	10.27
1912	9,023,705	420,500	4.76	296,834	32,743	11.03
1913	8,910,773	391,791	4.38	121,264	15,281	12.08
1914	737,050	53,331	7.23	483,767	48,850	10.53
1915	16,957	1,776	10.47	5,071,727	516,311	8.05
1916	6,969	676	9.70	19,260,612	1,911,521	9.92
1917	5,680	691	12.17	49,997,410	5,410,768	10.82
1918				21,135,367	2,637,893	12.48
1919				46,303,180	5,538,832	11.95
1920	83,462	5,445	6.49	14,435,455	1,788,610	12.39
1921	8,033	861	9.53	3,395,005	449,914	13.25
1922	5,620	360	6.52	1,710,860	169,780	9.75
1923	5,748	881	15.33	1,534,853	132,999	8.61
1924				9,601,043	578,889	6.03
1925	3,540	832	23.50	[3] 22,747,597	[3] 1,393,998	6.03
1926	18,942	2,817	15.61	[3] 34,971,891	[3] 2,059,914	5.89
1927				[3] 14,467,121	[3] 911,926	6.51
1928	1,560	195	13.00	[3] 17,788,919	[3] 1,170,307	6.58
1929				[3] 25,950,392	[3] 1,482,456	5.72
1930				[3] 30,582,101	[3] 1,679,701	5.49
1931	2,732	213	8.89	[3] 22,216,306	[3] 1,188,212	5.34
1932				[3] 16,291,713	[3] 708,257	4.90
1933				[3] 23,477,695	[3] 1,334,681	5.68

[1] Exports include ship's stores, but not exports to South-West Africa, Northern Rhodesia, and Southern Rhodesia.

[2] Converted at par, although South Africa was off the gold standard after the World War late 1920 to May 1925. The discount of South African currency during that period was usually the same as that for English currency, but varied for a short period from 5-percent premium to 8-percent discount against English currency.

[3] Including beef of Rhodesian and South-West African cattle slaughtered in the Union: 1925 to 1930, millions of pounds weight, 7, 28, 11, 16, 13, and 9, respectively.

Union of South Africa Official Year Book (37, *no. 12, p. 384*), Trade and Shipping, 1931 (*39*).

Exports of live cattle from the Union have been insignificant. The number of cattle for slaughter exported by water during 1929, 1930, 1931, and 1932, was 0, 98, 0, and 1,006, respectively; cows and calves 82, 165, 161, and 46; bulls 63, 39, 63, and 16, respectively. These in-

significant exports were chiefly to nearby South African countries. The 1931 exports included 29 head of cows and calves of Afrikander breed shipped to the United States. In addition, exports for slaughter to Northern Rhodesia (chiefly), Southern Rhodesia, and South-West Africa in 1930, 1931, and 1932 were 7,217, 9,805, and 6,391 head, respectively, and exports of other live cattle to these destinations 1,690, 722, and 1,051 head, respectively.

TABLE 30.—*Meat, fresh or frozen: Quantity exported overseas from the Union of South Africa to specified destinations*

Destination	Beef and veal					Mutton				
	1930	1931	1932			1930	1931	1932		
				Value					Value	
	Quantity	Quantity	Quantity	Total	Per 100 pounds	Quantity	Quantity	Quantity	Total	Per 100 pounds
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Dollars*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Dollars*
United Kingdom	3,782	948	830	52	6.28	140	.....	127	10	8.24
Italy	13,709	14,858	14,690	679	4.62	..	..	.....	.....	.....
France	8,240	4,648	.....	.....	.....	.....	.....	.....	.....	.....
Belgian Congo	.....	1,070	215	11	5.20	.....	27	3	(1)	11.12
Morocco	1,709	.....	.....	.....	.....	.....	.....	.....	.....	.....
Others	[2] 2,249	[3] 71	[4] 141	11	7.80	1	0	14	2	12.75
Total	29,749	21,591	[5] 15,876	753	4.74	147	38	[6] 144	13	8.78

Destination	Pork					Poultry				
United Kingdom	9	7	21	2	10.10	1	19	30	8	25
Italy	12	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belgian Congo	.....	103	.....	.....	.....	.....	(1)	(1)	(1)	31
Others	4	3	5	(1)	6.94	(1)	1	(1)	(1)	.....
Total	25	113	26	2	9.52	1	20	30	8	25.60

[1] Less than 500.
[2] Chiefly to Belgium, Germany, Egypt, and Australia.
[3] Chiefly to Belgium, Zanzibar, Mozambique, and Egypt.
[4] Chiefly to the Netherlands and Germany.
[5] Exports during the first 6 months of 1933 were at a greatly increased rate: Beef, 12,408,631 pounds; mutton 193,646 pounds.
[6] Union of South Africa Trade and Shipping.

Exports of live sheep are likewise insignificant. During 1929, 1930, 1931, and 1932 the numbers of sheep for slaughter exported by water were 3,617, 3,194, 2,110, and 1,474, respectively, and rams, ewes, and lambs numbered 113, 237, 70, and 108, respectively. To Northern Rhodesia, Southern Rhodesia, and South-West Africa exports of sheep and goats were 39,785 in 1930, 29,623 in 1931, and 18,738 in 1932.

Mutton exports are much less important than beef exports. During four recent years mutton exports were as follows:

	Exports overseas pounds
1929	31,614
1930	146,587
1931	35,522
1932	143,547

During the same years mutton used in ship stores was as follows:

	Ship stores pounds
1929	150,848
1930	152,095
1931	105,391
1932	105,630

Mutton exports, if any, to Northern Rhodesia, Southern Rhodesia, and South-West Africa are grouped with beef as "fresh meat." Small exports are made each week to other nearby African countries. Most of the mutton exports in 1930 and 1932 were to the United Kingdom, but there were none to that destination in 1931.

The Italian army meat contract was awarded in 1932 for the delivery of 10,000 tons of frozen beef. The stocks of cattle used for this contract are poor and small so that this represents approximately 50,000 head. The contract specified an extremely low price, which allowed the contractor to pay the farmer only 15 shillings ($3.65) per 100 pounds carcass weight. Even this low price was made possible only because of the export subsidy being paid by the Government. The contract was not renewed in 1934.

The annual quantity of beef that could be immediately available for export as chilled beef has been officially estimated at 10,000 head from the Union, 30,000 to 40,000 from Southern Rhodesia, and 7,500 from the protectorates. An agreement has been reached by representatives of these countries on the standard of quality for chilled-beef export, which is the same as the quality sent overseas from the Union in its experimental shipments. Rhodesian cattle will be slaughtered and the carcasses inspected in Rhodesia, while cattle from the protectorates will be slaughtered and inspected in the Union. The question of control of quantities exported was left in abeyance.

IMPORTS

The Union of South Africa represents the principal market for cattle shipped from the surrounding countries including Southern Rhodesia, Bechuanaland, South-West Africa, Swaziland, and Basutoland (table 37). Cattle imports into the Union from these countries reached substantial proportions during the year ended June 30, 1934, despite the fact that quarantine regulations on account of foot-and-mouth disease were imposed against shipments originating in Rhodesia and portions of Bechuanaland during the last few months of the fiscal year. The better grades of cattle are marketed in the Johannesburg or other Union markets, while the poorer grades of cattle are slaughtered and shipped as fresh meat (mostly to the Italian army) or as canned meat or meat extract.

BASUTOLAND, SWAZILAND, BECHUANALAND, AND SOUTH-WEST AFRICA

There are about 2,000,000 head of cattle in Basutoland, Swaziland, Bechuanaland, and South-West Africa. The cattle are fairly equally divided among the four regions. Ownership is largely in native hands except in South-West Africa. Trend figures are not available for Swaziland, Bechuanaland, and South-West Africa. In Basutoland, which is bordered by the principal sheep area of the

Union, sheep have been increasing more rapidly than cattle. The principal outlet is to the Union, although South-West Africa slaughters a good many cattle for direct export overseas.

TABLE 37.—*Cattle: Imports into the Union of South Africa from adjoining territories, 1930–32*

Year and country	Consumption in Union	Slaughter and export overseas	Breeding and working	Total imports	Principal months
1930					
	Number	*Number*	*Number*	*Number*	
Southern Rhodesia	7,466	21,935	----------	29,401	June to October.
Bechuanaland	9,818	11,749	1,978	[1] 23,545	March to October.
South-West Africa	7,948	----------	----------	[2] 7,948	May to December.
Swaziland	3,143	----------	1,231	[3] 4,374	Entire year.
Basutoland	175	41	11,451	11,667	
Total	28,550	33,725	14,660	76,935	
1931					
Southern Rhodesia	416	2,629	----------	[4] 3,045	
Bechuanaland	9,634	7,739	2,060	[1] 19,433	March to October.
South-West Africa	20,411	----------	----------	[5] 20,411	May to December.
Swaziland	3,523	----------	1,659	[3] 5,182	Entire year.
Basutoland	126	----------	17,933	18,059	
Total	34,110	10,368	21,652	66,130	
1932					
Southern Rhodesia	----------	----------	----------	----------	
Bechuanaland	10,483	7,575	2,059	[1] 20,117	March to October.
South-West Africa	22,401	----------	----------	[6] 22,401	May to December.
Swaziland	4,052	----------	1,287	[3] 5,339	Entire year.
Basutoland	34	----------	12,201	12,235	
Total	36,973	7,575	15,547	60,095	

[1] By subtracting from total.
[2] Trade and Shipping, 1930, gives 7,478 cattle.
[3] Assuming 1,000 pounds live weight per head.
[4] Trade and Shipping, 1931, gives 2,382 cattle.
[5] Trade and Shipping, 1931, gives 20,147 cattle.
[6] Trade and Shipping, December 1932, gives 21,592 cattle.

South African Crops and Markets and Trade and Shipping Returns.

BASUTOLAND

Basutoland is a mountainous native territory under British control which is surrounded by Orange Free State and Cape Provinces. It contains only 7,498,000 acres, but it has about 500,000 natives, among whom production is higher than in most native areas. Basutoland exported in the 5 years 1928–32, 7,212, 7,947, 11,667, 18,059, and 12,235 cattle, respectively. Imports in 1928 and 1929 were 4,772 and 2,428 cattle, but in each subsequent year they were far below 1,000. Basutoland also exported hides in those 5 years, amounting to 607,428, 445,286, 371,620, 186,015, and 102,730 pounds, respectively. The decrease in number of hides and the increase in number of cattle exported strongly suggest what progress may be expected from other native territories with respect to beef production.

Basutoland livestock figures up to 1930 were derived by working out the average yearly increase in stock from the 1921 and 1911 census returns, adding them each year to the 1921 census returns. It was hoped that an agricultural census would be taken again in 1931, when these figures would have been checked, but this was not done.

The figures for 1931 are arrived at by various means. Those for sheep and goats can be considered correct, as compulsory dipping was in force during 1931 and these are the figures obtained from the dipping returns. The principal veterinary officer and the agricultural officer were sure the figures given for cattle in 1930 were too high owing to great mortality through spring drought, and they reestimated the number of cattle at 500,000 (table 38).

TABLE 38.—*Livestock: Number in Basutoland, 1904–33*

Year	Cattle	Sheep	Goats	Year	Cattle	Sheep	Goats
	Number	*Number*	*Number*		*Number*	*Number*	*Number*
1904	200, 883			1927	659, 411	2, 148, 870	906, 647
1911	[1] 432, 748			1928	650, 000	2, 100, 000	905, 000
1921	[2] 571, 415	1, 851, 426	894, 257	1929	664, 166	2, 149, 074	907, 065
1922	588, 581	1, 903, 560	896, 322	1930	649, 090	2, 399, 801	1, 153, 591
1923	602, 747	1, 952, 574	898, 387	1931	600, 000	2, 828, 700	[3] 1, 005, 822
1924	616, 913	2, 001, 648	900, 452	1932	550, 000	1, 949, 322	723, 441
1925	631, 079	2, 050, 722	902, 517	1933	550, 000	1, 884, 597	669, 198
1926	645, 245	2, 099, 796	904, 582				

[1] Not including 4,603 owned by Europeans.
[2] Not including 6,251 owned by European traders in the villages.
[3] From official sources.

SWAZILAND

Swaziland is a governmental "island" in South Africa, set aside by the British Government as a reserve for natives. It consists of 6,705 square miles located at the southeastern corner of the Transvaal Province. The elevation is mostly from 1,000 to 2,000 feet, but the edge of the high plateau on the west is about 4,000 feet high. The low veld is covered with bushes and scattered trees, and everywhere there is thick grass of medium height. Rainfall ranges from 20 to 50 inches according to elevation and location. The population in 1921 included 2,205 Europeans, 110,295 Bantus, and 451 mixed and Asiatics.

There are several large estates owned and operated by Europeans, dating back to a time prior to the creation of Swaziland in its present status. One of these is the Bar R Ranch (also called Natalia Ranch), which is located just north of the Usutu River, near the Natal border. The ranch consists of 267 square miles (170,508 acres) with 34 miles frontage on the Usutu River. In 1926 the ranch was stocked with 18,000 head of grade Shorthorns and Herefords and had a substantial acreage planted to cotton. Nevertheless, the corporation failed to pay dividends, and in 1931 the entire 18,000 head of cattle were marketed, and the property was sold at auction in Johannesburg in August 1931 for £55,000 ($267,630), approximately 6 shillings 6 pence ($1.58) per acre. This is to be compared with a sale at 10 shillings ($2.43) an acre 3 years previous, but the previous transaction was never completed.

A European cattle rancher in Swaziland made the following observations on the cost of producing cattle in his area. The costs refer to a herd of 100 cows on 1,000 morgen (2,117 acres) of land, together with the natural increase. The original cows are sold at the end of the fourth year, and the herd, including young stock, is maintained at approximately 300 head.

Approximate cost of producing cattle in Swaziland

Interest at 6 percent:	
2,117 acres at $1.15, value $2,435.	
100 cows, value $1,460.	
2 bulls, value $195.	
Dipping tank, value $730	$280
1 herd boy	117
Dip (120 pounds arsenite)	10
Carting water	10
Total first year	426
Total second year	438
Total third year	462
Total fourth year	487
Total fifth year	511
Total 5 years	2,324

This rancher estimates his annual calf crop at 60 percent, and concludes that the cost of producing cattle in Swaziland is approximately $16 per head for cattle marketed as 4-year-olds. This estimate does not provide for the cost of supervision or death losses from disease, snake bite, crocodiles, etc. The present value of cattle such as are produced in Swaziland, if appraised at the ranch, is not much, if any, above this approximate cost. It would appear that the solution lies in improved breeding and improved markets.

BECHUANALAND

Bechuanaland, with its 176,000,000 acres, is much larger than the 2 native territories just discussed, but it is very dry and is populated by only about 150,000 natives and 2,000 Europeans. Most of the land, if used at all, is used for grazing native cattle, although there are considerable numbers of sheep (mostly nonwooled) and goats (table 39). No estimates of the trend of production are available.

TABLE 39.—*Livestock: Number in Bechuanaland, 1924*

Kind	Owned by natives	Owned by Europeans	Total
	Number	*Number*	*Number*
Cattle	426,344	68,718	495,062
Sheep	120,186	12,268	132,454
Goats	237,740	10,231	247,971
Horses and mules	2,264	493	2,757
Donkeys	6,206	2,278	8,484

Official Year Book of the Union of South Africa.

SOUTH-WEST AFRICA

South-West Africa, formerly a German possession, is now a mandate of the Union. Its area is vast, 206,332,000 acres, but the climate is mostly arid, and the population consists of only 32,840 Europeans (1931) and 261,000 natives (1926). The Europeans are chiefly interested in cattle and Karakul sheep, although other sheep, chiefly nonwooled, are common. The natives own a considerable number of cattle, nonwooled sheep, and common goats. In the aggregate about half the grazing is used by cattle (table 40).

TD 486 (1935) : USDA TECHNICAL BULLETINS : UPDATA
AGRICULTURE IN SOUTHERN AFRICA
TAYLOR, C.C. 2 OF 4

TABLE 40.—*Livestock: Number in South-West Africa, 1928–30*

Kind	Owned by—				Total		
	Europeans		Natives and mixed				
	1929	1930	1929	1930	1928	1929	1930
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Cattle	585,740	549,912	130,809	105,348	655,478	697,549	655,260
Karakul sheep	230,295	289,600	396	221	179,509	230,691	289,821
Wooled sheep	278,173	252,265	902	526	246,479	279,075	252,791
Blackhead Persian sheep	106,565	113,863	407	100	40,660	106,972	113,963
Other sheep	866,617	851,917	113,686	92,499	1,057,495	980,303	944,416
Angora goats	34,052	30,904	1,693	1,017	29,901	35,745	31,921
Other goats	464,118	380,407	550,537	446,342	1,192,539	1,014,655	826,749
Horses	14,202	13,309	6,806	6,067	18,832	21,003	19,376
Mules	1,733	1,775	71	57	1,795	1,804	1,832
Donkeys	37,878	37,108	23,617	23,868	57,879	61,495	60,976
Hogs	9,060	8,182	113	57	10,068	9,173	8,239

Correspondence, senior veterinary surgeon, Windhoek, South-West Africa.

The quality of the cattle is inferior, and owing to frequent droughts the output of beef is erratic and inferior. Practically no cattle feed is grown.

The Imperial Cold Storage Co. at Walvis Bay during 1931 slaughtered for export overseas 14,246 head of cattle, 323 sheep, and 46 pigs. Frozen-beef exports from South-West Africa were, therefore, about one-third as large in volume as beef exports from the Union.

Cattle ranching in South-West Africa during 1931 was unprofitable. One large cold storage company closed its ranch at Aruchab, and the branch of an internationally-known company is the only remaining large concern now ranching in South-West Africa. This company closed its meat-extract works at Okahandja which had absorbed 17,000 head of inferior cattle during 1930 but none during 1931.

The Government of South-West Africa, like the Governments of Southern Rhodesia and Northern Rhodesia, has ceased inviting immigrants to settle on agricultural lands until the present settlers shall be established on a profitable basis.

The 1932–33 drought in South-West Africa made it practically impossible to find cattle sufficiently fat for the proposed chilled-beef trade. Government representatives made a tour of inspection in an effort to locate 2,000 head suitable for chilling, but they were unsuccessful, and export operations from South-West Africa were not undertaken in 1933.

SOUTHERN RHODESIA

Southern Rhodesia is preeminently a cattle country (table 41), ranking fourth among the 13 countries of south and east Africa. It ranks second only to the Union in number of European-owned cattle and ranks first in the beef quality of the cattle. Cattle raising will continue to be the principal enterprise. The principal grazing area is in the drier southern part and the principal fattening area in the central portion around Salisbury. The northern third of

the colony is rendered useless by the presence of the tsetse fly which carries the deadly cattle disease trypanosomiasis. The colony is not suitable for wooled sheep except along the mountainous eastern border. The small European population of the colony—about 50,000—the small requirements of the northern copper mines, and the long and costly transportation of beef to the seaboard and to England are the principal handicaps to a more rapid expansion of cattle numbers. The proposed construction of a railroad westward from Southern Rhodesia to the Atlantic coast would contribute greatly to the progress of the colony by shortening the time and distance as compared with the other three rail outlets.

TABLE 41.—*Value of production and exports of cattle in relation to other products in Southern Rhodesia, 1929–30 and 1930–31*

Commodity	Production		Exports	
	1929–30	1930–31	1929–30	1930–31
	Dollars	*Dollars*	*Dollars*	*Dollars*
Cattle for slaughter	3, 771, 344	1, 581, 531	1, 654, 525	238, 446
Meat, fresh	1, 600, 996	973, 250	87, 593	20, 198
Hides, cattle, dry	413, 631	243, 312	384, 434	214, 115
Butter	564, 485	485, 625	350, 370	218, 981
Cheese	48, 662	36, 497	7, 299	4, 866
Tobacco, cigarettes	1, 075, 441	1, 177, 633	330, 005	384, 434
Tobacco, leaf	2, 189, 813	1, 839, 443	1, 489, 072	1, 824, 844
Corn, grain	3, 498, 834	2, 773, 763	1, 236, 028	827, 263
Corn, meal	2, 535, 310	2, 189, 813	442, 829	116, 790
Flour and meal, wheaten	924, 588	802, 931	189, 784	204, 382
Citrus fruit	437, 962	472, 026	309, 032	379, 508
Eggs	311, 440	286, 841	194, 650	155, 720
Pigs	291, 975	194, 650	63, 201	19, 465
Bacon and hams	155, 720	116, 790	24, 331	19, 465
Ground nuts	107, 058	102, 191	53, 529	48, 662
Cotton, lint	60, 828	87, 592	43, 796	92, 459
Total	17, 988, 003	13, 374, 888	6, 951, 438	4, 778, 658
Total, less duplications	12, 200, 988	8, 074, 091		

Southern Rhodesia Government Committee report, 1932; values converted at par.

TREND OF PRODUCTION

In 1930, Southern Rhodesia had only about 1,000,000 head of sheep and goats but 2,468,418 cattle, of which 1,558,075 were owned by natives. The number of cattle increased during the 2 following years on account of the loss of the export market following the outbreak of foot-and-mouth disease. This is doubtless only a temporary factor, but more permanent influences are at work tending to increase the output of cattle in Southern Rhodesia (table 42).

The number of cattle of Southern Rhodesia will probably increase 50 to 100 percent within the present generation. In 1932 cattle in Southern Rhodesia numbered 2,755,570 on an area of 150,344 square miles (96,220,160 acres). This indicates a ratio of approximately 35 acres per head, although in actual practice the various cattle ranches are stocked to ratios ranging from 3 to 35 acres per head. The average carrying capacity for the entire colony is low because approximately one-third of the area of the colony is afflicted with the tsetse fly, and no use can be made of this land. If this area is eliminated the ratio is narrowed to approximately 25 acres per head, which is reasonably accurate for the principal ranching areas.

TABLE 42.—*Cattle owned by Europeans in Southern Rhodesia, classified December 31, 1929 to 1933*

Age and sex	1929	1930	1931	1932	1933
	Number	*Number*	*Number*	*Number*	*Number*
Cows, regularly milked	50,809	52,975	87,778	97,336	54,028
Cows, other	233,854	241,090	220,101	222,294	241,046
Heifers over 1 year	128,510	127,751	132,785	137,534	131,495
Yearling oxen or bulls	72,085	81,080	88,165	94,220	77,615
Calves, under 1 year	148,192	153,833	149,238	150,503	137,821
Bulls in use	8,705	8,650	10,208	10,394	9,721
Other bulls	4,400	4,580	4,007	3,728	3,510
Trained oxen	116,805	110,830	111,750	114,003	121,040
Untrained oxen	138,652	129,565	150,061	161,863	162,180
Total	902,103	910,343	954,161	991,875	940,056
Purebred (include l above):					
Cows, regularly milked	1,976	2,032			
Cows, other	3,305	3,510			
Heifers	2,330	2,241			
Calves	2,623	2,789			
Bulls in use	3,330	3,053			
Bulls, other	1,271	1,000			
Total	14,844	15,297			

Rhodesia Agricultural Journal (*6*), Economic and Statistical Bulletin of Southern Rhodesia, May 21, 1934.

In 1898 there were only about 28,000 cattle left in Southern Rhodesia after the rinderpest invasion, of which about one-half were owned by Europeans and one-half by natives. The number of cattle increased rapidly among both classes of owners until 1924, at which time the Europeans and natives each owned about 1,000,000 cattle. Since then the number of European-owned cattle has declined slightly, while the number of native-owned cattle has increased 75 percent (table 43).

TABLE 43.—*Cattle: Number in Southern Rhodesia, 1898, 1903, 1908, and 1913–33*

Year	European-owned	Native-owned	Total
	Number	*Number*	*Number*
1898 (remaining after rinderpest invasion)	14,000	14,000	28,000
1903 (approximate)	80,000	90,000	170,000
1908 (approximate)	175,000	205,000	380,000
1913 (approximate)	300,000	375,000	675,000
1914	341,878	406,180	748,058
1915	394,856	446,060	840,916
1916	468,504	491,522	960,026
1917	532,311	551,032	1,083,343
1918	600,447	610,105	1,210,552
1919	678,508	652,776	1,331,284
1920	772,801	741,402	1,517,293
1921	905,040	845,498	1,750,538
1922	936,251	864,894	1,801,145
1923	993,608	927,343	1,920,951
1924	1,003,629	1,005,277	2,008,906
1925	1,006,086	1,095,841	2,101,927
1926	991,216	1,197,466	2,188,682
1927	956,522	1,370,567	2,327,089
1928	905,383	1,420,913	2,326,296
1929	902,103	1,495,803	2,397,906
1930 [1]	910,343	1,558,075	2,468,418
1931 [1]	954,161	1,628,299	2,582,460
1932 [2]	991,875	[3] 1,755,610	2,747,485
1933 [2]	940,056	1,748,621	2,688,677

[1] There were 2,660 European cattle owners in 1930, 2,821 in 1931.
[2] Economic and Statistical Bulletin of Southern Rhodesia, May 21, 1934.
[3] Natives also owned 288,958 sheep (nearly all nonwooled) and 785,409 common goats.

Southern Rhodesia Department of Agriculture, Report of the Secretary, 1930 (*86*), Official Yearbook (*57, no. 2, p. 353*), and Rhodesia Agricultural Journal (*31, p. 326*).

Any increase in production must be mostly for export since the domestic consumption is small in relation to the total number of cattle. In 1931, consumption in Southern Rhodesia was 82,683 cattle, of which 75,486 were slaughtered by butchers and 7,197 on farms. Death losses are more than half as important as local consumption. During 1931 death losses among European-owned cattle amounted to 58,124 (6.1 percent), of which 21,346 died from feed shortage and 19,297 from disease. These figures were higher than for the preceding year, when death losses amounted to 41,009 (4.5 percent), of which 10,843 died from feed shortage and 17,159 from disease.

All of the cattle owned by natives and most of the cattle owned by Europeans are native cattle of no particular breed. In 1931 only 13 percent of the European-owned cattle were classified as graded cattle, that is, better than native cattle, and less than 14,000 were purebred. Rhodesian cattle are mostly native cattle crossed, in the case of those owned by Europeans, with English or Africander bulls. Purebred cattle, in order of numerical importance, include Friesland, Hereford, Africander, Shorthorn, Angus, Sussex, South Devon, North Devon, Red Lincoln, Red Poll, and Ayrshire.

The Government of Southern Rhodesia is making some headway in improving the quality of the cattle, so that the product will be acceptable as chilled beef on English markets. Progress is being made in increasing the carrying capacity of the pastures by means of mowing during the most rapid growing season and by saving hay for the dry winter months. Methods are being devised for eliminating tick-borne diseases and for lessening the losses from trypanosomiasis. Land is relatively cheap, sparsely settled, and not fully stocked. Progress is being made in teaching the natives to send their surplus cattle to market. The chief native commissioner reported that natives sold 79,248 head of cattle in 1930. This declined to 41,156 in 1931, and 31,600 in 1932, but rose to 81,100 in 1933. The decline in 1931 and 1932 was caused by a closure of cattle markets on account of foot-and-mouth disease, and hence was only temporary. Including the 25,300 head of cattle consumed by the natives themselves, 106,400 head of native cattle were disposed of during 1933. However, death losses among native-owned cattle, 89,600 in 1932, and 193,100 in the dry year, 1933, exceeded the number of native-owned cattle sold or slaughtered. Rhodesian natives have more nearly commercialized their cattle ownership than have the natives in the Union, but there is still much need for further action in this direction.

The quality of Rhodesian cattle is generally inferior, although better than that in neighboring countries. The age at which the cattle are usually slaughtered is between 5 and 10 years, and the weight varies from 700 to 1,400 pounds. For export to the Union of South Africa oxen must weigh above 1,050 pounds and cows 750 pounds. Corn is seldom fed to cattle, although about 1,000,000 bushels are exported annually. The quality of the cattle will improve as breeding and feeding methods are improved. Breeding improvement is retarded by the existence of diseases to which the native cattle are more resistant. Feeding improvement is also retarded by the system of local marketing whereby cattle are sold by the head, occasionally by weight, without due regard to quality and finish.

Cattle diseases constitute a serious handicap to the industry. Many of them are tick-borne, and the present law requiring all cattle to be dipped weekly throughout the year is proving efficacious in conquering them. Trypanosomiasis is fly borne and less easily eradicated. The outbreak of foot-and-mouth disease in 1931 was the most serious calamity that had befallen the industry since the rinderpest scourge of 1895–98, coming as it did at the beginning of a campaign to put quality beef on the English market. Death losses from foot-and-mouth disease were not heavy, but the loss of the export market was a heavy financial blow to cattle producers.

About one-third of the colony of Southern Rhodesia and a large part of Northern Rhodesia would be suitable for grazing cattle except for the occurrence of the tsetse fly, which spreads the disease nagana or trypanosomiasis. The tsetse fly almost disappeared following the scourge of rinderpest which swept over Southern Rhodesia in 1896, eradicating both cattle and game. Since that time the fly has been gradually returning to the same areas which were originally infested. Considerable concern has been felt in Southern Rhodesia over the fact that agricultural settlement has extended north of Salisbury and Hartley into an area which was originally infested by the fly, and during the past 6 or 8 years the fly has encroached upon these areas, causing death losses among work oxen and beef cattle to the extent that some farms had to be abandoned.

To check this possible calamity to agricultural settlement in Southern Rhodesia the Rhodesian Department of Agriculture undertook to check and drive back the fly from the Umboe and Sipolilo areas of Lomagundi district by eradicating game upon which the fly feeds and from which the disease is spread to domestic animals. Fences 6 feet high consisting of 7 strands of barbed wire were erected along 3 lines of defense for a total length of 120 miles. Guns were issued to native hunters for the purpose of killing all game within these fenced strips. Results, as recently reported by the chief entomologist for Southern Rhodesia, are encouraging and lead to the belief that the evacuated farms can again be occupied and that the advance of the fly into its former haunts can be checked.

Indications are that, if and when economic conditions justify, extensive areas can be added to the present cattle areas of the Rhodesias and that the number of cattle, instead of decreasing, can be expected to increase. In fact, it has been demonstrated that losses from trypanosomiasis can be reduced by prompt and adequate treatment of cattle in the early stages of infection.

At the beginning of April 1931, an outbreak of foot-and-mouth disease was reported on two large ranches in the southern part of the colony. The affected ranches were stocked with 100,000 cattle, and the danger of further spread was serious.

This was said to be the first outbreak of this disease in southern Africa since 1891. The Rhodesian veterinary officer immediately placed an embargo on the movement of cattle and took other preventive measures. Cattle from Rhodesia were being shipped into and through the Union of South Africa, but a quarantine was imposed against all stock, livestock products, and vegetable products. The immediate effect was to put a stop to the vigorous efforts being put forth to expand the export trade in Rhodesian cattle. A large

number of Union police were ordered to the northern border of the Transvaal for patrol purposes to prevent stock entering the Union from Southern Rhodesia. Furthermore, no importation of cattle was allowed from Bechuanaland within 100 miles of the Rhodesian border. Similarly, outlets in Northern Rhodesia and Belgian Congo were closed.

The officials of the veterinary department adopted the policy of inoculating all cattle in infected zones in an effort to establish belts of immune cattle in addition to cattle-free belts. In this way clean areas were protected. The rate of mortality was insignificant, and no slaughtering of infected cattle was practiced. Infections in Southern Rhodesia ceased after October 1932, although Bechuanaland and the Union were both infected after that date. Export restrictions, except for cattle, were gradually relaxed during 1932 and 1933 until the disease recurred in 1934.

In the southern part of the colony rainfall is deficient, dropping from about 25 inches in the central portion to about 12 inches as one approaches the Limpopo River at the southern boundary. This area, draining into the Limpopo River, is generally too dry and too infertile for growing grain except on a very meager scale, and is given over entirely to cattle ranching.

The area north of the dry southern portion and south of the fly-infested Zambezi River Valley is a mixed-farming area in which cattle ranching is combined with the growing of corn, tobacco, and cotton. In the high, well-watered mountainous strip along the Portuguese border a successful beginning has been made in the production of wool and mutton. Along the eastern border and in the mountains near Fort Victoria the rainfall exceeds 40 inches per year, but in most of this triangle the rainfall is between 30 and 35 inches. Throughout the entire colony the winter months from April to October are almost rainless. Nevertheless, the summer months are sufficiently warm and rainy to make possible the production of good yields of corn ranging in good areas from 30 to 50 bushels per acre, and in exceptional instances amounting to much more. This is the area in which cattle from the ranching areas in the south may eventually be fattened for export to England either as live cattle or as chilled beef. Corn cannot be profitably grown in the mountainous strip along the eastern border, but the grazing on these mountain slopes, from 5,000 to 6,000 feet in elevation, is the best in the colony. Inaccessibility is the chief disadvantage of the eastern border.

In the two areas outside of the fly belt three types of soil are to be found. Three-fourths of the land is infertile, sandy, gravelly loam from decomposed granite. Yields of corn on this soil are low, and it is not often plowed for cropping unless the farm is devoid of the other two types of soil. This sandy land comprises the sand veld on which most of the cattle grazing is done. It is generally level to rolling and covered with a scrubby growth of bush and deciduous trees and a mixture of 20 or more kinds of grasses, most of which are 1 to 3 feet tall, stemmy, and not particularly nutritious except during the early stages of growth. Interspersed throughout the sand veld are patches of red soil similar to the Piedmont clay loams of the Appalachian States. This red soil is usually selected for growing corn and cotton. In 1 or 2 areas dark-fired tobacco is

grown on "contact" soil, where the red soil blends into the prevailing sand, or on the sand veld itself. In the areas around Salisbury, where the rainfall is 30 to 35 inches, most of the red soils have already been put under the plow, but in the drier areas to the south and southwest there are large patches of red soil which are included in the cattle-grazing lands. The grasses that grow on these patches are somewhat more nutritious, especially during the dry winter months, and are commonly reserved for winter grazing. The third type of soil is a black alluvial loam which occurs in small patches along the valleys. This soil looks like the black soils of Illinois, but is less fertile.

The principal problem confronting Rhodesian cattle ranchers is how to produce more beef on the sand veld, which comprises the bulk of the usable portion of the colony. Under existing practices most of the calves are born during the rainy summer months of January, February, and March. These cows and calves generally do well until the middle of the dry winter season, July, August, and September, when they rapidly lose condition. The moist swales or vleis are burned over during July and August in order to start a new growth of grass during August, September, and October before the rains begin. In this way the cattle are kept alive. At the beginning of the rainy season in October or November the weaners generally weigh about 400 pounds. A year later, as long yearlings, they weigh 600 to 700 pounds. As long twos they weigh 800 to 900 pounds, and as long threes 1,000 to 1,100 pounds. Many of the steers are kept another year, to be sold when weighing around 1,300 or 1,400 pounds, while in their best condition during the early winter months. The possible rate of growth is indicated by the weights of a few individual animals at the Marandellas Pasture Research Station:

Number and date of birth, 1931	*Weight July 7, 1932*	
No. 1, Aug. 29	pounds	512
No. 2, Sept. 12	do	400
No. 3, Sept. 14	do	509
No. 4, Sept. 21	do	527
No. 5, Oct. 26	do	433

The rate of growth of weaners is indicated by no. 6, which weighed 588 pounds on February 4, 1931, and 910 pounds on July 7, 1932, after grazing for half of 1 rainy season, 1 dry season, and 1 rainy season—a total of 17 months for a net gain of 322 pounds.

The agricultural experiment station is conducting grazing experiments at Marandellas, near Salisbury, and at the Matopos School of Agriculture, near Bulawayo, to determine methods of accelerating the rate of growth and of reducing the acreage of land necessary to carry a given number of cattle. At present, beef prices are too low to encourage much outlay on the part of producers. The cost of removing trees and small bush and the cost of applying commercial fertilizer seem excessive in relation to the value of land and cattle, but alternative grazing of pastures offers promise.

The judicious use of mowing machines on land that can be cleared at moderate cost offers promise of increasing, perhaps doubling, the carrying capacity where this is practiced. The use of a mowing machine during the rapid growing season increases the carrying

capacity, even though hay is not saved, because the feeding value of the second growth of young grass is higher. The curing of hay during the rainy months presents difficulties. A preliminary test with the production of grass silage showed that an aboveground stack of grass silage was a failure, although it is thought that grass silage would be a success if put into pit silos. Aboveground silos are seldom even considered in this country, in which pit silos are so easily constructed and where native labor for removing silage from a pit silo is so abundant and cheap.

The annual report of the Division of Plant Industry of Southern Rhodesia states that grazing experiments near Salisbury have demonstrated that 2 acres of woolly fingergrass (*Digitaria* sp.) under normal rainfall conditions will carry 3 mature cattle during the summer months from December 15 to April 15, and that 1¼ acres of Hunyani grass, or Rhodes grass (*Chloris gayana*), will provide sufficient pasturage for 3 mature cattle from January 1 to April 15. Results also showed that grass from natural grassland, if ensiled at the correct stage of growth, will yield a fodder closely resembling corn silage in feeding value, and that certain of the natural grasses that can be readily established as cultivated grassland produce a silage as high in protein content as combined corn and bean silage. The making of veld-grass silage was undertaken in 1932 on all the Government farms and experiment stations except the tobacco-research station, and a number of individual farmers were also keenly interested. A considerable quantity of this kind of silage was probably produced in the colony during the following summer. It is looked upon as a successful means of increasing the carrying capacity of the veld, ranking in importance with the mowing of grass as it approaches maturity and the saving of grass hay for winter feed.

The senior animal husbandry officer of the Southern Rhodesia Department of Agriculture, was the agricultural member of a survey party which reported at the beginning of 1932 on the practicability of constructing a railroad line from near Wankie in Southern Rhodesia to Walvis Bay in South-West Africa. He reported that this so-called desert is a promising beef-producing country with a few areas suitable for dairying and a few others suitable for sheep raising for the mutton market, provided an adequate water supply could be provided by means of wells or otherwise. He believes that Southern Rhodesia alone would be capable of producing for export overseas within 12 or 15 years 150,000 head of cattle, 50,000 head of pigs, and 5,000 tons of dairy produce per year. Cattle would be exported as chilled beef. Walvis Bay would be no further from Salisbury than Capetown and the time required to reach England from Walvis Bay would be 3 days less.

METHODS OF PRODUCTION

Much of the development of Southern Rhodesia is still in the pioneer and promotional stage. Much of the land is owned by large companies which are interested in both mining and ranching and which expect to sell land to settlers when business conditions improve.

The eighth annual report of one of these companies sheds considerable light on the agricultural situation in Southern Rhodesia. The

company owns 1,550,133 acres in Southern Rhodesia, including 23 working farms and 2 ranches. Subsidiaries of the company include cotton, tobacco, and cattle enterprises, in addition to mining.

It is significant that despite adverse marketing conditions and low prices the agricultural and ranching operations resulted in a profit in 1932, while other enterprises were unprofitable. The company looks forward to improved earnings from the inauguration of the chilled-beef export trade for its cattle and the increasing demand for better bulls that are produced on one of its ranches.

In the south-central part of Southern Rhodesia is one of the largest cattle ranches in the world. It is owned by three large companies. The ranch is irregular in shape, but is 130 miles long and 110 miles wide, contains about 3,500,000 acres, and carries 100,000 head of cattle. For management purposes the ranch is divided into 14 sections, each in charge of a foreman. The ranch employs 35 Europeans and 1,700 natives, the latter at an average wage of 16 or 17 shillings per month, including rations. At par of exchange, this is about $4 per month.

The ranch is characterized by level to rolling land, hilly in the northern portion, covered with scattered growth of trees and a fairly dense growth of various kinds of bunch grass 1 to 3 feet high. The general appearance is not unlike the scrub-oak lands encountered in our Southern States. The soil is generally infertile and consists of a sandy loam of decomposed granite, locally known as sand veld, with occasional stretches of red soil like the Piedmont loams of the Appalachian States and a few patches of black alluvial soil along the valleys. The ranch is traversed by three rivers—the Bubye, the Nuanetsi, and the Lundi—but one or more of these rivers are dry during the dry winter months, and facilities must be provided for watering cattle. Holes are scraped in the sand of the river bed to reach water, or hand pumps are operated by natives to pump the water into tanks. Away from the rivers, the small streams are dammed at intervals to hold water after the rains, and boreholes from 50 to 200 feet deep are scattered all over the ranch to provide additional water by pumping, usually by hand. Despite these efforts, there are about 1,000,000 acres along the watersheds between these rivers where boreholes 300 to 400 feet deep have yielded little or no water, so much of the land is therefore practically useless, except for a short period during the rainy season.

The ranch, as a whole, averages 35 acres per head, but if allowance is made for the 1,000,000 acres of unwatered and little-used land the ratio is 25 acres per head. The best areas of the ranch average only 12 acres per head. In addition to the cattle, there is probably upwards of 200,000 head of wild game on the ranch, including various kinds of buck (antelope), wildebeest, zebra, and giraffe. Additional cattle might be carried except for the fact that a margin of safety must be allowed for dry seasons and for grass fires which occasionally sweep across the veld destroying thousands of acres of feed. Each year hundreds of miles of fire protection are burned around the ranch, especially where it is bordered by native reserves.

The 100,000 cattle on the ranch are graded up from foundation native stock because of their higher resistance to disease. Purebred

Hereford, Shorthorn, and Africander bulls are used. Many of these are bought in the Union, but a small stud herd is kept on the ranch. The 100,000 cattle consist of 32,000 cows, 18,000 to 20,000 calves, 16,000 to 18,000 yearlings, 15,000 to 17,000 two-year-olds, and 14,000 to 16,000 three-year-olds. The cattle are usually sold at about 4 years of age. Calves are enumerated, earmarked, and dehorned with caustic potash at the age of 1 week. A 55-percent calf crop is considered normal. A 10-percent death loss among calves is expected during the first year, chiefly from wild dogs, leopards, lions, and disease. The death rate is about 1 percent among aged cattle and averages approximately 5 percent for cattle of all ages. The cattle are constantly herded in small "mobs", each in charge of a native herd boy assisted by one or two "piccanins." No horses are used for

FIGURE 34.—Grade Hereford cows and calves on a 3,500,000-acre ranch in Southern Rhodesia.

herding and, because of the constant daily contact of the herd boys, and the weekly handling through the dip tanks, the cattle are surprisingly tame. There are a few fenced paddocks of about 8 square miles, representing about 500 miles of fencing, but these are hard to find on so large a ranch.

The average rainfall is 18 inches, but there is less than this in the south and more than this in the north of the ranch, and it is highly variable from year to year. Practically all of the rain comes in the summer, between November and March, the rainy season, and immediately thereafter there is a superabundance of nutritious grass. During this period the cattle gain rapidly in weight, but during the dry months the protein content of the grass drops from 8 percent to 2 percent, stems become dry and unpalatable, and the cattle lose condition and weight. It is the usual practice on the ranch to run the bulls with the herds from May to October and have most of the calves drop as soon after February as possible, while the grass is at its best. Most of the sales are made from May to August, at the end

of the rainy season, when cattle are in best condition, though in some years and from some parts of the ranch, fat cattle can be sold as late as October.

About 10,000 bags (35,000 bushels) of corn are produced, principally in the northern portion where the rainfall is higher and the soil is more fertile. In addition, it is usually necessary to buy 2,000 bags. The corn is used for feeding the 1,700 natives and their families and for feeding the stud animals and the 2,000 trek oxen which are used on the ranch for hauling and plowing.

The manager of the ranch believes that the land is worth nothing now, but additional land would cost about 2 shillings (49 cents at par) per acre. He believes that the cost of producing a 3- or 4-year-old animal reared for market at 1,000 to 1,200 pounds live weight is approximately £4 ($19) and that in previous years the sales price has been approximately £6 ($29) per head.

Methods in the Umtali area are fairly typical of the more usual type of ranching. Settlement dates back nearly 40 years. In this area there are about 700 farmers, but the number of settlers was not increasing further during 1930 and 1931. This area extends north to Inyanga, west along the railroad to Headlands, and south along the border of Mozambique to Melsetter and beyond to Chipinga. It is mountainous, and various conditions are embraced in the area—from 3,000 to 5,000 feet elevation, from 30 to 60 inches rainfall, and from subtropical to temperate agricultural production.

The number of cattle is limited by the feed available during the dry season—the winter months. There is an abundance of grass during the rainy summer months. To increase the year-round carrying capacity, hay and silage are saved and fed during the winter.

TABLE 44.—*Cattle: Number of European owners, classified by size of herd owned in Southern Rhodesia, 1927–31*

Size of herd owned	European cattle owners in—				
	1927	1928	1929	1930	1931
	Number	*Number*	*Number*	*Number*	*Number*
Under 250 head	1,753	1,852	1,920	1,990	2,048
250 to 499	452	449	461	448	457
500 to 999	232	198	180	191	195
1,000 to 1,999	73	70	69	73	77
2,000 to 2,999	17	14	14	15	15
3,000 to 3,999	13	10	8	9	11
4,000 to 4,999	1	1	4	4	3
5,000 to 9,999	8	9	9	5	8
10,000 to 19,999	5	4	4	6	3
20,000 to 39,999	2	2	2	2	3
40,000 and over	1	1	1	1	1
Total	2,587	2,646	2,651	2,669	2,821

Southern Rhodesia, Summer Crop Returns (*35, p. 11*).

Most of the cattle are produced by fairly large companies, but some are produced by individual producers (table 44). The ranch of one of the latter covers 12,000 acres and carries 1,000 grade Sussex and Hereford cattle. This ranch also includes 150 acres of corn, 40 acres of flue-curing tobacco, and 50 acres of pumpkins and miscellaneous crops. Aside from the tobacco, which requires about 30

natives, it requires the employment of about 30 native laborers. These cattle are run in five camps of about 2,000 acres, each with streams of water centrally located. Calf crops average 60 percent, of which about 50 percent are raised to market age of 3½ to 4 years. The ranch is tsetse-fly free. Bands of wild dogs cause serious losses among the younger cattle—more serious than the losses from lions and leopards. The owners slaughter about 30 head per month for their own retail meat store in Umtali and sell another 150 head of live cattle per year.

Out of a total of 954,161 head of European-owned cattle, December 31, 1931, 32.3 percent were cows, 13.9 percent heifers over 1 year of age, 15.7 percent calves under 1 year, 1.5 percent bulls, 11.7 percent trained oxen, 15.7 percent untrained oxen, and 9.2 percent yearling oxen (table 42).

METHODS AND COSTS OF MARKETING

The principal markets have been the mining areas of Northern Rhodesia and the Belgian Congo, the Johannesburg market for heavy cattle, and the Italian army contract for frozen beef from the inferior cattle. A few live cattle have been exported to England. The newly established chilled beef trade with England, reestablished since the quarantine was relaxed, now ranks first in importance.

Most of the heavy class of cattle, including cattle bought and fed, come from the Salisbury area. The main cattle area around Bulawayo normally sends its cattle to Northern Rhodesia and the Belgian Congo. The foot-and-mouth disease quarantine stopped this movement and this loss of market was expected to continue, in part, after the quarantine was lifted.

In 1930, according to the annual report of the Southern Rhodesia Department of Agriculture, this colony exported 60,871 cattle.

Cattle exports from Southern Rhodesia, 1930

Destination:	Number
Union of South Africa:	
For export to Italy	21,775
For local consumption	7,466
Belgian Congo:	
For slaughter	24,093
For breeding	3,143
Northern Rhodesia:	
For slaughter	3,597
For breeding	324
Trek oxen	128
Portuguese East Africa:	
For breeding	25
England (on hoof)	320
Total	60,871

Three-fourths of the cattle exported to Italy were of inferior type. The Government paid an export bounty of $101.280 on these cattle ($4.65 per head) and $4,105.73 ($10.38 per head) on the live cattle shipped to England. The freight rate on the latter was £10 and other charges about £4 per head.

Since 1916 there has been a gradual increase in the export movement, until in 1928 there were 71,261 cattle exported (value £370,763-$1,804,360), of which 64,921 head were classed as slaughter cattle

(table 45). In 1930, 61,267 cattle were exported. This represents about 2½ percent of the total number of cattle in the country. By comparison, cattle slaughtered by butchers in 1928 totalled 102,284 and by Europeans on farms, 10,681 head. The number slaughtered by natives for consumption in the reserves, although unknown, has been estimated at 50,000 head.

TABLE 45.—*Cattle: Imports and exports, Southern Rhodesia, 1914–33*

Year	Imports				Exports			
	Bulls and oxen	Cows and calves	Total	Value [1]	Slaughter cattle	Other cattle	Total	Value [1]
	Number	*Number*	*Number*	*Dollars*	*Number*	*Number*	*Number*	*Dollars*
1914	2,483	3,876	6,359	218,985	----------	12	12	467
1915	3,489	3,079	6,568	226,561	----------	7	7	535
1916	370	1,490	1,860	127,260	12,815	113	12,928	551,342
1917	337	2,667	3,004	262,005	13,221	78	13,299	662,282
1918	275	692	967	143,396	22,975	482	23,457	1,060,937
1919	605	315	920	169,862	23,831	5,306	29,137	1,326,920
1920	467	437	904	144,929	24,142	7,345	31,487	1,449,647
1921	628	379	1,007	248,857	8,965	3,333	12,298	499,215
1922	431	281	712	103,350	19,405	3,134	22,539	548,846
1923	257	259	516	66,762	32,490	1,831	34,321	884,902
1924	247	410	660	61,042	45,269	1,870	47,159	1,119,433
1925	427	659	1,086	113,607	45,829	13,467	59,296	1,187,654
1926	416	639	1,055	125,577	68,933	3,803	72,738	1,701,124
1927	379	696	1,075	120,385	38,819	4,925	43,744	1,106,212
1928	610	1,065	1,675	173,254	64,921	6,340	71,261	1,804,138
1929	491	1,656	2,147	263,205	65,997	7,599	73,596	2,036,061
1930	353	1,286	1,639	111,195	59,584	1,683	61,267	1,709,212
1931	210	[2] 445	685	33,906	8,448	1,832	10,280	284,604
1932	49	[3] 897	946	18,897	0	0	0	0
1933	18	[3] 71	89	4,107	0	0	0	0

[1] Converted at par.
[2] Including 67 cattle for slaughter.
[3] Including 256 cattle for slaughter.

Southern Rhodesia Official Yearbook, (*57, no. 2, p. 359; no. 3, p. 298*).
Union of South Africa, Trade and Shipping, 1929 (*46*).
Trade of Southern Rhodesia, 1932.

The average value of cattle exported in 1928 was $25, but this represented a slight increase from the low level of 1922 to 1925. The cattle imported have much higher value, averaging $103, since they represent breeding stock.

It was estimated by a committee in Southern Rhodesia which reported in connection with the Imperial Economic Conference at Ottawa (1932) that under favorable conditions Southern Rhodesia will have an annual surplus of 150,000 head of cattle available for export. Of this number, the annual surplus of cattle suitable for the chilled beef trade is estimated at 20,000.

The Southern Rhodesian Department of Agriculture holds that the need for the development of an overseas trade in chilled or frozen beef is urgent, especially since the export of live cattle to the adjoining territories has been stopped, owing to the outbreak of foot-and-mouth disease. But the greater number of the cattle available for export are suitable only for the frozen-meat trade, and this demand is decreasing and is already unprofitable.

The results to be obtained from exporting frozen beef from Southern Rhodesia are unpromising, as indicated by the results of an experimental consignment of frozen beef shipped to London through

Beira in July 1932. Hindquarters brought 3½ pence (7 cents) and forequarters 2 pence (4 cents) per pound at Smithfield market. Prices were only about half as high as chilled-beef prices and amounted to only about $33 per 1,100-pound steer. The net return to the producer after deducting $21 (3½ cents per pound carcass weight) for slaughtering, freezing, transportation, and selling, was only about $12, which is less than the prices of $15 to $30 which could be obtained locally.

Rhodesian cattlemen are much more interested in developing the chilled-beef trade. They were prevented from doing this during the first part of the quarantine period occasioned by the outbreak of disease because of the embargo against such shipments being made through the Union for export at Capetown. The Port of Beira is too far from England to permit the successful shipment of chilled beef. In 1933 the embargo was lifted and chilled-beef exports from Southern Rhodesia through Capetown to England were inaugurated.

Beginning about April 1, 1933, a plant at Bulawayo began slaughtering and chilling about 1,000 head of cattle per week. Refrigerated space was engaged as follows on boats leaving Capetown:

	Quarters
Apr. 7	1,700
Apr. 11	2,000
Apr. 14	5,000
Apr. 21	1,700
Apr. 28	2,500
May 5	1,300
May 12	3,700
May 19	1,300
May 25	3,700
May 30	2,000
Total	25,800

In addition to the 6,450 head of cattle provided for in these commitments, the quantity was expected to be increased up to 8,000 head. The plant at Bulawayo was enlarged at a cost of about £8,000 to increase the chilling capacity by about 30 percent. It is estimated that it costs about 2½ pence per pound to deliver chilled beef on the London market, but part of this cost is offset by the value of hides and offal. Efforts are being made to provide local outlets in Southern Rhodesia and in the Union for beef rejected for bruising or other causes. The company offered 16 shillings 8 pence per 100 pounds carcass weight for stall-fed animals suitable for chilling, but all rejected meat had to be sold for the account of the producer.

Detailed results of the first 87 cattle slaughtered for chilled-beef export at Bulawayo in November 1932 are available. The exported portion consisted of 102 fores and 105 hinds weighing 38,940 pounds. The net proceeds amounted to 24 shillings 1.04 pence ($5.86 at par of exchange) per 100 pounds dressed weight.

Costs and returns of Southern Rhodesian chilled beef, November 1932

	British pence per pound
Slaughtering, chilling, loading, wrappers, etc.	0.7506
Railage, Bulawayo to Capetown	.8318
Pierage, cables, etc.	.0658
Ocean freight	.6187
Insurance	.0658
Expenses in United Kingdom	.2873
Shrinkage	.1976
Total (excluding railage to Bulawayo)	2.8176
Amount realized in United Kingdom (fores 2.5 to 3.14 pence, hinds 5.25 to 6.25 pence)	4.4481
Amount realized for offal	.2599
Bounty	1.0000
Total revenue	5.7080
Net proceeds	2.8904

From these 87 cattle, 72 fores and 68 hinds were rejected on account of bruising and for other reasons. The cost of marketing the rejects was as follows:

Cost of marketing chilled beef in Southern Rhodesia, November 1932

	Pence per pound
Slaughtering, freezing, loading, etc.	0.6500
Shrinkage	.1032
Total (for local sales)	.7532
Amount realized in Bulawayo	2.2971
Amount realized for offal	.2599
Total revenue	2.5570
Net proceeds	1.8038

This net return equals 15 shillings 0.38 pence per 100 pounds carcass weight. The average net returns, including rejects, was 2.4557 pence per pound, which equals 20 shillings 5.57 pence per 100 pounds carcass weight. The average dressed weight of the carcass was 738 pounds, which brought £7 11 shillings 0 pence each. The heaviest lot, averaging 821 pounds, sold for 2.79 pence for fores and 5.69 pence for hinds. The lightest lot averaged 650 pounds per carcass, and sold for a better price, especially the fores—3.13 pence for fores and 5.72 pence for hinds.

The average cost of local railage from the ranch to the Bulawayo plant was 12 shillings 3 pence per head, but the railway company later agreed to grant a rebate of 50 percent on all live cattle sent to the cold-storage plant for export as chilled or frozen beef. Railage of chilled beef from Bulawayo to Capetown amounted to 0.8318 pence per pound. Later, when Union currency was also on a par with sterling, this item of cost was reduced to 0.557 pence per pound.

Concerning this shipment, the senior animal husbandry officer for Southern Rhodesia observed that the beef exported was of superior quality considering that the cattle had been on feed for 4½ months or less and that the net returns, exclusive of the temporary bounty, compared favorably with prevailing prices in Southern Rhodesia, although in neither case were prices sufficient to cover average

production costs. Since that time, however, marketing costs have been reduced and are likely to be further reduced.

It is held by some authorities that the export of live cattle to England will be more profitable to Rhodesian cattlemen in view of the relatively high expenses in chilling and transporting meat in small quantities and considering the much higher prices obtainable in England for live cattle. But at present the export of live cattle is stopped by veterinary regulations. The export of live cattle to England from Southern Rhodesia was begun in 1925, but only 2,500 head have been shipped.

Prices obtained for live cattle exported from Rhodesia before the foot-and-mouth disease outbreak in 1931 show that the best prices per 100 pounds live weight were obtained for steers weighing about 1,100 pounds, but because of the high transportation charges per head, approximately £10 ($48.67), the best net returns were obtained for steers weighing over 1,400 pounds. Until freight rates are reduced it is probable that the best returns will be obtained for the heavier animals. This observation does not refer to chilled or frozen beef, since the freight is charged per 100 pounds and there is no particular advantage in shipping animals that do not realize maximum prices overseas.

The chief obstacle to export of live cattle to the United Kingdom is the high cost of ocean freight from Capetown. The lowest rate that has been quoted is £9 ($43.80 at par) per head. In addition, the cost of railage to Capetown is 24 shillings ($5.84) per head from Bulawayo and 28 shillings ($6.81) from Salisbury on the basis of a full car and exclusive of about 2 shillings 6 pence (61 cents) per head for feeding and watering enroute. The total cost of exporting cattle on the hoof in 1932 was, therefore, £10 6 shillings 6 pence to £10 10 shillings 6 pence ($50.25 to $51.22), exclusive of exchange. A reduction of £2 ($9.73) per head is deemed necessary to make the trade profitable. Canadian cattle are carried at $10.80 to $12 per head from Canadian to United Kingdom ports. This is only about one-fourth of the cost of ocean freight from Capetown.

Rhodesian cattle owners are anxious to obtain access to the cold-storage works at Walvis Bay, either by a stock-driving route with necessary water supplies, or by the construction of a railroad to the west coast.

The 1932 rates of ocean freight to European berth ports as reported by the committee appointed by the Government of Southern Rhodesia to investigate and report on certain matters relating to the 1932 conference at Ottawa were as shown in table 46.

TABLE 46.—*Ocean freight per pound, Southern Rhodesia to Europe*

[Conversions at par]

Item	From Union berth ports	From Beira
	s. d.	*d.*
Beef, frozen	9 16 (1¾ cents).	1 (2 cents).
Beef, chilled	9 16 (1¾ cents), plus 10 percent.	1 (2 cents) plus 10 percent.
Slaughter cattle, minimum open rates per head		£8 ($38.93).

A meat-extract plant was constructed in 1933 at West Nicholson. Operations were started in July 1933. About 100 cattle were to be slaughtered daily for the manufacture of meat extracts and bone meal. The product is intended for export to England.

MARKETING POLICIES

In a normal year the surplus cattle of Southern Rhodesia are disposed of as follows:

	Number
Slaughter cattle for domestic purposes	110,000
Export to Belgian Congo	30,000
Export to Northern Rhodesia	4,000
Export to Union of South Africa	8,000
Export overseas	30,000
Total	182,000

The exports overseas have been chiefly to Italy in connection with the Italian army meat contract. The difference between disposals and the annual rate of increase of cattle, which ranges from 200,000 to 250,000 head per year, represents the net gain in numbers. During the quarantine period the cattle normally exported (70,000 to 80,000 head) were also being added to existing numbers on farms.

The Government has paid a bounty of one-half penny (1 cent) per pound on dressed beef to facilitate export trade. The total amount paid out by the Government of Southern Rhodesia is as follows (conversions at par):

Under the Chilled and Frozen Meat Exports Act of 1924	£15,000	($72,999)
Under Act No. 34 of 1929	25,000	(121,665)
Under Act No. 5 of 1931	22,842	(111,163)
As a bounty upon cattle exported on the hoof during the years 1925–26 to 1931–32	5,176	(25,189)
Total	68,018	(331,016)

During 1930 a bounty of £20,818 ($101,313) was paid out by the Government on dressed beef and £849 ($4,132) on cattle exported on the hoof. In 1931 an act was passed making provision for a levy of 2 shillings 6 pence (61 cents at par) per head on all animals sold for slaughter in the local and inland markets, which would provide a considerable proportion of the amount required for the overseas export bounty. This levy was withheld on account of the foot-and-mouth disease embargo and did not become operative until July 1, 1932.

In October 1932 the regulations concerning the collection of the levy on cattle slaughterings were tightened. Thereafter, if 1 or more cattle were slaughtered for sale, barter, or consumption, a return had to be rendered, and if any person slaughtered more than 5 head during the year beginning July 1, 1932, he was required to pay the levy of 2 shillings 6 pence (61 cents) per head for cattle and 6 pence (12 cents) for calves. This stopped certain practices of evasion that had been observed.

In 1933 legislation was advanced to secure from the Government a guarantee of a bounty of three-fourths penny per pound on stall-fed and one-fourth penny per pound on grass-fed cattle exported overseas during the current year, this bounty to be paid as far as

possible from the present cattle levy of 2 shillings 6 pence per head on all slaughterings. The Government guarantees the Rhodesian Cold Storage & Export Co., Bulawayo, against loss up to a total payment of £15,000 per year. During 1932 the Government was called upon to pay this subsidy. It was argued that unless the export bounty were paid the volume of business of the company would again show a loss and that the Government would benefit by paying the bounty to the cattle producers. Another argument for such action was based on the fact that Southern Rhodesia, although handicapped by distance from ports, does not pay so large an export bounty as is paid in the Union, although the two currencies were then on a par with English sterling.

A new association was organized in Southern Rhodesia in April 1932 known as the Rhodesia Stock Owners' Association. The association received promise of support from cattle companies and large stock owners representing a total of 250,000 head of cattle. The objects of the association are:

To promote, advance, and protect the cattle industry of Rhodesia and the interests of those carrying on the business of stock breeders and ranchers.

To take joint action with other associations to further their mutual interests.

To make representations to the governments on matters affecting the cattle industry, and to promote or oppose legislation or other measures affecting that industry.

To give particular attention to the marketing of cattle and sheep with special reference to the export of chilled and frozen meat to overseas markets.

The Cooperative Cattlemen's Association, Ltd., arranged with the Land Bank of Southern Rhodesia for a system of insurance against the risk that animals fattened by members within a period of 12 months will not realize an amount sufficient to satisfy their liability to the association for the cost of the cattle plus interest and the cost of administration and other charges. The members are to pay a fixed charge of 2 shillings 6 pence per head. Under this agreement a member derives any profit realized from the sale of his cattle without incurring any liability to make good losses incurred through export. Steers bought for fattening at a cost of, say, £4 plus the indemnity levy of 2 shillings 6 pence, an administration levy of 2 shillings 6 pence, and interest on the amount borrowed from the land bank, 1 shilling 6 pence, would represent a total cash outlay of 4 pounds 6 shillings 6 pence which would be the net price guaranteed from the insurance fund.

Another change in the plan of financing is that, whereas formerly the members had to take out shares in the association on the basis of 10 shares of £1 each, of which £1 is paid in and £9 remains as contingent liability providing additional security to the land bank, under the new scheme a member must buy only 1 share for each head bought on credit and for his £1 will receive a fully paid-up share, thus eliminating contingent liability.

This association is encouraging the fattening of cattle for sale during the early summer months, August to December, when grass-fattened cattle from the grazing areas are not available.

The Rhodesian Government decided in 1932 to reduce the rate of interest charged through the land bank and the lands department from 5 percent to 4½ percent and perhaps to 4 percent as a measure of relief to the farmers of Southern Rhodesia.

NORTHERN RHODESIA

Agricultural production in Northern Rhodesia is not likely to expand materially in the near future. During the past 24 years of European settlement the number of farms taken up totals only 260, covering slightly more than 1,000,000 acres. Only an insignificant extent of land suited for agriculture remains unoccupied, and large areas are suitable only for grazing livestock. Despite this, there are not more than six ranches in the territory, all of which were started a number of years ago. There are only about 12,000 Europeans in the colony, and most of them are employed on the copper mines near the Congo border. There are only about 300 European farmers in the colony. Of this number, 43 are tobacco growers in the Fort Jameson area; the remainder are chiefly engaged in cattle ranching or a combination of this with corn production, especially in the Kafue Valley.

TREND OF PRODUCTION

The colony of Northern Rhodesia is not likely to share in the expansion of cattle numbers which is to be expected in Southern Rhodesia and in the Union. About two-thirds of the colony is infested with the tsetse fly, which makes cattle grazing impossible. The colony is also threatened with rinderpest, which exists in the neighboring territory of Tanganyika. Markets are very limited, and distances are too great for exporting.

There were 97,055 European-owned cattle on November 30, 1932, as compared with 388,199 native-owned cattle. This represents an increase since 1929, when the numbers were 93,961 and 378,569, respectively. The number of native-owned cattle can be only roughly approximated. The number of European-owned cattle averages about 250 per farm. The greatest increases occurred in cows, heifers, and calves, suggesting a tendency toward an expansion in cattle numbers. Most of the European-owned cattle (66 percent) are in the two districts of Lusaka and Mazabuka in the lower Kafue Valley. The localization of the cattle is shown in table 47.

The number of native-owned cattle in the Mazabuka area is fairly accurate, but the number in Barotse is only roughly approximate. The latter is strictly native-reserve land and, since the natives view with suspicious alarm the desire to count their cattle, the counting is not undertaken in view of the personal risk involved. The estimate is based on observations of a very general character. It is known, however, that before the outbreak of pleuropneumonia in Barotse Province in 1913 the number was 3 or 4 times the present number.

There were only 99,144 European-owned cattle in Northern Rhodesia in December 1931. The distance from outside markets practically limits the production of cattle to what can be consumed in the colony and at the nearby mines in the Congo. These farmers and ranchers are having a most difficult time. A few have abandoned their land. The Government officials are not encouraging immigration for the purposes of farming, and immigrants intent on such a venture are warned against the difficulties of such an undertaking.

Only 353,000 cattle were owned by the 1,372,235 natives in the colony, or only 1.3 head per family of 5, as compared with about 6 head per family unit in the native Transkei areas of the Union. The

cattle population of the colony might be considerably expanded without supplying more than the requirements of the native population. Most of the native-owned cattle are in Barotseland, a native reserve in the western part of the colony. No cattle are allowed to come out of Barotseland, for the occurrence of pleuropneumonia in Barotseland forced the veterinary authorities to stop the sale of cattle from this important area.

TABLE 47.—*Cattle: Number and classification in Northern Rhodesia, 1929–32*

District	Owned by—					
	Europeans			Natives		
	1929	1930	1932	1929	1930	1932
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Livingstone	2,928	3,068	4,204	7,173	6,807	7,536
Choma	15,422	17,944	10,033	43,685	40,056	46,782
Mazabuka	22,938	25,366	27,013	173,241	160,707	174,206
Lusaka	42,170	45,952	37,310	21,480	25,380	28,757
Fort Jameson	6,384	6,209	5,317	25,758	27,105	20,205
Abercorn	2,133	1,481	4,162	5,550	4,383	11,593
Isoka	1,986	2,581		7,294	8,048	
Barotse				94,381	84,100	90,000
Total	93,961	103,201	97,055	378,569	362,768	388,199

Classification	Owned by Europeans		
	1929	1930	1932
	Number	*Number*	*Number*
Bulls	1,057	1,250	1,047
Cows	25,542	25,876	26,508
Heifers	10,697	11,285	12,583
Oxen	39,920	39,697	38,050
Bull calves	9,041	9,008	18,201
Heifer calves	7,704	8,003	
Total	93,961	[1] 103,201	97,055

[1] Including 1,481 and 2,581 cattle in Abercorn and Isoka districts not classified.

Northern Rhodesia Blue Book (22).

When the restrictions against cattle from Southern Rhodesia were relaxed, following the eradication of East Coast fever, Southern Rhodesia came to supply most of the cattle required for the copper mines of Northern Rhodesia and Belgian Congo, amounting to 30,000 head in 1928 and 25,000 head in 1930, as compared with only 800 from Northern Rhodesia. The outbreak of foot-and-mouth disease in Southern Rhodesia has temporarily altered the situation since 1931.

Dairying is carried on in a small way to supply the mines, and a cooperative company was started in 1923, but this failed on account of inadequate supplies during the dry season and the low quality of the cream produced. The outcome of a more recent creamery venture in Lusaka is still in doubt. Dairying is expensive in the mining areas because the cows must be stall-fed owing to the absence of grazing or the presence of the tsetse fly.

METHODS OF PRODUCTION

An uninviting picture of cattle ranching in Northern Rhodesia is portrayed by a technical adviser. Most of the cattle ranching is conducted along the southern end of the railroad between Livingstone and Pemba, where the soil is too poor for cultivation. The carrying capacity of the land is 5 or 10 head per 100 acres. This low rate is largely attributed to the useless character of the rank grass which grows abundantly for the greater part of the year. As a result of rigidly enforced veterinary regulations cattle diseases are not prevalent. Friesland and all the British beef breeds have been tried for crossing with native cattle, but with indifferent results. The use of high-grade bulls with good native cows is recommended. Cattle are customarily herded and kraaled at night for protection against wild animals, but fenced pastures are now being recommended among those who can afford to pay for the necessary fencing.

The output consists chiefly of slaughter steers and occasionally old cows or surplus heifers. The top price for steers has been about £8 10s. 0d. ($41.36) and for cows £3 10s. 0d. ($17.03). The local mine commissaries buy nearly all of the supplies for feeding the native laborers. Actual figures obtained from cattle ranchers showed the cost of building up a herd of 3,000 head to be £4 3s. 4d. ($20.28) per head if the cattle are herded and kraaled, and £3 11s. 2d. ($17.32) per head if the cattle ranged in fenced pastures. Under the latter system the rancher might expect a profit from a 3,000-head ranch of £750 ($3,650) per year over living expenses and interest charges, but before allowing for outbreaks of epidemic diseases. Nothing more than living and interest expenses could reasonably be expected from a herd of less than 1,000 head.

The quality of the cattle is very inferior. Cattle are not slaughtered until 6 to 10 years old, by which time their live weight is 600 to 800 pounds. Their dressing percentage is under 50 percent—rarely as high as 53 percent. They are badly inbred. Zebu blood is often evidenced by the slight hump on the shoulders. Size is greatly increased by crossing with English cattle. A crossbred suckling calf (native×Hereford) may be as large as its dam. European farmers are introducing Hereford, Sussex, South Devon, and Ayrshire blood. The last two are used with dual-purpose or dairying intentions. Africander bulls from South Africa are used to restore hardihood of progeny. The native cattle have acquired immunity or resistance to disease, which it is difficult to maintain in the crossbred progeny. Therefore, only quarter-blood bulls are used by many European farmers. The native cattle in Barotse Province are wide-horned, nonhumped, and slightly larger than those in the northeastern Province, probably because of the raids made on the cattle of Boer farmers in the south prior to 1900.

Cattle diseases, such as pleuropneumonia, trypanosomiasis, black leg, anthrax, east-coast fever, and tuberculosis, constitute the principal limitations to the cattle industry in Northern Rhodesia. The situation is aggravated by the indifference of natives to the adoption of control measures. This is particularly true in Barotse Province, where the cooperation of the paramount chief is lacking and Government assistance is not forced upon them. Elsewhere natives are

beginning to appreciate the value of dipping. To have a dipping tank at the kraal, although at first opposed, is now beginning to be a mark of distinction among natives, like the ownership of a wagon, even if never used.

Opportunity is taken to have dipping inspectors act as agricultural advisers. Cattle are dipped weekly by veterinary officers at these dipping tanks, and the cost is borne by the taxpayers in England. The number of dipping tanks was increased in 1930 from 166 to 180, 8 of them in native reserves. The aim is to have dipping tanks placed within 15 miles of each other, to avoid long drives each week to the tank. There is some damage to the grass in the vicinity of the tanks. Supplies of water are not always accessible during the dry season to permit the free movement of cattle. A compulsory dipping law contingent upon petitions from two-thirds of the cattle owners in the district was passed in 1930 but remains inoperative because of apathy.

Tsetse fly (carrying trypanosomiasis) claim irregular zones throughout the territory, thereby preventing the displacement of game animals by cattle in one-half or two-thirds of the country. The borders of these zones are usually sharply defined and mysteriously permanent except where the land is cleared. No means of avoiding the disease in tsetse-fly areas has been discovered, although the use of sodium antimony tartrate is general as a palliative, especially in the Fort Jameson area.

The carrying capacity of the range, considering the long dry season, is about 15 acres per head. Deaths from malnutrition often occur among old cows and weaners toward the end of the dry season or following veld fires. Corn is not fed to cattle, although tests indicate that results from this practice were gratifying, but the market for better finished beef is very small. The pasture grasses are probably deficient in certain necessary minerals, and bone-meal feeding gives conspicuous benefits.

Attempts are being made by the Government to establish the native-cattle industry on a sound basis, but progress is slow. In 1931 one dipping tank stood unused because the headman of that kraal of natives refused to allow his people to dip their cattle, even though some were anxious to do so. There is a general indifference among the natives concerning cattle improvement. Grazing lands are poorly chosen, too many males remain uncastrated, old cows are kept until they die from feed shortage or in calving, and animals for sale are chosen at random without regard to condition. Certain headmen who have responded to the Government's program of dipping and management have been presented with quarter-blood bulls as further means of improving the progeny.

For the benefit of both Europeans and natives, a research station was established at Mazabuka during 1928–29. Valuable investigations of disease control, poisonous weeds, feeding, and breeding, have been undertaken.

METHODS OF MARKETING

The principal market for cattle of Northern Rhodesia is at the mines around Ndola and in Belgian Congo. There were 2,123 cattle exported to the Congo in 1929 and 800 in 1930. There were also

12,628 cattle moved to mining areas in the territory for slaughter during 1930. Most of these came from Mazabuka and Lusaka. The number of cattle slaughtered is small in relation to the numbers kept, because of the extreme age at which maturity is reached. The mining areas consumed 18,000 head from all sources in 1930, most of which were produced by natives. With the curtailment of copper-mining activity this market outlet was curtailed.

The prices obtained for ordinary cattle are very low. Mine contractors buy at auction at local markets or by private treaty from country storekeepers. A cooperative association for the marketing of all stock, including that bought from natives by the country traders was proposed as a means of dealing more efficiently with contractors. A feature of the proposed scheme was sale by weight instead of by head or lot. It was hoped that premiums for quality would be more real and more obvious, and encourage better feeding and care. In August 1931, 40 cattle producers formed the new society.

GOVERNMENT AIDS

It has already become necessary to support artificially the small cattle industry of Northern Rhodesia. The Governor, in accordance with the terms of the customs agreement between Northern Rhodesia and the Union of South Africa, has brought into operation a clause prohibiting importation of cattle on the hoof if they are below a certain weight. A certificate must also show that the meat is of prime quality. Looking toward the time when the foot-and-mouth disease embargo against Southern Rhodesia will be lifted, the Governor has also taken steps to determine some means of prohibiting the entrance from Southern Rhodesia and Bechuanaland of cattle on the hoof below a certain weight, or of frozen and chilled meat below a certain weight. Northern Rhodesia is anxious to keep its limited markets at the copper mines for itself exclusively.

TANGANYIKA

The Department of Agriculture of Tanganyika reports the following census of livestock for the year 1931. These animals are owned almost exclusively by natives. The number of cattle is about half as large as that in the Union and practically equal to the number in Kenya.

Livestock numbers in Tanganyika, 1931

Cattle	5,069,438
Sheep	2,233,287
Goats	3,250,783
Pigs	3,300
Donkeys	50,733
Horses	87
Mules	99
Camels	56

Despite this large number, the foreign trade is negligible. Exports of all hides and skins have ranged between 5 and 15 percent of the total value of all exports (table 48).

TABLE 48.—*Hides and skins: Exports from Tanganyika, 1913 and 1926–30*

Year	Quantity	Value		Year	Quantity	Value	
		Total	Percentage of all exports			Total	Percentage of all exports
	1,000 lb.	*1,000 dol.*			*1,000 lb.*	*1,000 dol.*	
1913	7,741	1,336	15.4	1928	7,375	1,824	9.3
1926	4,604	860	5.3	1929	5,711	1,085	5.9
1927	6,250	1,163	7.0	1930	4,690	891	4.7

Tanganyika Territory, Department of Agriculture, annual report 1930 (50).

Cattle diseases, especially trypanosomiasis and rinderpest, are serious checks to the development of a commercial cattle industry. The Leeds afforestation authorities have given valuable assistance to the department of tsetse research in Tanganyika by the experiments they have undertaken. It has been proved that open countries, free from all trees and scrub will not hold the kind of fly that occurs in Tanganyika. Clearings are therefore extremely valuable in exterminating the pest. Most drastic measures failed to dispose easily of the savannah bush, which covers the greater portion of the territory, but an injection of poison into the tree trunk has been found to result in the early death of the tree and may help to clear great areas of bush land at small cost.

KENYA

In 1930 there were 5,192,824 cattle in Kenya, representing an average of 1 to 28 acres, the same as in the Union of South Africa, but in Kenya nearly all the cattle are owned by natives.

The number of cattle owned by Europeans increased from 161,210 in 1924 to 259,188 in 1933, an increase of slightly more than 60 percent. The upward tendency still continues. Cattle are much more important numerically than sheep. The number of wooled sheep owned by Europeans in Kenya increased from 133,916 in 1924 to 203,372 in 1933. The rate of increase was approximately the same as that for cattle, but since 1929 there has been no further tendency toward an increase in wooled sheep numbers. In 1933 European farmers also owned 36,134 nonwooled sheep, which is practically the same number as in 1924. Kenya will continue to produce more beef and dairy products than wool and mutton.

The number of cattle owned by Europeans in 1933 included 68,653 work oxen and 152,594 breeding cattle. Of the latter, 1 percent were purebred, 74 percent were grades, and 25 percent were native stock. The purebred cattle were chiefly Shorthorn, Friesland, and Aryshire. Most of the cattle are kept for beef purposes, but the annual output is small. In 1932–33 farmers in Kenya sold only 9,904 cattle for slaughter which was 23 percent less than the number sold 2 years before. Death accounted for more cattle than slaughterings. In 1932–33 European farmers lost by death 22,542 cattle, of which east coast fever caused 17 percent, and rinderpest 4 percent.

Dairying is of minor importance. Butter produced for sale by creameries or on farms has amounted to 1,778,876 pounds in 1932–33.

Cattle owned by natives in 1930 numbered 4,965,963. This was the first serious attempt to enumerate livestock owned by natives, although it had been estimated in 1928 that the natives owned approximately 3,500,000 head. The tendency is definitely upward, although not as much as this comparison would indicate. Goats are second and sheep third in importance among the natives. In 1930 the natives owned 4,321,543 goats and 2,996,828 sheep. These figures include a relatively small number owned by native squatters on the farms of Europeans in Kenya.

Exports of live cattle are insignificant, but for a long period exports of hides have been exceeded in value only by coffee, sisal, and corn. The development of the cattle industry is retarded by the occurrence of serious cattle diseases, such as rinderpest, foot-and-mouth disease, east-coast fever, pleuropneumonia, trypanosomiasis, and anthrax.

UGANDA

In Uganda, cattle represent the principal type of livestock production, which is almost entirely in the hands of natives. In 1931 there were 2,064,745 cattle, as compared with 2,112,978 goats and 907,582 sheep. The number of cattle increased slightly betwen 1930 and 1931. Hides represent almost the only commercial output of these cattle.

Most of the cattle are located in the southeastern part, in the extreme southwestern corner, and in the extreme northeastern corner.

Conditions affecting the probable future development of the cattle industry are generally similar to those discussed in connection with Kenya.

DAIRY PRODUCTS

UNION OF SOUTH AFRICA

TREND OF PRODUCTION

The Union of South Africa has about 750,000 European-owned cows that are milked—707,280 according to the 1925 census. This number is small as compared with the 10,500,000 cattle of all kinds, including 5,500,000 native-owned cattle. From the latter, milk production is negligible. Most South African cattle are nondescript and poorly suited for dairy purposes. In 1925 census returns, covering 82 percent of all European-owned cattle in the Union, revealed only 913,000 head (32 percent of the breeding stock reported) of breeding cattle to be distinguishable as purebreds or grades of known breeds. Friesland (Holstein) cattle predominated; Ayrshires, Jerseys, and Red Polls were much less numerous.

Over 30,000,000 pounds of butter and 10,000,000 pounds of cheese are annually produced in the Union.[8] This is about one-third as much butter as is produced in our Southwestern States of similar

[8] Census reports of butterfat sold by European farmers are about 10 percent too low, judging by apparent and actual overrun of butter manufactured in creameries. Census reports also appear to be too low in the case of wool, fruit, and Turkish tobacco. Exports or receipts by handlers exceed the quantities enumerated by the census.

area. Dairying will never develop as a predominating enterprise as it has in New Zealand and Wisconsin, but it will probably develop to the extent that it has in our Southwestern States. Land is practically untaxed, hence nearly all of the land, except that in native reserves, is privately owned in large farms or ranches. Such extensive farming methods are not conducive to dairying.

The chief obstacles to the development of the dairy industry are (1) scrub bulls, (2) insufficient feed especially during the dry winter months, (3) allowing calves to run with milk cows, and (4) inefficiency on the part of the native laborers. The official survey in 1925 revealed the fact that only 10 to 15 percent of the bulls were purebred, and in no area were more than 32 percent of the bulls purebred.

Classification of distinguishable breeds in the Union of South Africa, 1925

Breeds, purebred and grade.	*Percentage of total improved cattle*
Friesland (Holstein)	44.3
Shorthorn	21.8
Africander	16.8
South Devon	8.0
Aberdeen Angus	2.4
Ayrshire	1.7
Hereford	1.7
Red Poll	.9
Jersey	.7
Brown Swiss	.6
Sussex	.5
North Devon	.5
Other breeds	.1
Total	100.0

The first creamery in the Union of South Africa was established in 1892 at Bedford, near Port Elizabeth. After the first power-driven manufacturing machinery was installed and cream testing was begun other creameries soon followed in 1896. Dairying was encouraged by the Government, especially after 1903, so that butter imports dropped from 11,192,667 pounds in 1906 to 3,606,503 pounds in 1910. Imports of butter practically disappeared by 1917–18, but increased again to more than 4,000,000 pounds in 1927–23 (fig. 35). At that time the Board of Trade and Industries of the Union of South Africa conducted an extensive inquiry into the dairy industry, and formulated plans for increasing the efficiency of creamery operation and improving the returns to producers. As a result of this and other factors, especially the farming depression since 1929, production of creamery butter has greatly increased and imports have again become of negligible importance.

Butter exports have become increasingly important, and in 1929–30 they amounted to 4,791,000 pounds, which is by far the highest figure on record (fig. 35). The increase in production has come only slightly from the production of farm butter. The great increase is attributed to creamery manufacture. A system of paying export bounties on butter and cheese exports was begun in 1930. These funds are derived from the levy on all production, so that until exports become much larger in proportion to the total production than

at present, there will be a strong and persistent influence favoring the expansion of butter and cheese production. This tendency is being augmented by increasing efficiency in the manufacture of butter which is traceable, chiefly, to increasing volume per factory.

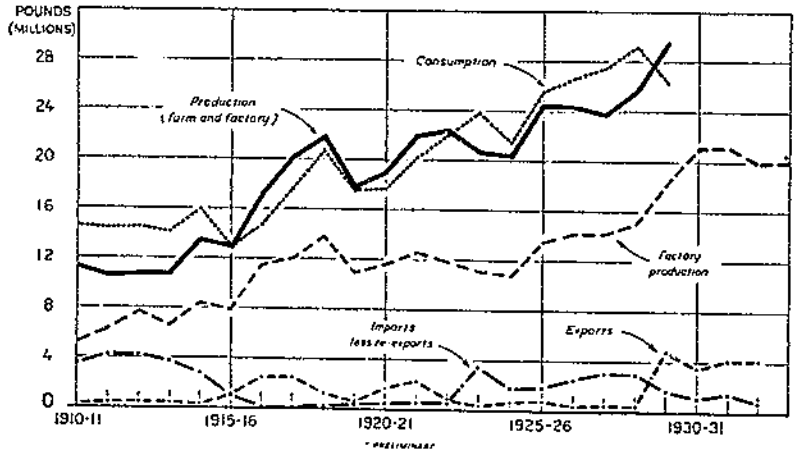

FIGURE 35.—BUTTER: PRODUCTION, CONSUMPTION, EXPORTS, AND IMPORTS, UNION OF SOUTH AFRICA, 1910–11 TO 1933–34.

Factory production and exports of butter have increased rapidly since 1920.

The manufacture of cheese has also played an important part in the expansion of the dairy industry, but its growth has been less rapid than that of butter (fig. 36). In 1910 practically all of the

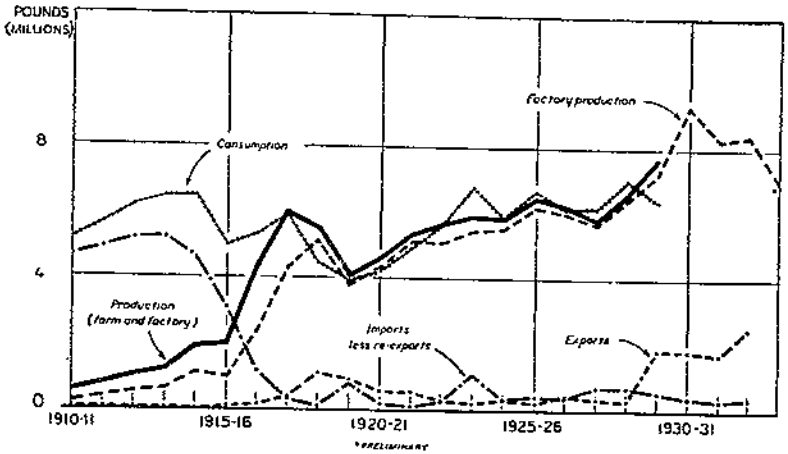

FIGURE 36.—CHEESE: PRODUCTION, CONSUMPTION, EXPORTS, AND IMPORTS, UNION OF SOUTH AFRICA, 1910–11 TO 1933–34.

Production and consumption have increased slowly since 1920.

cheese consumption in the Union was imported. Imports amounted to nearly 5,000,000 pounds per year until 1915–16. During the 5 years following 1910–11, the production of cheese increased from

545,000 pounds to 1,975,000 pounds. During this period the production of factory cheese and farm cheese was about equally important. Within the next 2 or 3 years, however, factory production increased to about 5,000,000 pounds, while farm production dropped to about 250,000 pounds and imports practically disappeared. Since that time, the farm production of cheese has remained unimportant, whereas factory production has increased to the record figure of 9,310,000 pounds in 1930–31. Exports of cheese were unimportant until 1929–30, when the total reached 1,825,000 pounds. The present tendency continues upward, except as interrupted by years of drought.

There are 110 registered cheese factories in which the 1930–31 average production per factory was 81,000 pounds of cheese. This enumeration does not include private cheese factories conducted by farmers who do not treat more than 75 gallons of milk per day. The output per factory has been increasing, as may be judged from the fact that in 1927 there were 150 factories producing only 6,000,000 pounds of cheese or an average of 40,000 pounds per factory. From the records of the board of trade and industries in 1927, it appeared to be improbable that there was a single cheese factory the annual output of which exceeded 200,000 pounds. The factory returns for February 1932 show that out of a total production of 911,810 pounds of cheese, Cheddar constituted 705,096 pounds and Gouda, primarily for local consumption, 185,049 pounds. Other types, including Roquefort and Kraft, amounted to 21,665 pounds. In 1927 there were 19 factories making Gouda cheese only.

The expansion in cheese production will be reflected in increased exports since cheese consumption in the Union is not expanding. Despite increased population, the Union in 1927 did not consume as much cheese as it did 12 years previously. Assuming that all of the cheese in the Union is consumed by Europeans, which overstates the case, consumption per capita was 3.53 pounds in 1924–25 as compared with 4.2 pounds in the United States, 9.8 pounds in the United Kingdom, and 26.4 pounds in Switzerland. Consumption of cheese in the Union in 1929–30 was less than in 1913–14, in marked contrast to the consumption of butter, which increased within the same period from 14,000,000 pounds to 26,000,000 pounds. The consumption of both butter and cheese was smaller in 1929–30 than in the peak year 1928–29.

BUTTER QUALITY

Generally speaking, South African butter is of poor quality (table 49). The cream received at each creamery and the butter manufactured must be graded according to official standards. The butter submitted for export is subsequently regraded, often degraded, at the ports by Government graders. The reliability of the grading done by Government inspectors in South Africa is attested by check grading in London.

South African butter sells in London at prices about one-third lower than prices for Danish, considerably lower than New Zealand and Australian butter, and even slightly lower than Russian butter. The causes of low quality are deep-seated. Among them are the following: (1) Small dairy herds and infrequent delivery of cream,

(2) sparsity of farming population and long-distance transportation, (3) native labor on farms and careless handling of milk and cream, (4) inexperience on the part of new producers and factories, (5) ineffective cooling of cream on farms, (6) overgrading of cream by overanxious creameries, and (7) lack of pasteurization at the creameries.

TABLE 49.—*Creamery butter: Classified by grade, in the Union of South Africa, 1930–31*

Item	First grade		Second grade		Third grade		Cooking grade		Total	
	1,000 pounds	*Per-cent*	*1,000 pounds*	*Per-cent*	*1,000 pounds*	*Per-cent*	*1,000 pounds*	*Per-cent*	*1,000 pounds*	*Per-cent*
Butterfat bought	10,922	63	4,922	28	1,547	9	55	(1)	17,446	100
Butter manufactured	12,410	60	6,063	29	2,151	11	93	(1)	20,717	100
	Cases		*Cases*		*Cases*		*Cases*		*Cases*	
Butter submitted for export	17,278	32	34,208	64	2,163	4			53,649	100
Grade as officially classed	3,138	6	31,330	58	16,105	30	3,076	6	53,649	100
	1,000 pounds		*1,000 pounds*		*1,000 pounds*		*1,000 pounds*		*1,000 pounds*	
Exported overseas	176	6	1,755	62	902	32			2,833	100

[1] Less than 0.5 percent.

METHODS AND COSTS OF MARKETING

Creamery-operating expenses are relatively high owing to the small volume of business per creamery. In the Union there are 59 creameries producing about 20,000,000 pounds of butter per year, an average of about 330,000 pounds per creamery. By way of comparison, in the United States there were, in 1932, 4,424 creameries which produced 1,694,132,000 pounds of butter, an average of 383,000 pounds per creamery.

The largest factory, which is located at Vryburg, has an annual output of approximately 2,500,000 pounds. In 1925 only six creameries in the Union had outputs exceeding 500,000 pounds and the highest was 719,800 pounds. An attempt is made to prevent excessive competition by refusing official registration to creameries located in close proximity to creameries already established.

The board of trade and industries has reported:

> Unreasonable rivalry has loaded dairying with redundant creameries, cream depots, and cheese factories. The unsound position thus created is aggravated so far as the creameries are concerned by such practices as touting for supplies, paying transport charges on cream (some of it carried ridiculously long distances) and the false grading of cream. Thereby costs have been forced up.

The Government is attempting to concentrate the volume in a small number of creameries. During 1931–32 the dairy industry control board considered 6 applications for new creamery licenses and 16 for new cheese-factory licenses but the board approved the issue of only 1 creamery license and 3 cheese-factory licenses.

A conference of creamerymen from the Union and South-West Africa was held in May 1933 to devise ways and means to stabilize butter prices both in and out of the Union. A plan was drawn for the appointment of approved agents and the pooling of products in different grades on a voluntary basis. According to this plan, a

butter stabilization company is to be formed which will be controlled by the dairy industry control board, although this board will not actually handle the products. Manufacturing companies are to nominate distributing agents for approval of the board. These accredited agents will be required to submit monthly reports of the butter output and sales, and quantities carried over. Each month's sales will constitute a separate pool, and export sales will be kept separate from local sales. Any factory whose average price for any grade exceeded the average equalization price for that grade will return the excess to the board for distribution between the factories in order to equalize returns. In the case of export butter the net price at the port will be taken into equalization so it will not matter which factory sells locally and which exports. The bounty will be added to the net price of export butter.

The chairman at the conference was the Secretary for Agriculture, and the chief sponsor for the plan is the president of the South African Agricultural Union and a member of the dairy industry control board, from which it follows that this additional plan for price fixing is likely to be put into operation.

As a further step in maintaining prices, the board adopted the scheme of advertising to encourage a greater consumption of butter and cheese in the Union.

The creamery industry has derived considerable benefit from the sales organization—South African Cooperative Creamery Association, Ltd. (Sacca). In 1927 this organization marketed approximately 50 percent of the Union's creamery production. Butter is handled by this organization on the pooling system, whereby all sales are made by Sacca at uniform prices. The creameries may sell butter locally, but such sales are brought into the pool, the creamery being credited with 2-percent commission, and all member creameries share in the benefit if high prices are realized on such local sales. If a creamery sells butter at less than the ruling price it must pay the difference into the Sacca pool. At least 5-percent commission is charged on all sales, and any surplus is rebated at the end of the year to the member creameries. Sacca's customers are generally retailers, but butter is sometimes sold to wholesalers and speculators. On export butter, Sacca's London agents have been paid 2 percent. Another agency at Johannesburg distributes for a number of creameries at a maximum commission of 7½ percent. Exportation is also handled at this rate divided as follows:

	Percent
Johannesburg house	4½
London selling agent	2
London buying office	1

Cold-storage, cartage, railage, and insurance are paid by the creameries, but the agents take the risk of bad debts.

The cost of marketing South African butter in London, the principal destination, as indicated by an actual consignment in 1932 (table 50), was 3.8 pence per pound, of which 2.2 pence represented loss on foreign exchange, an item not included in 1933. With South African, English, and American currencies at par, the cost would be about 3½ cents per pound.

TABLE 50.—*Butter: Cost of marketing 7,728 pounds, South Africa to London, 1932*

Receipts, expenses, and net return	Actual cost			Cost, gold basis	Cost per pound
	£	s	d	*Dollars*	*Cents*
Receipts:					
Proceeds of sale	303	14	0	1,090.36	14.2
Subsidy, at 10 percent	20	17	0	101.47	1.3
Total	324	11	0	1,197.83	15.5
Expenses in South Africa:					
Railage, Bethlehem to Durban	8	5	11	40.37	.5
Cold storage, etc.	5	15	9	28.16	.4
Grading charges	1	17	6	9.14	.1
London charges:[1]					
Discount to buyers	2	10	7	9.14	.1
Freight	18	18	0	68.23	.9
Interest on freight	0	0	7	.11	.001
Marine insurance	0	12	5	2.24	.03
Customs clearing	0	0	6	.09	.001
Fire insurance	0	1	6	.27	.003
Cartage from railway to store	1	1	4	3.85	.05
Weighing, delivery, etc.	0	0	9	.14	.001
Man rate and cold storage	3	16	5	13.80	.2
Selling commission and guaranty	7	11	10	27.41	.4
Exchange	70	8	9		
Balance received by creamery	203	9	2	988.14	12.8
Total	321	11	0	[2] 1,191.08	[2] 15.4

[1] Converted at rates prevailing at time of shipment, $3.61.
[2] Slight difference due to fractions in converting to gold basis.

An analysis of costs of manufacturing cheese in the years 1923–25 shows that manufacturing expenses of 12 cheese factories averaged 4.7 cents; administration costs, 2.5 cents; selling expenses, 1.8 cents; total costs, 9 cents. To this must be added the average cost of milk, 6.6 cents, making a total cost of 15.6 cents per pound of cheese. This was almost exactly the average selling price of the cheese manufactured by these factories.

In 1927 several fairly large agencies were handling cheese. One of these sold on a 2½-percent commission basis, the factory taking credit risks. Other agencies charged commissions of 5 percent and 7½ percent, depending on the size of the account.

The relation between the prices paid for butterfat and the average market prices for butter and cheese are shown in table 51.

TABLE 51.—*Butter, cheese, and butterfat: Price per pound in the Union of South Africa, 1919–30*

Year	Butter	Cheese	Butterfat			Year	Butter	Cheese	Butterfat		
			First grade	Second grade	Third grade				First grade	Second grade	Third grade
	Cents	*Cents*	*Cents*	*Cents*	*Cents*		*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1919	49	28	38	34	30	1925	31	28	34	30	26
1920	53	32	57	55	51	1926	36	28	30	28	24
1921	53	32	49	44	40	1927	56	28	37	34	31
1922	34	24	32	28	24	1928	49	34	39	35	32
1923	34	24	32	30	28	1929	44	31	36	32	28
1924	40	27	36	34	30	1930	34	25	28	24	20

Agricultural Census Report (*48, no. 12*).

GOVERNMENT AIDS

In 1930 the Union Government enacted the Dairy Industry Control Act, which created the dairy industry control board with power to regulate the butter and cheese trade by a system of licenses, to impose a processing tax on the creameries and cheese factories, to require certain quotas to be exported, and to pay export bounties on butter and cheese exports. The processing tax (levy) was fixed at 1 penny (2 cents) per pound of butter, butter substitutes, and cheese, either manufactured in the country or imported. The levy is not collected on the first 50 pounds of farm butter sold by any farmer during any one month. The bounty rates have been paid at variable levels according to the volume of exports over which the levy fund could be spread, but, generally speaking, the bounties have been about 10 cents per pound. A higher bounty is paid for higher quality products (table 52).

The total amount of bounty paid on butter exports during the year ended June 30, 1932, was £148,237 ($721,410) and on cheese £26,458 ($128,761). The effect of the bounty has been to raise domestic prices well above export-price parity.

TABLE 52.—*Butter and cheese: Export bounties in pence per pound paid in the Union of South Africa at various periods*[1]

Grade	Date effective					
	Oct. 1, 1930	Dec. 10, 1930	Nov. 15, 1931	Feb. 1, 1932[2]	Sept. 1, 1932	Nov. 15, 1932
Butter:	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
First	6	8	6½	7	6	5
Second	4	6	5½	6	5	4
Third	3	4	3½	4	3	2
Cheese:						
First	3½		4	6	6	5
Second	3¼		3¼	5	5	4½
Third	3		3	4	4	4

The bounties in cents are double the pence figures.

[1] Subject until Sept. 1 to certain minimum prices being paid for the 3 grades of butterfat (10, 9, and 7 pence; formerly 12, 11, and 9 pence). Minimum price for cheese, 5 pence (10 cents) per Imperial gallon or 1 shilling 2 pence (28 cents) per pound of butterfat.

SOUTHERN RHODESIA

TREND OF PRODUCTION

Dairying is of recent introduction in Southern Rhodesia except for local milk supplies, but today nearly half the farms produce dairy products. The first creamery was established in 1913, but there were 8 creameries in 1931 which produced over 1,000,000 pounds of butter per year, and 4 cheese factories and 30 cheesemaking farmers producing about 150,000 pounds of cheese (table 53). The total milk production on about 1,200 farms where dairying is practiced to some extent was 5,812,000 gallons in 1927 and 4,929,000 in the dry year 1928. There was a net export movement of 552,000 pounds of butter in 1927, 321,000 pounds in 1928, and 832,514 pounds in 1930. Of cheese, however, there was a net import movement of 135,000 pounds in 1927, 190,000 pounds in 1928, and 118,017 pounds in 1930.

TABLE 53.—*Butter and cheese: Factory production, by months, 1930 to July 1934*

Year and month	Union of South Africa		Butter		
	Butter	Cheese	Southern Rhodesia	South-West Africa	Bechuanaland
1930	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
January	2,732	1,017	203	113	104
February	2,415	842	191	168	91
March	2,406	777	215	229	61
April	1,898	614	182	298	39
May	1,304	516	137	280	54
June	958	507	75	175	32
July	923	593	53	180	
August	786	600	33	118	
September	704	628	24	72	
October	901	806	26	47	
November	1,316	884	30	27	
December	1,853	895	142	54	
Total	18,376	8,679	1,311	2,132	
1931					
January	2,705	1,114	240	120	
February	3,065	1,052	242	240	
March	2,953	881	241	370	
April	2,255	690	167	375	
May	1,787	586	114	387	
June	1,436	581	64	304	
July	1,163	566	51	262	
August	1,001	537	25	183	
September	903	532	20	134	
October	947	541	15	101	
November	1,540	715	38	120	
December	2,303	870	176	220	
Total	22,168	8,665	1,393	2,834	
1932					
January	2,276	905	188	290	
February	2,546	912	217	323	
March	2,977	915	272	461	
April	2,356	717	198	594	
May	1,695	540	175	572	
June	1,430	507	96	507	
July	1,251	516	59	405	
August	1,128	540	42	318	
September	964	538	24	214	
October	1,230	679	30	150	
November	1,617	829	33	201	
December	2,277	1,007	133	284	
Total	21,747	8,605	1,467	4,325	
1933					
January	2,631	1,019	218	303	
February	2,058	771	220	374	
March	2,344	871	224	439	
April	1,702	667	114	353	
May	1,445	529	91	315	
June	1,153	444	44	239	
July	1,044	417	39	193	
August	907	392	26	148	
September	715	343	15	90	
October	685	322	11	68	
November	889	394	25	59	
December	1,957	727	98	103	
Total	17,630	6,896	1,115	2,787	
1934					
January	2,894	985	198	160	
February	2,596	836	156	272	
March	2,349	782	130	385	
April	1,796	619	101	400	
May	1,393	536	86	449	
June	994	446	41	379	
July	848	422	30	358	

Monthly bulletins of Union Statistics and Monthly Press Release, Office of Census and Statistics.

A tendency toward dairying is evident. For example, a creamery was established in 1928 at Umtali. During the calendar year 1930 this creamery bought 60,000 pounds of butterfat, which was much more than during the first year. In 1931, the butterfat purchased approximated 80,000 pounds. The cream is delivered by as many as 100 farmers in the summer but by very few in the winter. As much as 3,000 pounds of butter is churned per week during the flush season but only 1 or 2 small churnings per week are made during the winter. Dual-purpose cows, Red Poll and Shorthorn, produce most of the supply. Butter is sold in pound prints locally and exported to the port of Beira, Mozambique, about 200 miles distant.

A Government milk-recording scheme has been in existence in this colony since 1929. The scheme is as yet in its infancy, and in 1932 only two official milk recorders had been appointed. The cost to the Government of Southern Rhodesia of maintaining the milk-recording service amounts annually to approximately £1,300 ($6,326). This sum includes all expenditures incurred in the form of milk recorders' salaries, transport, etc. A charge is made for milk-recording services, and the revenue thus derived probably did not exceed £200 to £250 ($973 to $1,217) per annum. The amount of public funds devoted to dairy-herd improvement in these directions was approximately £1,100 ($5,353) per annum.

In July 1931 approximately 700 cows had been entered and were being tested under the Government milk-recording scheme.

With regard to the average milk and butter fat production of the cows under test, it was only possible to calculate this in regard to such animals as had been recorded and tested for lactation periods of at least 150 days. Since the beginning of the milk-recording scheme, approximately 200 cows had completed lactations of at least 150 days. The average milk and butter fat production of these cows was as follows:

Average milk production	pounds	5,187
Average butter fat production	do	193
Average percentage butterfat	percent	3.72

It is almost impossible to furnish reliable figures with regard to the average milk and butter-fat production for the country as a whole. Approximately 50,000 cows are used annually in this colony for dairying purposes, but a large number of these are allowed to suckle their calves and are only partly milked. The following figures, therefore, although the only ones available, do not represent the actual average milk and butter-fat production for this colony as a whole.

The average milk production per cow per annum is approximately 1,200 pounds (120 Imperial gallons), and the average butter-fat production is approximately 40 pounds.

METHODS AND COSTS OF MARKETING

In 1931 the cream producers tributary to Bulawayo organized a cooperative association that accepted the most favorable bid from each of the five creameries at Bulawayo for supplying it with the entire output of the membership. The details of the scheme are of interest. Cream producers paid a 5 shilling ($1.22) membership fee

to their organization and signed an agreement to send their cream exclusively to the Rhodesian Cooperative Creameries until September 30, 1933. Damages for violation of the agreement were prescribed. The association, in turn, agreed with the creamery upon a price to be paid for cream which would be not less than that laid down for first-grade butterfat by the South African Cooperative Creameries Association and the price of the lower grades would show differences of 2 pence (4 cents) per pound between any two grades. Furthermore, members of the association and shareholder producers of the company were entitled to a first claim of 25 percent of the net profits, payable in proportion to butterfat delivered, and, in addition, any balance remaining after paying the 10-percent interest on capital.

The costs of marketing Rhodesian butter are about the same as those described for the Union. The present rates of ocean freight to European berth ports, as reported by the committee appointed by the Government of Southern Rhodesia to investigate and report on certain matters relating to the Imperial Economic Conference at Ottawa (1932), are (for butter or cheese) one-half penny (1 cent) per pound from Union berth ports and 1 penny (2 cents) per pound from Beira.

Southern Rhodesia has voluntarily come under the provisions of the Union Dairy Control Act, No. 35, of 1930, which provides for a levy and export bounty on all butter and cheese manufactured.

SOUTH-WEST AFRICA

South-West Africa is too arid to become an important dairy-producing country. However, noticeable expansion and improvement of methods and quality have recently occurred. To reduce the cost of operating creameries in South-West Africa arrangements have been made to concentrate the manufacturing of butter at three large creameries located at Omaruru, Gobabis, and Windhoek. Plants at these places will renovate tainted butter to prevent heavy degrading of South-West African butter and bring it up to the standard of Union butter now being exported. The plan includes the grading of butter at creameries by officials of the dairy-control board. It is claimed that the plan will reduce overhead expenses in the manufacture of butter as well as improve the quality and enable the price paid to farmers for cream to be increased 2 to 4 cents per pound.

HOGS

The countries discussed in this bulletin do not have many hogs. Corn is grown in abundance, but it is used primarily for human consumption, cattle feed, or export. The grazing lands of South and East Africa are better suited for cattle, sheep, and goats than for hogs. In the Union other classes of livestock have increased greatly during the last 20 years, but the number of hogs has remained fairly constant at less than 1,000,000 and the value of total production of bacon and ham in factories and on farms amounted to less than $45,000,000 in 1929–30. Imports of bacon and ham exceeded exports in 1930 by only 137,000 pounds.

Southern Rhodesia had only 66,000 hogs in 1930, of which 41,000 were owned by natives. The number has increased slowly, but imports of bacon and ham still exceed exports by a wide margin.

South-West Africa has less than 10,000 hogs, Swaziland has the same, and the other native protectorates have practically none.

It is not probable that these countries will become important hog producers, even if corn exports decrease. It will be more profitable to combine corn feeding with grass fattening of cattle and lambs, since these classes of livestock can make better use of the grazing lands, which make up over 95 percent of the total area.

POULTRY

Egg production is achieving some importance in South African countries because the months of maximum production and exports, September to December, coincide with the period of lowest production and highest prices in European countries.

The Union of South Africa in 1926 had 10,798,000 fowls, chiefly in Cape and Transvaal Provinces, of which 6,754,000 were owned by Europeans. By 1930 the European-owned fowls had increased to 8,090,000, about the same number as are found in the State of Virginia. The number of fowls is insignificant in the dry areas of Northwestern Cape Province, but in the wheat-growing areas around Capetown and the corn belt of Orange Free State and Transvaal the number is reasonably high considering the small number of farms. Egg production is associated geographically with wheat, corn, and dairying, and with native reserves.

The egg-export trade from South Africa began in 1914. The Union's exports to overseas markets increased from 25,610 cases—of 30 dozen—in 1920 to 194,915 cases in 1931. Including ships' stores, exports rose from 32,588 to 204,776 cases. The steady growth of overseas exports was interrupted only in 1922 and 1931.

An aggressive bid is being made for export markets. As with fruits, butter, and cheese, exportation is controlled by the perishable products export control board, which arranges suitable shipping facilities. The South African Poultry Association, through its four provincial egg circles and with financial aid from the Government egg-export levy of 18 cents per case is improving the grades and regulating the minimum quality of the exports.

The United Kingdom represents the principal market, although small quantities are also exported to Canada, continental Europe, and nearby African countries.

South African eggs sell in London at prices that compare favorably with prices paid for Australian and Danish eggs.

South African eggs supply only 2 or 3 percent of the imports of the United Kingdom, but the average price during 1930 and 1931, partly because of seasonal considerations, were higher than those in any other country.

In 1932 export prices fell to low levels, the Government export subsidy of 10 percent did not cover the loss on foreign exchange, and the Government's policy of maintaining corn and wheat prices above export parity operated against poultry and egg producers. Expansion was temporarily checked. A further increase of production

and exports may be expected when price relationships are more nearly restored to normal. Exchange loss has already been eliminated, and the export subsidy was lowered only to 7 percent.

Under the agreements concluded at Ottawa in 1932 the Union is exempt from the duty on eggs imported into the United Kingdom, amounting to 3 shillings per 42-pound case, 4 shillings 6 pence per medium-weight case, and 5 shillings 3 pence per 51-pound case of 30 dozen. This has the effect of diverting eggs from the continent of Europe to other markets during October to January.

Southern Rhodesia, with only 258,000 chickens owned by European farmers, also shares in the South African exports to England and to nearby African countries to the extent of about 10,000 cases. Southern Rhodesia has only recently changed from an egg-importing to an egg-exporting country.

The feed cost of producing eggs in Cape Province has been ascertained by the Government to be 3.8 pence (7.7 cents at par) per dozen when the production is 10 dozen eggs per hen. In comparison, eggs sold locally in 1932–33 at 12 to 18 cents per dozen. The cost of producing a pullet to laying age was ascertained under those conditions to be 4 shillings 10 pence ($1.17 at par).

In November 1932 South African eggs were bringing in London 39 to 47 shillings per 30-dozen case, according to weight.

The cost of importing eggs from Bulawayo to London via Capetown is 11 shillings 5 pence ($2.78 at par) per 30-dozen case. This includes the 9-pence export levy collected by the Union Government. Export through Beira to London would cost only 7 shillings 7 pence ($1.84) per case, but cold-storage facilities are not available at Beira. The ocean freight rate is 90 shillings ($21.90 at par, per 40 cubic feet) from Beira as against 70 shillings ($17.03) from Union ports.

One of the largest exporters of eggs in the Union is the Cape Egg Circle Cooperative at Capetown. During 1931–32 the operating expenses of this cooperative were 1.1 pence per dozen as compared with 1.25 pence for the egg circle at East London and 1.71 pence at Bloemfontein. The average price paid to its members was 10½ pence (21 cents) per dozen, from which the producer must deduct about 1 penny (2 cents) for railage, returned empties, and breakage.

FRESH DECIDUOUS FRUIT

INTERNATIONAL SIGNIFICANCE

The importance of the Union of South Africa in the world's deciduous-fruit trade arises from its location in the Southern Hemisphere, which permits exports to be made to countries in the Northern Hemisphere during the northern winter season. The deciduous-fruit production in South Africa is large only in comparison with the production in other countries in the Southern Hemisphere that market their fruits at the same time South Africa does (table 54). These are Chile, Argentina, Australia, and New Zealand. The season is earlier in the Union of South Africa than in most competing countries. The first shipments of stone fruits reach England in time for the Christmas trade and continue to arrive for the next 5 months. South African fruit is never stored for delayed marketing but is shipped as soon after harvesting as possible.

The increasing shipments of South African fresh fruits to European markets have meant that apples and pears from the Northern Hemisphere, which can be stored for marketing after Christmas, now meet increased competition. Even South African soft fruits, such as grapes, peaches, nectarines, and plums, compete indirectly with the apples and pears of the Northern Hemisphere.

TABLE 54.—*Apples and pears, fresh: Approximate production and exports by principal countries, 5-year average 1927-28 to 1931-32*

Country	Apples		Pears	
	Production	Exports	Production	Exports
Northern Hemisphere:	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
United States [1]	[2] 160,000	15,800	22,500	1,700
France [3]	[4] 66,000	[5] 600	[6] 35,000	[5] 500
Russia [3]	50,000	[5] 800	5,000	[5] 200
Germany [3]	40,000	[5] 35	15,000	[5] 50
Netherlands [3]	4,000	[5] 1,000	2,000	[5] 400
Belgium [3]	2,000	[5] 900	4,000	[6] 2,000
Poland [1]	[7] 32,000	[5] 70	[5] 4,000	[5] 10
Switzerland [1]	15,000	[5] 1,200	6,300	[5] 700
Rumania [1]	14,000	[5] 400	4,300	(8)
England and Wales [1]	12,500	(8)	1,100	(8)
Canada [1]	10,300	4,300	350	[5] 150
Italy [1]	[9] 11,000	[5] 2,000	[9] 6,500	[5] 900
Austria [1]	7,000	[5] 200	2,800	[5] 1
Hungary [3]	3,000	[5] 150	1,500	(8)
Czechoslovakia [1]	8,000	[5] 300	3,900	(8)
Spain [1]	4,500	(8)	3,200	[5] 20
Yugoslavia [1]	6,500	[5] 1,500	2,800	[5] 50
China [3]	6,000	(8)	5,000	[5] 200
Japan [1]	4,000	[5] 120	6,600	(8)
Chosen [1]	1,000	(8)	600	(8)
Mexico [1]	800	(8)	400	(8)
Greece [1]	200	(8)	440	(8)
Luxemburg [1]	400	(8)	190	(8)
Bulgaria [1]	60	(8)	10	(8)
Southern Hemisphere:				
Australia [1]	8,300	[10] 3,000	1,700	[10] 240
New Zealand [1]	3,000	[10] 1,000	240	[10] 60
Union of South Africa	[10] 300	[10] 25	475	250
Chile [1]	500	[10] 150	200	10

[1] Total crop.
[2] Commercial averaged 95,200,000 bushels.
[3] Rough estimate.
[4] Dessert apples about 6,000,000 bushels
[5] 3-year average, 1928–29 to 1930–31.
[6] Dessert pears about 2,000,000 bushels.
[7] Production was less after the freeze of 1928.
[8] Not available but small.
[9] Not available, but of some commercial importance.
[10] Figure less than those of last few years because of sharp upward trend.

From official sources and for the Union of South Africa, estimates made by American Agricultural Attaché.

UNION OF SOUTH AFRICA

TREND OF PRODUCTION

During the 1932–33 shipping season the Union of South Africa exported 55,297 shipping tons of deciduous fruit. This is exclusive of about 1,000 shipping tons of pineapples. Each shipping ton of 40 cubic feet is the equivalent of 25 bushel boxes, although in actual practice a wide range exists in the size of the boxes used. This tonnage represents a new record for the South African fruit industry, a continuation of the rapid growth of fruit exports since 1919, and further increases are impending as the trees become older. The 1933–34 exports are estimated to be 68,838 shipping tons (fig. 37 and table 55).

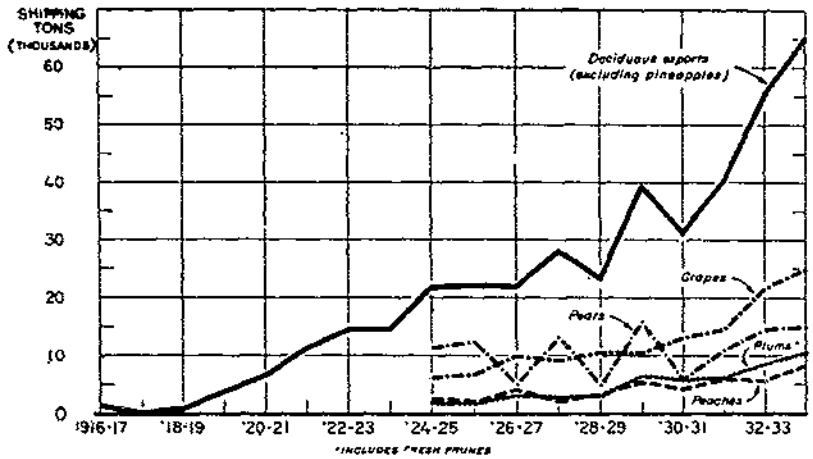

FIGURE 37.—FRESH DECIDUOUS FRUIT EXPORTS, UNION OF SOUTH AFRICA, 1916–17 TO 1933–34.

A rapid expansion has occurred during the last 15 years.

TABLE 55.—*Fresh deciduous fruit: Exports, Union of South Africa, 1927–28 to 1932–33*

Fruit	1927–28	1928–29	1929–30	1930–31	Estimate, 1931–32	Estimate, 1932–33	Estimate, 1933–34
	Shipping tons [1]	*Shipping tons* [1]	*Shipping tons* [1]	*Shipping tons* [1]	*Shipping tons* [1]	*Shipping tons* [1]	*Shipping tons* [1]
Grapes	9,195	10,428	10,494	13,065	14,581	21,773	25,877
Pears	13,240	4,843	15,871	5,878	10,978	14,560	17,503
Peaches	2,098	3,292	5,470	4,192	5,905	5,660	8,320
Plums [2]	2,682	3,009	6,258	5,731	6,201	8,645	10,046
Apples	262	941	456	1,551	1,878	3,160	5,341
Nectarines	375	670	607	460	584	676	1,046
Apricots	83	47	75	93	50	332	[3] 437
Melons	33	52	32	214	[3] 217	[3] 491	[3] 268
Grenadillas	12	10	4	5	(3)	(3)	(3)
Mangoes	11	10	11	9	(3)	(3)	(3)
Persimmons	3	4	2	4	(3)	(3)	(3)
Quinces	5	2	3	4	(3)	(3)	(3)
Litchies	12	2	1	5	(3)	(3)	(3)
Avocados	1	1	(4)	(4)	(3)	(3)	(3)
Pomegranates	1	1	1	1	(3)	(3)	(3)
Strawberries	0	(4)	0	0	(3)	(3)	(3)
Cherries	0	0	5	0	(3)	(3)	(3)
Tomatoes	0	0	(4)	0	(3)	(3)	(3)
Figs	0	0	(4)	0	(3)	(3)	(3)
Total [5]	[6] 28,000	23,312	39,297	31,252	40,391	55,297	68,838

[1] Approximate weight per shipping ton of 40 cubic feet: grapes 500 pounds, pears 1,400 pounds, peaches, plums, and nectarines 800 pounds, apples 1,500 pounds.
[2] Including fresh prunes.
[3] Miscellaneous fruits included with melons.
[4] Less than ½ ton.
[5] Not including pineapples, approximately 1,817 tons in 1932–33.
[6] Total does not check as officially reported.

Grapes and pears are most important, but peaches, plums, apples, and nectarines are of considerable and increasing importance. Apricots are not shipped extensively as fresh fruit, but are usually dried. Pineapples and subtropical fruits are shipped in less significant quantities (fig. 38).

The Union of South Africa first achieved fame in fruit through its wine and grapes. Wine was an important item two centuries

ago when Capetown was merely a trading port for passing ships. During the early part of this century, with the improvement of refrigerated transportation, deciduous tree fruits came into equal im-

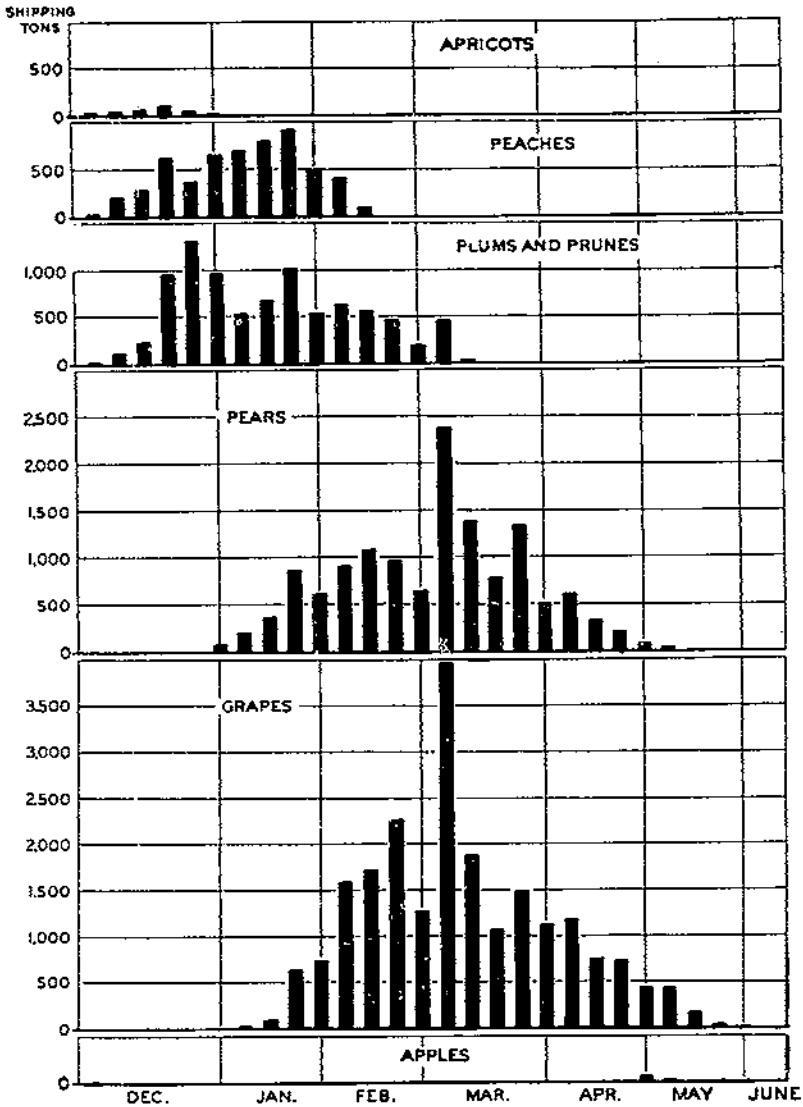

FIGURE 38.—FRESH DECIDUOUS FRUIT SHIPMENTS, WEEKLY, FROM THE UNION OF SOUTH AFRICA, 1932-33.

The peak movement of plums occurs in early January, peaches in late January, pears and grapes in early March.

portance in the Capetown area (fig. 39). Deciduous production was introduced in 1656. The first fresh fruit was exported in 1888. Immediately after the World War there was a wave of enthusiasm for citrus fruits which resulted in extensive plantings in the vicinity

of Port Elizabeth and in the northern Transvaal. The present tendency is for a small expansion of citrus, a moderate expansion of vineyards and deciduous orchards around Capetown, and a more general expansion of apple, peach, and plum acreage in Orange Free State and in southern Transvaal.

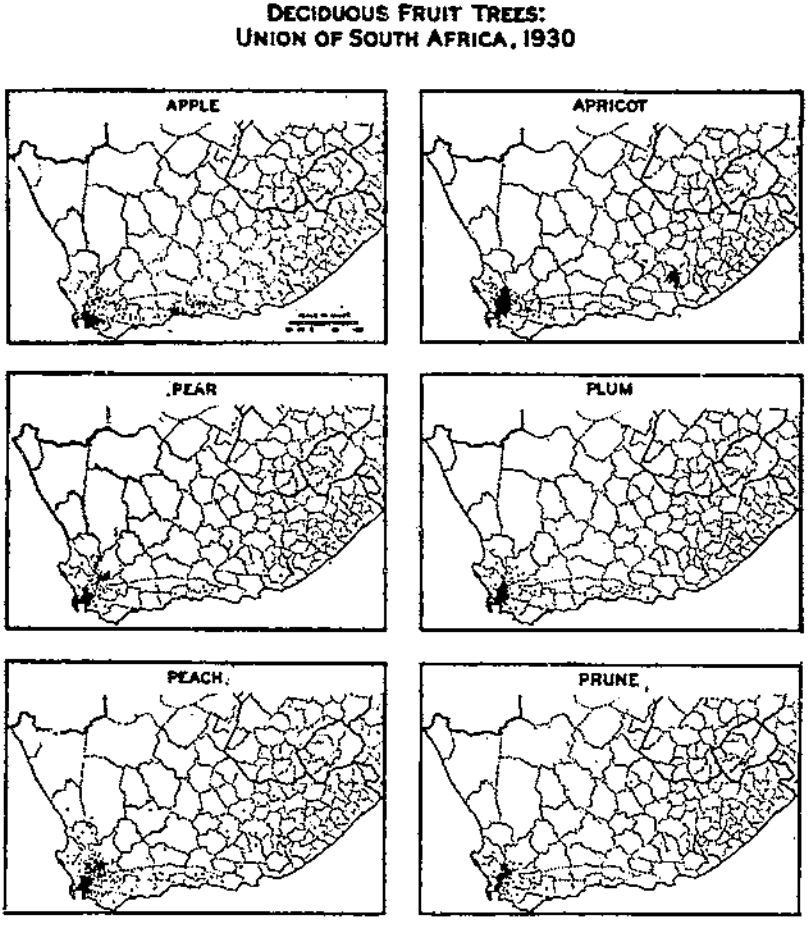

FIGURE 39.—The principal fruit districts lie back of Capetown. Expansion has recently occurred along the south coast. Two irrigated areas lie north of Port Elizabeth.

Orange Free State (which has no citrus orchards) in 1926 had only 10 percent of the Union's fruit acreage, but in 1930 it had 18 percent. Growers there have much more serious obstacles to overcome than had the fruit growers of western Cape Province. Much of the land in this new area consists of a shallow layer of soil overlying rock, and the soil is not very fertile except along the border of Basutoland. This new area has an elevation of 5,000 to 6,000 feet, is subject to frosts, and is especially subject to severe hailstorms,

which have checked the enthusiasm of many aspiring orchardists. This area now produces a small quantity of extra early fruit for the English Christmas market, but its further development is doubtful.

Definite information regarding planting since 1930 is not available, but reports from nurserymen indicate that there has been little planting of any sort, with the possible exception of vineyards in the western Cape Province.

GRAPES

About 80 percent of the grape production is used for wine, 10 percent for drying, and 10 percent for fresh grapes. About 90 percent of the wine grapes and about 75 percent of the table grapes are for domestic consumption. The raisins and sultanas (a special type of golden-colored seedless raisin) are chiefly for export. In 1925 only 2½ percent of the Union's 110,000,000 vines were utilized for producing export grapes, but since then many vineyardists on the margin of the table-grape area have grafted or replanted their wine grapes with table varieties.

According to the agricultural census for 1929–30 there were 75,002 acres planted to grapevines in the Union of South Africa. The annual production of fresh grapes ranges from 200,000 to 250,000 tons, or about one-tenth of the United States production. Of this acreage, 98 percent were in the Cape Province. The 1930 acreage represented an increase of 36 percent in the 4 years since 1926, as compared with an increase of only 16 percent in the 8 years between 1918 and 1926. Assuming that the number of vines per acre in 1930 was 1,860, as in 1918 and 1921, there were in 1930, 140,000,000 vines, as compared with 102,107,984 in 1921, and 87,839,966 vines in 1918. The percentage of nonbearing vines was 16.8 percent in 1921, but information on this point is not available from the 1930 census. The expansion in acreage since 1926 was most marked in the raisin- and wine-producing areas in Worcester, Robertson, and Montagu (table 56).

The vineyard expansion is attributed largely to the enactment in 1924 of the Wine and Spirit Control Act (no. 5 of 1924), which gave the Cooperative Wine Growers' Association of South Africa 100 percent control over distilling wine. Under this system of management the association has been able to sell its distilling wines to the merchants at a price high enough to make production rather profitable. Acreage therefore expanded. According to plans recently recommended, however, the producers will hereafter receive a much lower price for their surplus production, and consequently it is expected they will find it advantageous to use the surplus grapes to produce raisins, sultanas, good wines, or fresh grapes, and thereby reduce the excessive production of distilling wine. The limitation of acreage for a period of 3 years has also been proposed.

Since it is not probable that much of the South African wine production can be diverted from distilling into wine-consuming channels, one must conclude that although the total grape production will not increase during the next 3 years, there will be a slightly decreased production of wines and an increased production of table grapes and raisins or sultanas. Since table grapes constitute about

10 percent and raisins and sultanas scarcely 10 percent of the total output, a slight diversion of the grapes used for wine into these channels may be expected to cause a marked percentage increase in their output.

TABLE 56.—*Grapes: Acreage and percentage production, by kind, in the principal districts of the Union of South Africa, 1925 and 1930–32*

Districts [1]	Acreage			Percentage of total production		
	1925	1930		Wine, 1932 [2]	Dried, 1930 [3]	Exported, fresh, 1931 [4]
	Acres	*Acres*	*Percent*	*Percent*	*Percent*	*Percent*
Cape	1,160	[5]		4		
Bellville	[6]	1,674	2			
Malmesbury	2,512	5,109	7	5	[7]	
Piquetburg	1,579	2,908	4		[7]	
Clanwilliam	531	624	1		[7]	
Van Rhynsdorp	[8]	607	1		2	
Wynberg	2,275	2,703	4			41
Somerset West	[9]	3,962	5		[7]	2
Stellenbosch	10,866	[10] 9,427	13	15	[7]	6
Paarl	14,568	[11] 11,849	18	19	[7]	20
Wellington	[12]	4,269	6		2	[7]
Tulbagh	1,774	1,797	2	4	1	
Worcester	9,944	11,683	16	26	51	26
Montagu	1,827	1,888	3	7	2	[7]
Robertson	3,784	5,804	8	19	15	
Caledon	1,202	1,196	2	1	[7]	
Swellendam	682	1,812	2		3	
Ladismith	605	916	1		2	
Oudtshoorn	794	969	1		2	
Other districts	4,218	6,005	6		20	5
Total	58,321	75,002	100	100	100	100

[1] Arranged geographically from Capetown north and east.
[2] 1932 vintage reported to Cooperative Wine Growers' Association.
[3] 1930 census report, including stalk raisins, loose raisins, sultanas, currants, and dried-wine grapes.
[4] 1931, South African Department of Agriculture, bulletin 109 (*45*).
[5] Vineyard acreage included in new district, Bellville.
[6] Not yet separated from Cape district.
[7] Less than 0.5 percent.
[8] Insignificant acreage.
[9] Not yet separated from Stellenbosch district.
[10] Part of vineyard acreage in new district, Somerset West.
[11] Part of vineyard acreage in new district, Wellington.
[12] Not yet separated from Paarl district.

Agricultural census reports. Outlying districts are expanding acreage more rapidly.

In the Ceres district—now devoted chiefly to the production of pears, peaches, and plums—the land was originally used for grapes, and in the event of a collapse in prices obtainable from the exportation of these fruits, it is possible that the Ceres district will revert in some degree from fruit trees to vines.

The tendency toward the expansion of the vine acreage is now apparent in several outlying districts less suitable for tree fruits, including Kakamas (along the Orange River, northern Cape Province), Ladismith, Oudtshoorn, and Graaf Reinet (these three in the Little Karoo of southeastern Cape Province). More or less irrigation water is available to all these outlying areas.

Grapevines are concentrated in the area around Capetown, but the area has recently spread eastward along the south coast, and isolated instances of vine-acreage expansion are to be noted just south of Durban, just south of Orange Free State, and in the irrigated oasis on the Orange River in northwestern Cape Province. Only three magisterial districts showed a decrease in vine acreage

in 1930, and in each case the decrease is accounted for by a change in the boundaries of the district. The largest increases in vine acreage occurred around Somerset West, around the wheat growing district of Malmesbury, and in the inland grazing districts of Worcester and Robertson where orchard acreage decreased. It is rather remarkable that in the immediate vicinity of Capetown, where grapes have been grown for over 200 years, the acreage expanded more than 4,000 acres, but this expansion is exceeded by the expansion in the bordering districts, especially Worcester and Robertson, where drying is centered. The expansion around Malmesbury is surprising in view of the high guaranteed price of wheat ($1.65 per bushel at par).

It is the practice of growers of grapevines to graft certain varieties to stocks planted by themselves so that nurserymen's information concerning grape sales is not conclusive. According to comments made by leading nurserymen, the planting of wine varieties has declined considerably, while the planting of table varieties, and particularly export varieties, continues steady. At the annual auction sale of grapevines in July 1932, prices were low, and large stocks remained unsold. There was a complete lack of enthusiasm in bidding. The new grape plantings in 1932 were 99 percent for replacements and only 1 percent for expansion.[9]

TREE FRUITS

The total area in orchards in 1930 (excluding bananas, 13,000 acres) was 265,586 acres (commercial citrus about 50,000, deciduous 115,000, noncommercial citrus and deciduous 100,000) and in grape vines, 75,002 acres. This represents an increase since 1926 of 91,613 acres of orchards and 15,519 acres of vines. The percentage increase in orchards, 52 percent, was much greater than the percentage increase in vines, 27 percent (tables 57, 58, and 59).

TABLE 57.—*Fruit trees, noncitrus: Number in the Union of South Africa, 1911 to 1930*

Year	Apple	Pear	Plum and prune	Apricot	Peach	Nectarine	Mango	Other
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1911[1]	1,430	651	636	1,025	5,902	99		
1918[1]	2,171	788	1,144	1,161	5,770	206	97	[2] 2,372
1918[3]	1,225	500	765	722	2,434	96	79	602
1919[3]	1,148	511	812	763	2,517	52	102	
1920[3]	1,212	542	996	908	2,411	58	106	
1921[4]	2,471	838	1,422	1,454	5,446	78	134	[2] 2,089
1924[1]	2,707	1,073	1,740	2,169	6,147	78	156	1,595
1925[1]	2,976	1,156	1,812	2,387	6,865	106	170	1,858
1926[1][5]	2,438	968	1,551	2,039	(7)	(7)	189	[8] 5,162
1930[1][5]	2,464	1,010	1,372	2,191	3,501	76	231	1,793

[1] All districts.
[2] Including all fruit trees in native locations and reserves (1,056,402).
[3] Principal fruit-growing districts only.
[4] All districts, including urban areas.
[5] Including all fruit trees in native locations and reserves (964,576).
[6] Trees the produce of which is grown for sale.
[7] Included in other fruits.
[8] Including nectarines and peaches.

Union South Africa Official Yearbook (*17, no. 13, p. 586*).

[9] Statement by A. I. Perold, secretary, Cooperative Wine Growers' Association.

TABLE 58.—*Peaches: Number of trees and percentage production in the principal districts of the Union of South Africa, 1925, 1930, and 1931*

Districts [1]	Trees on farms occupied by Europeans						Percentage of total production		
	1925		1930 [2]						
	Bearing	Non-bearing	Bearing	Non-bearing	Percentage of all districts		Dried 1930	Fresh exports [3]	
					Bearing	Non-bearing		1930	1931
Cape Province:	*Number*	*Number*	*Number*	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Stellenbosch [4]	55, 150	83, 490	97, 030	20, 140	3	3	2	12	8
Caledon [4]	68, 600	45, 170	99, 000	33, 640	3	5	5	32	49
Paarl [4]	99, 000	76, 020	140, 740	31, 420	5	4	1	25	16
Tulbagh	29, 430	25, 910	49, 170	25, 960	2	4	10	1	(5)
Piquetberg	18, 140	12, 690	24, 250	8, 560	1	1	1		
Clanwilliam	27, 080	16, 910	37, 570	26, 650	1	4	3		
Ceres	131, 000	58, 070	190, 080	82, 900	7	11	25	15	2
Worcester	113, 030	86, 650	142, 980	24, 940	5	3	10	2	1
Robertson	24, 940	12, 140	16, 640	3, 330	1	1	5		(5)
Montagu	33, 670	16, 570	34, 600	6, 300	1	(5)	6		
Ladismith	19, 530	9, 960	19, 750	5, 040	1	1	4		
Orange Free State:									
Ficksburg [4]	125, 050	46, 810	88, 390	12, 840	3	2	(5)		
Transvaal:									
Vereeniging	81, 790	14, 270	53, 180	15, 510	2	2			
Potchefstroom	97, 970	17, 380	55, 200	10, 040	2	1	1		
Krugersdorp [4]	161, 330	37, 930	139, 160	29, 200	5	4	1		
Johannesburg [4]	100, 170	25, 520	159, 440	32, 400	6	4			
Pretoria [4]	223, 610	55, 040	98, 870	33, 230	3	5			
Rustenburg [4]	183, 600	28, 170	87, 600	11, 920	3	2	2		
Potgietersrust [4]	27, 270	48, 420	99, 850	1, 020	3	(5)			
Others	3, 796, 810	719, 730	1, 210, 520	303, 530	43	43	24	13	6
Total	5, 427, 170	1, 437, 750	2, 864, 020	726, 650	100	100	100	100	100

[1] Arranged geographically from Capetown northward and eastward.
[2] 1930 census includes only trees the products of which were grown for sale, while the 1925 census included noncommercial trees, numerous notably in Orange Free State and Transvaal Provinces.
[3] South African Department of Agriculture Bulletins 95 and 109 (*29, 45*).
[4] Area of district reduced between 1925 and 1930 by change of boundaries.
[5] Less than 0.5 percent.

Agricultural census reports.

Many varieties of each kind of fruit are exported, but in most instances two or three varieties comprise the bulk of the shipments. The principal varieties of peaches in order of maturity are: Inkoos, Duke of York, Alexander, Peregrine, Pucelle (Maid of Malines), and Elberta (fig. 40). The principal varieties of plums are: Methley, Santa Rosa, Wickson, Gaviota, and Kelsey, all of them Japanese varieties. The principal varieties of pears are: Bartlett (Bon Chretien), Beurre Bosc, Winter Nelis, and Kieffer. Two-thirds of the apple exports are Oheninuri variety. White Pearmain is the only other important export variety except Jonathan.

There has been much less planting of fruit trees in the Union of South Africa during the last 2 or 3 years (table 60). Planting during the year ended August 31, 1932, was about 25 percent less than during the preceding year, judging by the number of fruit trees issued from nurseries for planting purposes during 1930–31 and 1931–32.[10] Many of the trees issued were to replace old trees, so that the total number of trees has not expanded to the extent shown by these figures. Several leading nurserymen complain that there appears to be a complete

[10] Returns from a questionnaire recently issued by the Union Department of Agriculture.

cessation of expansion and that their business has suffered accordingly. The number of trees held in nurseries also declined from 1930 to 1932.

PLATE 40 Peaches on the sandy soil between Worcester and Ceres are heavily irrigated. Production is used for canning, drying, and export as fresh fruit.

TABLE 59.—*Pears: Number of trees and percentage production in the principal districts of the Union of South Africa, 1925, 1930, and 1931*

District	Trees on farms occupied by Europeans				Percentage of total production		Percentage of total production		
	1925		1930						
	Bearing	Non-bearing	Bearing	Non-bearing	Bearing	Non-bearing	Dried 1930	Fresh, exports[1] 1930	1931
	Number	*Number*	*Number*	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Cape Province									
Stellenbosch[2]	99,120	42,740	93,660	43,850	16	7	12	9	8
Somerset West[2]			20,280	23,250	3	4	8	2	(3)
Caledon[4]	53,270	21,630	49,790	26,270	7	4	2	8	10
Paarl[5]	82,470	27,880	75,790	22,610	12	5	11	16	6
Worcester	17,200	11,060	56,870	20,060	10	3	25	10	15
Tulbagh	1,080	30,970	10,850	26,240	2	5	2	1	----
Ceres	74,980	134,230	160,020	113,970	27	20	32	48	53
Orange Free State									
Ficksburg[6]	10,300	4,890	7,110	2,040	1	1	2	----	----
Transvaal									
Krugersdorp[6]	9,580	9,200	11,260	5,740	2	1	----	----	----
Others	58,280	166,140	171,200	176,200	29	43	6	6	8
Total	412,480	514,850	639,060	489,740	100	100	100	100	100

[1] Arranged geographically from Cape town northward and eastward.
[2] Includes trees only from the produce of which were grown for sale, while the 1925 census included also ornamental trees, numerous in the Orange Free State and Transvaal Provinces.
[3] South African Department of Agriculture Bulletin 97, 1931, p. 7.
[4] Area defined as required between 1925 and 1930 by change of boundaries.
[5] New district created in 1920 out of portions of Stellenbosch, Paarl, and Caledon districts.
[6] Less than 5 per cent.

Agricultural censuses reports

TABLE 60.—*Fruit trees: Number recently planted in the Union of South Africa in relation to the total number of commercial trees on farms in 1930*

Kind of fruit	Commercial trees on farms[1] Aug. 31, 1930	Issued from nurseries					
		Trees issued, year ended Aug. 31—			Percentage of trees on farms in 1930		
		1930–31	1931–32	1932–33	1930–31	1931–32	1932–33
Deciduous:	*Number*	*Number*	*Number*	*Number*	*Percent*	*Percent*	*Percent*
Almond	458, 290	129, 911	45, 126	27, 328	28	10	6
Apple	2, 464, 370	231, 829	179, 377	149, 554	9	7	6
Pear	1, 009, 740	31, 705	20, 084	25, 837	3	2	3
Peach	3, 590, 670	280, 130	232, 766	272, 566	8	6	8
Apricot	2, 190, 820	84, 467	63, 189	77, 966	4	3	4
Plum	907, 130	77, 431	58, 765	50, 759	8	6	5
Prune	412, 120	12, 433	15, 553	23, 369	3	4	6
Nectarine[2]	76, 420	19, 403	20, 006	13, 198	25	26	17
Mango	230, 940	2, 178	2, 032	703	9	9	0.3
Avocado	39, 920	4, 032	2, 202	1, 223	10	6	3
Total	11, 440, 420	873, 519	639, 085	642, 303			
Citrus:							
Lemon	190, 890	7, 700	4, 535	6, 614	4	2	3
Orange	3, 883, 350	151, 178	108, 184	115, 963	4	3	3
Tangerines	272, 260	7, 952	5, 158	6, 731	3	2	2
Grapefruit	311, 110	19, 324	10, 476	20, 436	6	3	7
Total	4, 663, 610	186, 244	128, 353	149, 744			
Grand total	16, 104, 030	1, 059, 763	767, 438	792, 047			

[1] Census enumeration.
[2] Only nectarines, and possibly apples, show continued and marked expansion.
From official sources.

Deciduous-fruit acreage is still expanding in the Lange Kloof Valley, west of Port Elizabeth (tabulated as Other Cape). This area is already producing substantial quantities of plums, apples, and peaches. About 50 percent of the trees are old bearing trees, 25 percent are new bearing trees, and 25 percent are not yet in bearing. Most of this production in the past has been for domestic consumption, but increasing quantities for export, especially apples and pears, are expected from the Lange Kloof Valley. In 1933 exports from this area, exclusive of pineapples, increased over 350 percent. The soil is described as unusually fertile, and the climate and elevations of 2,000 to 3,000 feet are suitable for deciduous-fruit production. Expansion of planting has been temporarily checked by the attraction of growing wheat at the guaranteed price of $1.65 per bushel.

From the present situation, it seems probable that deciduous-fruit exports from the Union, which exceeded 54,000 shipping tons in 1932–33, will reach 70,000 and possibly 80,000 tons within the next 3 years. This expansion will consist chiefly of (1) grapes from the older area around Paarl and from the new areas around Worcester and Malmesbury, (2) nectarines from around Elgin, and (3) pears and apples from the young trees and recent plantings around Ceres, Elgin, and the Lange Kloof Valley (table 61 and fig. 41).

During the South African marketing season South African apricots, peaches, and plums dominate the English market, and prices will depend mainly on demand conditions and on the volume of South African supplies (table 62). This is also largely true of grapes. However, South African pears and apples compete with

TABLE 61.—*Deciduous fruit: Percentage of total shipping tons exported from stated localities in the Union of South Africa, 1928–31*

Locality	Apricots				Peaches				Nectarines			
	1928	1929	1930	1931	1928	1929	1930	1931	1928	1929	1930	1931
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Constantia	.....	.....	.....	.....	3	1	2	2	(1)	1	1	2
Somerset West	5	.....	.....	.....	1	1	4	1	(1)	1	2	1
Caledon	.....	.....	.....	1	30	31	32	48	12	14	17	39
Stellenbosch	14	15	15	6	8	8	12	8	13	11	15	13
Paarl	51	67	55	66	25	28	25	10	26	38	34	20
Wellington	24	16	22	3	(1)	(1)	(1)	(1)	2	3	(1)	.....
Tulbagh	5	2	.....	15	1	1	1	(1)	1	(1)	(1)	.....
Ceres	.....	(1)	8	1	25	23	15	20	43	28	30	25
Worcester	.....	.....	.....	8	1	3	2	2	3	4	1	.....
Other western Cape Province	.....	.....	.....	.....	.....	(1)	(1)	(1)	.....	.....	.....	.....
Other Cape	.....	.....	.....	.....	(1)	1	1	1	.....	(2)	.....	(1)
Orange Free State	.....	.....	.....	.....	.....	.....	5	.....	.....	.....	.....	.....
Transvaal	1	.....	.....	.....	6	3	1	2	(1)	(1)	.....	.....
Natal	.....	.....	.....	.....	(1)	(1)	(1)	(1)	.....	(2)	.....	.....
Total	100	100	100	100	100	100	100	100	100	100	100	100

Locality	Plums				Pears				Apples			
Constantia	2	1	(1)	1	3	4	5	3	.....	.....	.....	.....
Somerset West	(1)	(1)	1	3	2	2	3	3	5	2	.....	6
Caledon	2	2	3	5	5	6	8	10	31	24	60	68
Stellenbosch	20	16	21	19	11	7	10	8	2	1	(1)	4
Paarl	53	48	52	40	24	9	16	6	2	3	4	1
Wellington	7	7	7	3	1	.....	(1)	.....	.....	.....	.....	.....
Tulbagh	5	6	3	2	(1)	(1)	1	1	.....	.....	(1)	.....
Ceres	8	18	10	21	41	48	48	53	30	40	13	7
Worcester	(1)	1	1	3	13	23	9	10	.....	1	.....	(1)
Other western Cape Province	.....	.....	(1)	1	(1)	(1)	.....	(1)	4	2	2	6
Other Cape	(1)	(1)	1	2	(1)	(1)	(1)	(1)	1	4	8	4
Orange Free State	.....	.....	(1)	.....	.....	.....	(1)	.....	.....	.....	1	(1)
Transvaal	2	3	(1)	(1)	(1)	1	(1)	.....	10	4	4	(1)
Natal	1	(1)	1	(1)	(1)	(1)	(1)	(1)	[2] 6	[2] 19	8	6
Total	100	100	100	100	100	100	100	100	100	100	100	100

Locality	Grapes				Total			
	1928	1929	1930	1931	1928 [4]	1929	1930	1931
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Constantia	41	47	39	42	.....	21	13	19
Somerset West	1	1	2	2	.....	1	2	2
Caledon	.....	.....	.....	.....	.....	3	9	13
Stellenbosch	9	7	6	5	.....	8	11	9
Paarl	27	19	25	20	.....	22	25	20
Wellington	4	1	3	(1)	.....	1	2	1
Tulbagh	1	(1)	(1)	(1)	.....	1	1	1
Ceres	1	(1)	(1)	(1)	.....	17	24	17
Worcester	15	22	24	27	.....	15	12	15
Other western Cape Province	.....	.....	.....	(1)	.....	(1)	(1)	1
Other Cape	1	3	1	4	.....	(2)	(1)	2
Orange Free State	.....	.....	.....	.....	.....	.....	1	.....
Transvaal	.....	(1)	.....	.....	.....	6	(1)	(1)
Natal	.....	(2)	(1)	(1)	.....	(4)	(1)	(1)
Total	100	100	100	100	.....	100	100	100

[1] Less than 0.5 percent.
[2] Included with Transvaal.
[3] Origin not known; produced either in the Transvaal or western Cape area.
[4] Not given.

Reports of the chief government fruit inspector, The Deciduous Fruit Export Season, 1927–28, 1928–29, 1929–30, and 1930–31.

similar products from Canada, Australasia, and the United States on the markets of the United Kingdom. Consequently the price paid for South African apples and pears will follow the price trend for comparable varieties of apples and pears from these competing sources and will be less affected by the expansion of production in South Africa.

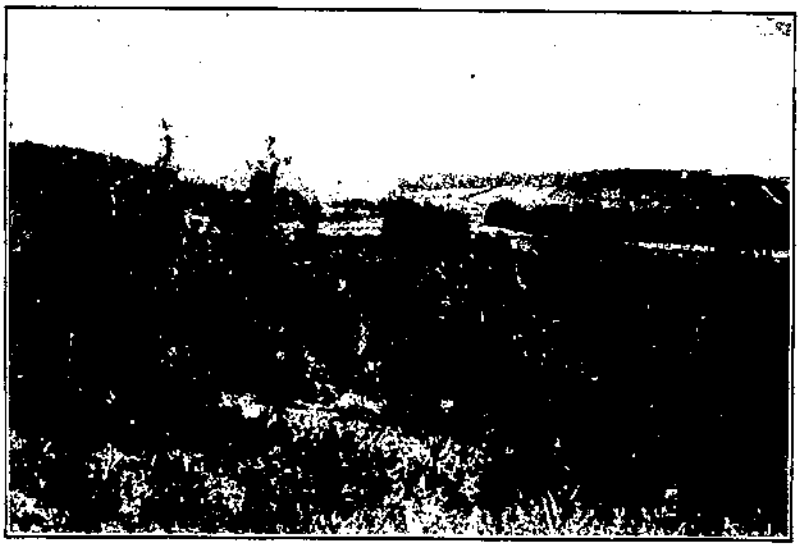

FIGURE 41.—Apple orchards near Elgin, western Cape Province. Most of the apple exports originate in this area.

TABLE 62.—*Fresh fruit: Imports into the United Kingdom and percentage from South Africa, December to May 1930–31 and calendar year 1931*

Year and month	Apricots		Peaches		Plums		Pears [1]		Grapes		Apples	
	Total imports	Percentage from South Africa	Total imports	Percentage from South Africa	Total imports	Percentage from South Africa	Total imports	Percentage from South Africa	Total imports	Percentage from South Africa	Total imports	Percentage from South Africa
1930–31	*Short tons*		*Short tons*		*Short tons*		*Short tons*		*Short tons*		*Short tons*	
December	3	100	13	100	5	------	6,832	------	3,472	------	39,032	(2)
January	20	100	269	100	302	100	2,800	------	1,008	------	20,736	(2)
February	(2)	100	492	100	350	100	2,184	13	784	36	23,464	(2)
March	------	------	304	97	673	98	4,648	17	1,680	80	21,560	(2)
April	------	------	2	80	270	30	3,304	30	1,848	67	20,936	(2)
May	$57	------	3	------	38	------	3,976	4	1,456	23	20,696	(2)
1931	4,984	1	5,204	21	28,728	6	69,355	3	52,920	6	425,659	(2)

[1] 1931 was a year of short crop in the Union of South Africa.
[2] Less than 0.5 percent.

Empire Marketing Board, Fruit Supplies in 1931 (*19*).

PINEAPPLES

There are about 11,000 acres of pineapples in the Union, chiefly in Bathurst district, east of Port Elizabeth. Between 1921 and 1926 exports of fresh pineapples from the Union of South Africa rose

from 550 to 2,090 shipping tons. Since that time exports have fluctuated around 1,000 shipping tons.

The Government horticulturist at Port Elizabeth believes that in the area north of Durban, especially in Lower Umfolozi district, conditions are even more suitable for pineapple production than in the Bathurst area.

In many respects the new area is similar to the Bathurst area. This area is hilly and covered with small bush or trees and tall grass. The soils are variable but are similar to the Bathurst soils, ranging from sandy to heavy clay loams. Rainfall fluctuates around 25 inches, as at Bathurst, but has varied from 57 inches in 1925 to 17 inches in 1931. The atmosphere is satisfactorily humid in this new area; in fact, the humidity is generally from 75 to 85, as compared with 60 to 75 in the Bathurst area. The maximum temperatures seldom exceed 100° F. and are generally lower than in the Bathurst area. The minimum temperatures over a 3-year period were slightly below freezing point on three occasions, all in the same year, whereas in the Bathurst area no temperature has been reported to be below 32°. The wind velocity is not high. This new area is practically free from diseases and insect pests affecting pineapples; in fact, pineapple diseases are rather rare in the Bathurst area, where pineapples have been grown for 60 years.

A considerable number of growers have already begun to grow pineapples in this new area. A very large acreage of land is suitable for their cultivation. Growers are producing Smooth Cayenne pineapples ranging in size from 5 to 8 pounds, as compared with the Queen variety in the Bathurst area, the fruit of which weighs only 1 to 1½ pounds. One grower estimates that a production of 20 tons per acre can be obtained.

This new area was first settled by Europeans after the World War. Cattle farming was unsuccessful on account of the tsetse fly, and cotton growing was abandoned because of low prices. A small amount of land under irrigation near the coast is planted with sugarcane. It is thought that pineapples will be extensively planted on unirrigated lands.

OLIVES

Olives have been grown to some extent since 1885 at least, but they are not sufficiently numerous to justify a separate classification in the agricultural census reports. There are several important growers in the Capetown area. There is one plantation of 50,000 to 60,000 trees near Paarl, from which 1,000 gallons of olive oil and about 4 tons of olives were sold in 1932.

The local price paid for oil was from 18 shillings to 1 pound 4 shillings ($4.38 to $5.84) per gallon, while the price of the olives ranged from 6 shillings 6 pence to 12 shillings 6 pence ($1.58 to $3.04) per case of 26 to 28 pounds. The Union exports practically no olive oil and imports about 30,000 to 40,000 gallons per year. A slight expansion in this agricultural industry may be expected.

PRICES

The prices obtained for South African deciduous fruit on the London market during recent years have proved profitable, judging by the expansion in production. Prices at the end of the season are

usually lower than at the beginning, and an average price is difficult to ascertain. There are also price differences between the grades of each fruit sold. Subject to these limitations, table 63 reflects the trend of prices obtained in London for first-quality South African fruit. During the 1931–32 season these prices were subject to a foreign-exchange discount of 25 to 35 percent, which was substantially offset by an export subsidy paid by the South African Government. The prices in 1933 were not subject to the exchange discount but were supplemented by the same export subsidy. Much higher prices were received in the 5-year period 1922–23 to 1926–27 than in the last 3 years. This decline is explained by the increasing shipments to the United Kingdom. It is interesting to note the course of the prices. Peaches, plums, and grapes brought much lower prices in recent years, whereas pears registered a much smaller price change. This was because pears from South Africa do not dominate the market and the South African volume has less effect on prices.

TABLE 63.—*Fresh fruit: Index numbers of prices of South African fruit, c. i. f. London, 1912 and 1923–33*

[1925 average=100] [1]

Year	Peaches	Plums				Pears			Grapes		
		Methley	Wickson	Santa Rosa	Kelsey	Bartlett	Beurre Bosc	Winter Nelis	White Hanepoot	Waltham Cross	Gros Colman
1912	62	.....	77	.....	49	87	104	77	60	28	48
1923	85	140	97	111	98	91	104	83	116	103	97
1924	100	160	90	94	102	100	109	92	98	97	110
1925	100	100	100	100	100	100	100	100	100	100	100
1926	77	90	79	83	83	96	100	85	109	97	100
1927	100	150	60	89	.....	.....	.....	.....	.....	.....	90
1931	31	.....	.....	.....	41	.....	.....	.....	84	55	68
1932	31	.....	48	.....	44	87	70	62	84	69	66
1933	31	.....	48	33	44	52	70	62	65	52	45

[1] 1925 prices (converted at par): Peaches $3.16, Methley $1.22, Wickson $1.76, Santa Rosa $2.19, Kelsey $2.74, Bartlett $1.40, Beurre Bosc $1.40, Winter Nelis $1.58, White Hanepoot $2.61, Waltham Cross $3.53, and Gros Colman $3.77.

South African Department of Agriculture, Science Bulletin 73 (6), and newspaper quotations.

METHODS OF PRODUCTION

The orchards and vineyards of western Cape Province are attractively situated in the valleys and on the slopes of the mountains that rise behind Capetown. The climate varies amazingly within a few miles, so that some districts are most suitable for table grapes, some for wine grapes, some for raisins, some for apricots, some for pears, and others for peaches and plums. The similarity with California fruit areas is striking. The amount of rain and its seasonal distribution, protection from strong winds, and soil conditions are the factors determining this geographical specialization.

The type of farm is discussed elsewhere [11] in connection with methods of Turkish tobacco production which frequently occurs on the same farms. However, the competition for labor at the critical season between tobacco and fruit is causing tobacco production to shift south and west from the Stellenbosch-Paarl center, leaving fruit

[11] Tobacco, p. 229.

predominant on these farms. Small streams are used for irrigating orchards and vineyards in most districts, but grapes, especially, are grown in many areas where rainfall is adequate or where irrigation water is unavailable and the rainfall is insufficient for fruit trees. The soil is frequently shallow, and the land for further orchard and vineyard expansion in this area is distinctly limited.

The usual insects and diseases common in the United States are prevalent, and, in addition, the Mediterranean fruit fly is found. San Jose scale occurs elsewhere in the Union and in 1932 an isolated outbreak near Capetown was met with vigorous efforts to stamp it out and prevent its spread in this important area. Frosts occur occasionally in western Cape Province and frequently in the elevated Orange Free State and Transvaal Provinces. Hail is serious on the high veld but not in western Cape Province. Heavy winds are often particularly damaging. Delayed foliation of fruit trees, especially peaches, due to warm dry winters sometimes causes a short crop. A cold wet winter is conducive to a good production of peaches, pears, and grapes. It is believed that winter temperature and humidity conditions around Wellington, Paarl, and French Hoek are unsuitable for the production of peach varieties now in use and that delayed foliation is largely accountable for the failure of prunes in the western Cape Province, where hundreds of thousands of trees have been removed within the last few years.[12] New varieties or new methods of caring for the trees may offer a solution to this problem and extend the area in which these trees may be grown. The use of oil sprays is giving encouraging results.

Table 64 shows the monthly distribution of rainfall at four important points and the months at which blooming and picking of the various fruits occur.

TABLE 64.—*Rainfall in the deciduous-fruit districts of the western Cape Province, normal and 1932*

Month	Blooming[1]	Picking[1]	Tokai		Stellenbosch		Paarl		Ceres	
			Chiefly grapes		Chiefly plums and pears		Chiefly plums and grapes		Chiefly pears	
			Normal	1932	Normal	1932	Normal	1932	Normal	1932
			Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
January		B, C, D, E, F	1.14	1.25	0.80	1.05	0.87	1.51	1.05	2.14
February		C, D, E, F, G	.64	3.09	.55	4.26	.51	4.13	.55	7.09
March		D, E, G	1.30	.80	.92	.38	.92	1.39	1.02	1.09
April		D, E, G	2.76	.51	2.24	.55	2.05	.42	2.86	.68
May		G	5.14	8.03	4.18	5.30	5.00	5.33	5.90	4.12
June			7.25	7.19	4.02	4.40	6.26	9.27	7.87	7.76
July			6.03	4.01	4.03	3.00	4.71	3.19	6.00	2.17
August	F		5.50	4.97	3.53	2.54	4.87	3.61	5.53	3.37
September	A, B, C, D, E, F		3.87	7.17	2.73	2.73	3.23	3.21	3.97	1.68
October	D, E, G		2.88	2.75	2.20	1.14	2.33	.51	3.49	1.67
November	G	A, F	1.91	.38	1.39	.44	1.35	.11	1.73	.84
December		A, B, C, F	1.27	1.92	.78	.77	.91	.75	1.25	.94
Total			39.09	42.04	28.57	26.56	33.61	33.06	41.52	33.55

[1] A, apricots; B, peaches; C, nectarines; D, pears; E, apples; F, plums and prunes; and G, grapes.

[12] Statement by O. S. H. Reinecke, horticulturist, Stellenbosch Elsenburg College of Agriculture.

There are three distinct fresh grape growing districts near Capetown. The Paarl district is usually the first to place grapes on the market and ends its shipments with Waltham Cross (Rosaki), Red and White Hanepoot, and Barlinka, just when the second district, Constantia, is about to start with its Red Hanepoot, White Hanepoot, Gros Colman, Raisin blanc (Servan blanc), and Henab Turki (Trisere du Japon). Similarly, toward the peak of the Constantia season, the latest of these three districts, Hex River and De Doorns, begins to export and continues for at least a fortnight with Waltham Cross, Barlinka, and Almeria grapes after the Constantia district has completed its shipments.

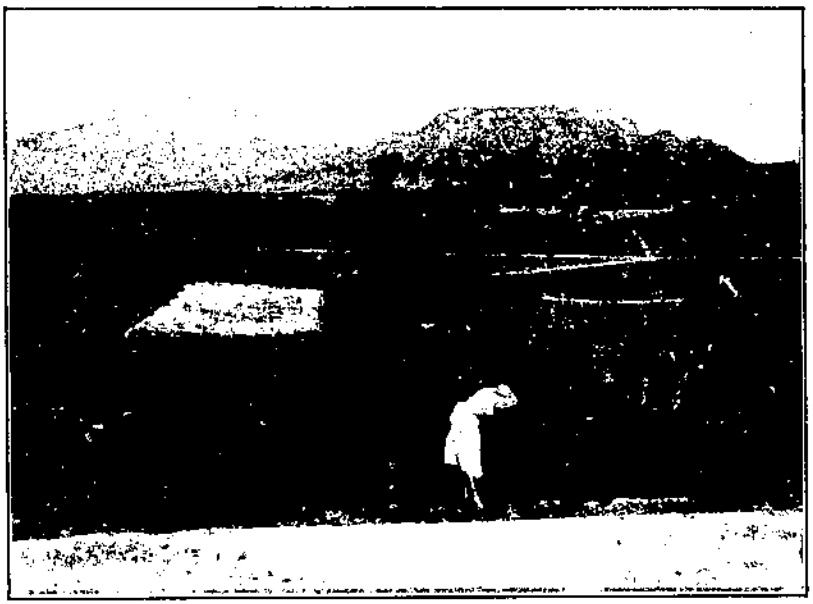

FIGURE 42.—Grape vineyards near Capetown; carefully trellised table grapes in foreground and wine grapes in the background.

Vineyards in western Cape Province are planted on hillsides and on level valley lands (fig. 42). A northern slope facing the midday sun is preferred for table grapes. The low-lying soils are more commonly used for wine grapes or (behind the mountains) for the dried product. Ten acres of grapes, as compared with 35 acres of tree fruits, are deemed necessary for an economic unit. About 25 varieties are grown for fresh export. The principal varieties in each of the chief fresh-grape exporting areas are shown in table 65.

The percentage of total grape exports in 1931 represented by these varieties was as follows:

	Percent
White grapes:	
White Hanepoot	15
Raisin blanc (Servan blanc)	8
Waltham Cross (Rosaki)	28
Almeria	9
Red grapes:	
Red Hanepoot	12
Flame Tokay	1

Black grapes:	Percent
Black Prince (Black Hamburg)	0.1
Gros Colman	9
Barbarossa	1
Prune de Cazouls	3
Henab Turki (Trisere du Japon)	7
Hermitage	1
Barlinka	3
Gros Noir	.3

TABLE 65.—*Grapes, fresh: Leading varieties grown in the principal areas for export*

Area	Season	White	Red	Black
Paarl	Early	Waltham Cross, White Hanepoot	Red Hanepoot	Black Prince (Black Hamburg), Hermitage.
	Midseason			Barbarossa, Prune de Cazouls.
	Late			Barlinka, Gros Noir.
Constantia	Early	White Hanepoot	Red Hanepoot	Gros Colman.
	Midseason	Raisin blanc		Barbarossa, Prune de Cazouls.
	Late		Flame Tokay	Henab Turki (Trisere du Japon).
Hex River Valley (Worcester)	Early	Waltham Cross		
	Midseason			
	Late	Almeria	Flame Tokay	Barlinka.

These varieties, all European, are mostly grafted on American root stocks to obtain resistance to phylloxera. The rows are run east and west, if possible, to prevent sunburning the fruit. The rows are spaced 4 to 8 feet apart (wine grapes 5 by 5 feet, which means about 1,700 vines per acre). On irrigated lands the vines are closer together, and on dry lands they are farther apart. The spacing also depends on the soil and the variety. For producing table grapes the vines are trellised, often with T-shaped supports about 3 feet high and 7 to 9 feet apart, carrying 2 wires at the ends of the crosspiece and 1 wire 12 inches lower attached to the main support. The grapes hang down freely, are well shaded and easily prethinned, and the bloom is not damaged. Pruning is done during the winter months June, July, and August. The grapes are thinned in the spring (from November to January) to 7 to 8 bunches per vine. A yield of 3 to 5 pounds (one-third to one-half box) per vine is expected. The bunches are also shaped and trimmed while being prethinned. The small and bad berries and those inside the bunch are carefully clipped away. As this work must be done by skillful workers within about 6 weeks' time, it is an important limiting factor in export-grape production. The operation is repeated once before picking and once after picking. About half the berries are removed from the bunch by thinning. When ripe, the bunches are cut and laid single layer in a field box, are transported to the packing shed, and are given the final thinning before being packed for export (fig. 43). After transportation to the docks they are inspected according to Government standards, held in cold storage, and shipped under refrigeration weekly or oftener. The trip to England requires 17 days or longer.

The boxes are 12 by 18 inches, outside measurement, and 5, 5½, or 6 inches deep. Each bunch is individually wrapped, and the bunches are packed with fine excelsior (wood wool). A packed box weighing 14½ to 15 pounds contains 10 to 10½ pounds of grapes (*43*).

In 1931, 659,476 boxes of exported grapes were graded as follows: Selected, 31 percent; choice, 69 percent.

The cost of producing export grapes has been estimated by Perold (*26, pp. 632–636*) at 3 shillings 4 pence (81 cents at par) per 10-pound box, assuming bare land to cost £100 ($486.67 at par) per acre, establishing £87 10 shillings ($425.83 at par) per acre (the life of a vineyard being estimated at 33 years), management £35 ($170.33 at par) per acre, and other charges to be at prices prevailing just prior to 1927. In addition, picking and packing per box, 4 pence (8 cents), packing material, 7 pence (14 cents), transportation charges, insurance, inspection, levy, etc., 1 shilling 10 pence (45 cents), and commission on 10-shilling price, 9 pence (18 cents), bring the total cost of production and marketing to 6 shillings 10 pence ($1.66) per box. A price of 6 shillings 8 pence per box on the London market is considered sufficient to cover production and marketing costs when yields are 450 boxes per acre. One leading grower estimates costs as low as 4 shillings 6 pence ($1.09 at par) per box, considering the present subsidy of 1 shilling 3 pence (30 cents) per box. Another grower estimates that for local markets a price of 1 shilling 9 pence (43 cents) is sufficient to cover costs.

FIGURE 43.—Grapes for export are carefully harvested by Cape colored laborers.

METHODS OF MARKETING FRUITS

The commercial fruit growers in the Union of South Africa are well organized for marketing. There are 17 local deciduous-fruit associations, with a combined membership of 1,186 growers. Four of these associations are in Transvaal, 1 in Orange Free State, and 12 in Cape Province. All 17 are members of the South African Cooperative Deciduous Exchange, which performs most of the actual business for the members. Most members pack and ship their own fruit (fig. 44). There is practically no centralized packing. The exchange handles all the export fruit for the members and most of

the fruit shipped by members for local sale. The exchange, together with its component associations, supplies members with packing material and other farming requisites. There are actually between 1,500 and 2,000 commercial growers of deciduous fruit in the Union, but only about 750 of these produce deciduous fruit for export. Only about 40 percent of the export fruit is handled by the exchange. The exchange maintains an office in Capetown and an overseas representative in London. The growers may nominate the overseas concern to which the overseas representative will have the fruit delivered for sale, or he may leave the overseas representative free to designate the agents through whom overseas distribution shall be made. It is the function of the overseas representative to allocate the fruit to the

FIGURE 44.—Bartlett (Bon Chretien) pears in the Hex River Valley are picked in early February.

various fruit concerns in the various cities, consideration being given to the fruit specifically nominated for them. The fruit concerns sell on commission; the charge usually being 7½ percent (fig. 45).

The South African Deciduous Exchange, Ltd., and the South African Cooperative Citrus Exchange, Ltd., are the sole members of a federal organization, the Fruit Growers' Cooperative Exchange of South Africa, Ltd., which undertakes supervision of shipping and cold storage. All three exchanges are financed from the Government levy on exported fruit. All fruit, whether shipped by members or nonmembers, must bear the export levy. This may operate indirectly to achieve compulsory cooperation so that the costs of soliciting patronage and the other overhead costs of marketing may be kept at a minimum. The Government levy on deciduous-fruit exports is 5 shillings ($1.22) per shipping ton of 40 cubic feet, plus another 5 shillings (recently 3 shillings) for advertising and propaganda.

The Perishable Products Export Control Board is a governmental body which arranges shipping space and assists in regulating exports. It is maintained by a portion of the levies collected on exports. During the 1930–31 fiscal year, the Perishable Products Export Control Board received £1,383 ($6,731) from the deciduous-fruit levy, £1,975 ($9,612) from the citrus-fruit levy, £278 ($1,353) from the egg levy, and £317 ($1,543) from the butter and cheese levy.

In 1932 the South African Cooperative Deciduous Exchange was slightly reorganized to make each grower a member of the central exchange as well as a member of the local association. In the central exchange each member grower and each member association was given 1 vote and 2 additional votes based on the value of produce delivered to the exchange and purchases made from it and each

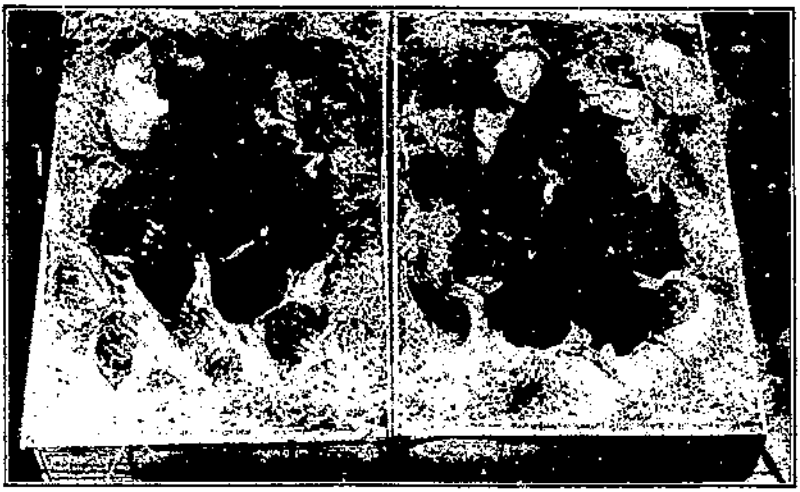

FIGURE 45.—South African Bartlett pears exposed for sale on the London market. This fruit competes with pears from the United States.

member subscribed to at least 5 shares, thus providing additional capital. This legalizes the existing policy of buying supplies direct for fruit growers.

The exchange maintained for some years an inland marketing department which was not self-supporting, and the deficit was made up out of the levy on exports. This was opposed by those exporters who were not interested in inland sales, with the result that the inland-marketing department was abandoned prior to the opening of the 1932–33 season. A Government levy of 1 penny per pound sterling for all fruit marketed inland has been proposed for the support of the inland-marketing department if it is revived.

With the increase in volume and the drop in prices, South African fruit growers undertook in 1933 to effect material reductions in marketing costs, attempting to obtain a reduction in ocean freight from 70 shillings to 52 shillings 6 pence ($17.03 to $12.77 at par) per shipping ton, a reduction in the 5 shillings 6 pence ($1.34) per ton charge for shipping services, a reduction in the 5 shillings ($1.22) per ton per week charge for precooling, and a reduction in the export levy of 5 shillings ($1.22) per ton. The cooperative exchange

charges 2 shillings 6 pence (61 cents) per shipping ton for shipping, carrying, forwarding, and insuring deciduous fruit and 1 shilling (24 cents) per shipping ton for clearing and forwarding imported packing materials.

The success with which South African fruits are meeting on European and Canadian markets is chiefly due to improvements that have been made in precooling and transportation facilities, combined with extreme care in grading, packing, and inspecting the fruit.

The physical facilities perfected for properly packing the fruit, transporting it to the port, precooling, and refrigeration while en route to overseas destinations, are most creditable. From a quality point of view, the deciduous fruits exported from South Africa are to be highly commended. The growers are skillful farmers served by competent educational and marketing organizations. The export grapes are carefully trellised and laboriously prethinned. The tree fruits are picked and packed with the utmost care. The South African Cooperative Deciduous Fruit Exchange, Ltd., appropriates liberally for the purpose of research work in production and marketing.

The Government regulations for the grading, packing, and precooling of deciduous fruits are contained in Government Notice No. 2065 of 1930 and No. 1398 of 1934. These elaborate regulations are enforced with meticulous care by a competent corps of Government inspectors stationed at the various ports and occasionally at inland points. To qualify for export, every lot of fruit, whether privately or cooperatively owned, is inspected and must conform to regulations governing maturity, size, condition, and freedom from insect or other injury. No fruit with visible spray residue or with more than one-hundredth of a grain of arsenious oxide per pound can be exported. The type of box, its size, and method of packing are also specified by regulation. The fruit is precooled in Government-owned plants at the ports. The temperature is carefully maintained at 34° F. The refrigeration chambers on the ship must also be maintained at this temperature. No fruit can be exported overseas otherwise.

Causes of rejections, in 1930–31, were: Bad picking 42 percent; bad packing, 37 percent; diseases and pests, 18 percent; and prohibited varieties, 3 percent. In the case of grapes, 59 percent of those rejected were rejected because of wastiness and 38 percent because they were below export quality.

The standards are high. Only 31 percent of the grape exports of 1930–31 were Select grade, the remainder being Choice. It is apparent that South African growers have the usual difficulty in eliminating defects from the export fruit, but by rigid inspection and educational service to growers, the quality, already high, is being continually improved (fig. 46).

Most of the exports go to England; a few go to Scandinavian and other continental markets and to Canada. None go to the United States because of the fruit-fly quarantine, although the latter has been modified recently with respect to grapes. The Deciduous Fruit Exchange is unable to make regular consignment of fruit to continental markets as there are no regular direct shipping facilities, so potential customers in the Netherlands, Belgium, and Germany cannot be assured a continuity of supply. Scandinavia is one of South Africa's best markets, yet the exchange representative there constantly has to

supplement his supplies from South Africa with fruit reconsigned from London. The high cost of reshipping South African fruit from Southampton to continental markets is more than the premium to be obtained on continental markets over prices in England. The growers who are members of the exchange have control over the destinations selected. Few are willing to run the risk of obtaining prices lower than those obtained in London. The exchange, therefore, must guarantee London parity in order to make shipments to the Continent. During 1930, the Deciduous Fruit Exchange incurred a cash loss of over £5,000 ($24,330) in its endeavor to sell South African fruit on the Continent.

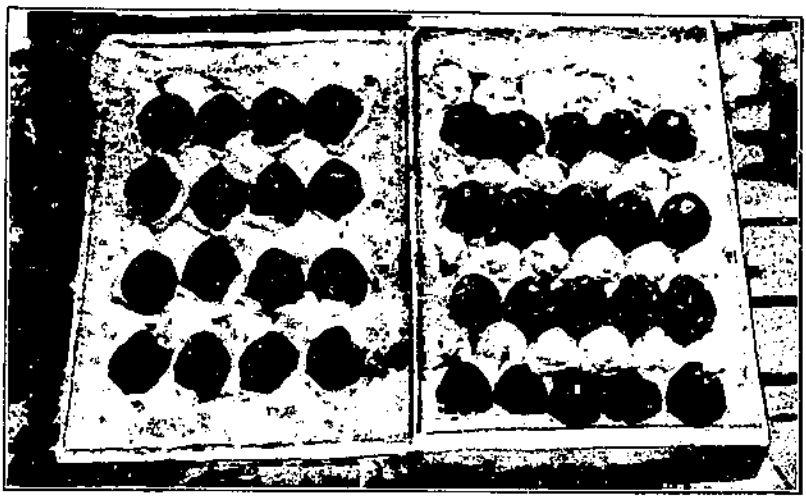

FIGURE 40.—South African plums displayed for sale in London, partially removed from paper wraps. South African fruit is well graded and well packed.

The high duties imposed by continental countries on South African fruit constitute another reason why consignments to the Continent are so small. However, exchange officials feel confident that the Scandinavian authorities will cancel the existing duty on South African fruit, in consideration of the fact that South African growers buy their boxwood and fruit-packing material from Sweden. No similar argument can be brought to bear on other continental countries.

The ocean freight rate from South Africa to England for deciduous fruits is 70 shillings ($17.03 at par of exchange) per shipping ton of 40 cubic feet. This is considerably higher than the rate of 52 shillings 6 pence ($12.77) for citrus fruits, probably because of the extra care and handling in refrigeration that is necessary for deciduous fruits.

An Indian shipping company has decided to equip four of its steamers with refrigerators for carrying fruit to India. Each ship will be equipped to carry 300 tons of fruit. The Deciduous Fruit Exchange has sent a representative to Bombay to investigate the possibilities of developing these markets for South African fruit.

During the 1932–33 season fruit was railed from Capetown to Durban at a cost of 33 shillings ($8.03 at par) per shipping ton

refrigerated, or 18 shillings ($4.38) per ton unrefrigerated. Freight from Durban to Bombay cost 50 shillings ($12.16) per shipping ton. Properly refrigerated boats left Durban for Bombay fortnightly and required 19 days for the trip, but the ships arrived on Saturdays so the time consumed in reaching the market was somewhat prolonged. The fruits considered as most likely to be marketed successfully in India are pears, apples, and grapes. Australian fresh fruit provides competition, but is said to be shipped only as deck cargo and is not equal in quality to South African fruit.

METHODS OF MARKETING WINE

About 80 percent of the grape crop is converted into wine and related products. The varieties are mostly other than those used for table grapes: Steen (Stein), Greengrape, White French, Muscadel Red, and White. The varieties Hanepoot and Hermitage are used for either wine or table grapes, and Hanepoot grapes are used for raisins.

Some good table wines are produced and marketed by individual growers, chiefly pure natural wines (light dry types), mostly white wine, and a smaller quantity of fortified wines, mostly red. The export wines are chiefly of the sweet and heavy types (fortified). Conditions of climate and soil make South African light wines stronger than the European varieties. They average from 13 to 14 percent of alcohol, or 23 to 24 percent proof spirit. The production of good table wines represents only about 20 percent of the total wine production, the remainder is inferior distilling wine.

All wines used for distillation are by law sold exclusively through the Cooperative Wine Growers' Association (the K. W. V.) to the merchant distillers, of whom there are only four of importance. These buy distilling wine direct from the farmer and pay through the K. W. V. for the quantities purchased at the price set by that association, which has been £7 18 shillings 9 pence ($38.63 at par) per leaguer[13] since 1924. The surplus distilling wine is delivered to the K. W. V. for distillation and export, so far as is possible, in fortified wines. Good wines for consumption are sold to the merchant distillers or to the wholesalers, and the K. W. V. has nothing to do with setting these prices and remitting these funds to the growers. In 1921 the merchants paid £2 ($9.73 at par) per leaguer more for good wine than the price paid by the K. W. V. to growers for distilling wine.

This premium was continued for several years after the act of 1924 was passed, but recently they have paid as low as £4 5 shillings to £5 ($20.68 to $24.33 at par) per leaguer for good wine as compared with the price of £3 3 shillings 6 pence ($15.45 at par) paid by the K. W. V. to growers for distilling wine. That association is still paying growers £5 and £6 ($24.33 and 29.20 at par) for good wines for export purposes.

The 4 principal distilling merchants sell to the wholesalers, to the retailers, and to about 12 merchants who sometimes buy also from the K. W. V. or from the farmer. There are about 200 wholesalers and 3,000 retailers in the Union. The retail establishments are mostly

[13] A leaguer is 153.7 United States gallons.

owned or controlled through credit by the big brewery companies whose headquarters are overseas. They are chiefly concerned with the sale of beer, and the wine growers complain that inordinately high margins of profit are charged for wines and brandies as compared with beer. Light wines are bought from growers at 1½ pence (3 cents) per bottle and retailed by bottle stores (for consumption off the premises) at 12 to 18 pence (24 to 37 cents) per bottle. Growers are prohibited by law from selling more than 4 gallons of wine at a time and then only to persons occupying a house to the value of £250 ($1,217 at par). This is aimed to prevent excessive sales to the colored population. Permits must be obtained from the police both for sale by the farmer and for delivery by the purchaser. Consequently, only a few farmers engage in this intricate business of selling wines direct to consumers.

Wine growers are well organized. Soon after 1900 a number of cooperative wineries were organized to improve the quality and decrease the cost to individual growers of manufacturing and maturing wines. Five of these associations are still in existence, with a membership of 88, capital and reserves of £30,000 ($145,988 at par) and a turn-over in 1927 of £50,000 ($243,330 at par). These wineries manufacture good wine for consumption and sell in bulk under contract to wholesale merchants. One company bottles its wine and sells direct to retail merchants.

The K. W. V. was organized in 1917. Its membership of 3,165 includes nearly all of the wine growers. The paid-up capital and reserves in 1927 was £525,000 ($2,555,000), and the turn-over for that year was £503,000 ($2,488,000). The Wine and Spirits Control Act (No. 5 of 1924) gave the association absolute monopoly control over the sale of all distilling wine whether produced by members or nonmembers. Every wine grower in Cape Province must render to the association on a certain date each year a return for all wines, spirits, and brandy produced by him and must state what quantity he has for disposal for consumption as wine and what quantity he has for sale as distilling wine.

It is the duty of the K. W. V. to make an estimate at the beginning of each year of the probable production and consumption for that year of distilling wines in South Africa, that is, wines to be used for distilling into brandy or spirit and for fortifying sweet wines. If the consumption figure happens to be two-fifths of the production (the 1933 surplus declaration was 60 percent) the wine grower is then entitled to sell to the merchants for brandy and wine-fortifying purposes two-fifths of his supply at the price fixed by the K. W. V., which, since the passing of the Wine and Spirit Control Act, has been £7 18 shillings 9 pence ($38.63 at par) per leaguer of 20 percent alcoholic content. The price previously paid was £3 ($14.60) per leaguer. The remaining three-fifths must be delivered free of charge to the K. W. V., or the grower may in practice sell his vintage and pay for his surplus in cash, with which the association purchases the wines of other wine growers who were unable to sell their designated percentage. The surplus is stored, destroyed, or distilled, and the product is sold outside the Union by the K. W. V. That association deducts from the returns enough to deal with the surplus and

each year fixes the price which it remits to the farmer. The byproduct return from a part of this surplus enables the association to fix the surplus percentage at 60 percent instead of some higher figure or, if any profit arises, it is added to the financial reserves of the cooperative.

Although the K. W. V. cannot sell these distilling wines for less than £7 18 shillings 9 pence ($38.63 at par) per leaguer for use in the wine trade of South Africa, it can and does use the spirit (at least 500,000 proof gallons annually) from these surplus wines for the fortifying of its good wines for export. The K. W. V. has started its own export sales company in Great Britain, the South African Wine Farmers' Association, London, Ltd. Between 1927 and 1931 the exports of the association of fortified wine and concentrated grape juice increased from 380,000 United States gallons to 1,824,000, but in the latter year, after allowing for the consumption of nearly 5,000,000 gallons in the form of good wines and spirits used for fortification purposes, the surplus remaining from the ever-expanding production amounted to almost 10,000,000 gallons.

The figures in table 66, based upon reports of the K. W. V., are indicative of the recent circumstances which have led to the present surplus of wine.

TABLE 66.—*Wine and spirits: Production, consumption, and price Union of South Africa, 1923 to 1933*

Year	Wine produced	Distilled spirits [1]		Price per gallon for distilling wine	
		Consumption	On hand end of year	To merchants [2]	To growers
	1,000 gallons [3]	*1,000 gallons* [3]	*1,000 gallons* [3]	*Cents*	*Cents*
1923	16,907	1,114	----------	----------	----------
1924	13,149	1,094	----------	[4] 25	----------
1925	17,055	1,115	----------	25	----------
1926	17,563	1,162	----------	25	16
1927	17,877	1,143	----------	25	16
1928	21,712	1,146	----------	25	16
1929	22,328	1,069	3,417	25	15
1930	24,956	1,010	4,205	25	13
1931	[5] 22,510	925	4,510	25	11
1932	[5] 27,918	827	5,478	25	10
1933 [6]	[5] 27,221	----------	4,520	25	10

[1] Proof gallons, eliminating spirits under rebate of duty, export allowances, etc., and eliminating produce of sugar and produce of grain.
[2] At 20-percent strength. Prices converted at par of exchange.
[3] United States gallons.
[4] Price in 1921 was 29 cents (at par) per United States gallon.
[5] Not corrected for higher wine equivalent of fortified wine and brandy.
[6] Wine production in 1934 was 30,630,000 gallons.

Union of South Africa, census and customs reports; K. W. V. reports and correspondence.

There is a surplus of good wine which must be delivered as distilling wine to the K. W. V. The latter discourages the production of inferior-quality wine, especially acid wines, by deducting 10 percent when the wines contain more than 1.4 grams per liter of acetic acid. The K. W. V. also proposes to persuade its members to agree to a sliding scale which will diminish the price paid to the growers by 1 percent for every tenth gram by which the volatile acidity exceeds 1.4 grams per liter.

The production of wine has continually increased, and most of the wine produced is for distilling into spirits which are used chiefly for fortifying of wines handled by the wine merchants. However, the consumption of spirits produced from wine has consistently declined. Between 1923 and 1932 the production of wine doubled, while the consumption of spirits decreased 25 percent. Most of the increased wine production has come from the new irrigated districts of Robertson, Worcester, and Montagu, where production of wine is said to average 4 leaguers per 1,000 vines (about 8 leaguers per acre) as against 2 leaguers per 1,000 vines (about 4 leaguers per acre) in the older unirrigated districts of Paarl and Stellenbosch.[14]

In 1921 the combined production of wine in Robertson and Worcester districts was 31,000 leaguers (4,765,000 United States gallons). This fell to 27,500 (4,227,000 gallons) in 1924, and then increased to 74,000 (11,374,000 gallons) in 1930. On the other hand, production in the districts of Stellenbosch and Paarl was 56,000 (8,607,000 gallons) in 1921, 43,000 (6,609,000 gallons) in 1924, and 54,000 (8,300,000 gallons) in 1930. The expansion of wine production is definitely in the newer areas, where yields under irrigation are higher, while the older districts of Stellenbosch and Paarl are gradually changing over to the production of table grapes.

South Africa is more of a beer-drinking than a wine- or brandy-drinking country. Between 1923 and 1932 the consumption of spirits decreased 25 percent; consequently the price paid to farmers for wines fell from £5 0 shillings 6½ pence ($24.46 at par) per leaguer to £3 3 shillings 6 pence ($15.45 at par) in 1932 and 1933. In certain areas £3 ($14.60 at par) per leaguer was an inducement to continue planting, whereas elsewhere the reverse was true.

The overproduction of wine was not evident until the last year or two because the Wine and Spirit Control Act decreed that all brandy sold for consumption in South Africa should contain at least 25 percent of 3-year-old pot-stilled brandy matured in wood under excise supervision. Therefore, during the years 1924–27 the merchants purchased 25 to 30 percent more than their distilling-wine requirements in order to stock up with properly aged brandy. At the end of that period they no longer needed to increase their stocks, and furthermore consumption had declined. Farmers, on the other hand, although warned against overproduction, had been attracted by the fixed price and had planted a heavily increased vine acreage.

In 1921, 1922, and 1923, when confronted with a serious surplus, the K. W. V. destroyed wine amounting to 1,813,814, 6,151,842, and 6,121,871 United States gallons, respectively. Again in 1932 the organization decided to destroy 43,000 leaguers (6,609,000 gallons) of inferior wine. The K. W. V. is also making vigorous efforts to expand the outlet for wines and grape juice both at home and abroad. Efforts are being made to induce the legislative assembly to legalize the sale of light wines in coffee houses and restaurants without the imposition of the heavy taxes paid by regular liquor dealers. Most of the exports go to the United Kingdom, where the subsidiary company is actively pushing South African wines. The

[14] These yields must represent yields among better-class growers, because the average for the Union as a whole in 1930 was only about 3 leaguers per acre of wine grapes.

association is also undertaking to capture the Swedish market for certain wines, consisting largely of the Cape Muscadel. Canada is also taking some South African heavy wines.

The English market does little business in South African high-strength sweet wines. The Australian port types hold the market at present in all the shops of the United Kingdom, and the South African port types are difficult to obtain and are rarely in evidence. The fortified sweet types exported to the United Kingdom from the Union of South Africa appear to be used chiefly in blending. Unless the demand for South African wine is increased at home or abroad, grape acreage must be curtailed or the grapes must be diverted into fresh- or dried-fruit export channels.

Although the K. W. V. pays no bounty on the export of wine, it has spent a great deal of money on a bounty on the export of raisins and sultanas. However, there has been no appreciable increase in the export trade of raisins and sultanas, so that the bounty payments are not considered very successful.

The Cooperative Wine Growers' Association is undertaking to manufacture unfermented grape juice in quantity for home sale and for export. An introduction has already met with favor on home markets, and a small consignment has been sent to the Netherlands. The directors have established a large factory at Worcester, capable of producing 1,064,000 United States gallons of grape juice a year. This is the area in which vineyards have expanded rapidly during recent years, and from which the unusually large shipments of export grapes were made toward the end of the 1932 season. It was expected that about 500,000 gallons would be produced in 1933.

A considerable quantity of brandy is manufactured, chiefly by the Cooperative Wine Growers Association but sometimes by individual farmers. Most of the brandy (class A) is distilled from wine or must be produced by the fermentation of fresh grapes without the skins. Class B brandy is distilled from the juice and skins of grapes. Class C brandy includes "dop", which is brandy produced from skins which have been separated from wine or must and subsequently mixed with water, wine, or must, for distillation. An excise duty of 22 shillings 6 pence ($5.47 at par) per proof gallon is imposed on class C brandy and one of 17 shillings 6 pence ($4.26) on class B brandy, as compared with a duty of 12 shillings 6 pence ($3.04) on class A brandy. Since 1924 the law has required that all brandies put on the market for consumption after June 1, 1928, must be a blend containing at least 25 percent of 3-year-old matured pot-still brandy distilled from approved wine and matured according to Government regulations. Brandy distilled from wine especially approved and passed for maturation is entitled to a rebate of 3 shillings per proof gallon after 3 years of storing.

Grape sirup (moskonfyt) is a minor product related to wine. This nonalcoholic product is being advocated as a supplementary outlet for a portion of the surplus wine-grape production. In 1921 a cooperative moskonfyt company was organized at Villiersdorp which used 63,500 gallons of mos or grape juice the first year and 1,780,127 gallons in 1932. The mos is preserved in large cement tanks, closed to the atmosphere, to which small quantities of preservative are added

to prevent fermentation. Five leaguers of mos are evaporated in boiling pans to make one leaguer of moskonfyt. No sugar is added. The finished product is sold locally in bottles and tins and used as a substitute for sirup as a drink and in cooking. The annual production of about 2,000 leaguers of moskonfyt represents the equivalent of 10,000 leaguers (1,537,000 United States gallons) of juice so that it is about one-third as important as table wine.

GOVERNMENT AIDS

The Union Government is stimulating the deciduous-fruit industry in several ways.

(1) The export levy of 5 shillings ($1.22 at par) per shipping ton goes a long way toward supporting the South African Cooperative Deciduous Fruit Exchange and the Perishable Products Export Control Board whose vigorous efforts are largely responsible for the efficiency with which South African fruit is marketed. A supplementary levy of 3 shillings ($0.73 at par) per shipping ton, formerly 5 shillings ($1.22), is exclusively used for advertising and sales promotion. These levies are collected on all deciduous fruit exported, whether shipped by members of the exchange or by nonmembers.

(2) As from December 1, 1931, the Union Government has paid an export subsidy of £2 8 shillings ($11.68 at par) per shipping ton of all deciduous fruits except grapes, which have received £3 4 shillings ($15.57 at par), and pineapples, which have received £1 12 shillings ($7.79 at par). Wine also received an export subsidy of 10 percent. These subsidies were inaugurated soon after England abandoned the gold standard, thereby causing a loss of 25 to 35 percent in the transmission of funds from England to the Union of South Africa, but the subsidies were not discontinued when South Africa also abandoned the gold standard and eliminated the loss on foreign exchange.

(3) By offering reciprocal advantages the Union Government has maintained a preferential treatment for South African fruit shipped to the United Kingdom. Under the terms of article 2 and schedule B of the draft agreement between the United Kingdom and the Union of South Africa, as arranged in 1932 at the Imperial Economic Conference, the United Kindom imposes duties on the following fruits, from which South African fruit will be exempt:

Peaches and nectarines, raw	14 shillings ($3.41) per hundredweight (112 pounds) from Dec. 1 to Mar. 31.
Plums, raw	9 shillings 4 pence ($2.27) per hundredweight from Dec. 1 to Mar. 31.
Grapes, other than hothouse	1½ pence (3 cents) per pound from Feb. 1 to June 30.
Apples, raw	4 shillings 6 pence ($1.09) per hundredweight throughout the year.
Pears, raw	4 shillings 6 pence ($1.09) per hundredweight throughout the year.

These enumerated periods include the entire shipping season for these fruits from South Africa. Peaches, nectarines, plums, and grapes are not exported from the United States to the United Kingdom in significant quantities during the enumerated months. A large part of the late pears exported from the United States to the

United Kingdom are exported during the same period, January to May, when all of the South African pear crop is exported. During this period the preferential tariff on pears is effective against the United States. Few apples are exported from South Africa at any time. It is therefore improbable that the tariff preference granted to South Africa will interfere materially with the marketing of fruit (other than late pears) from the United States, although with respect to apples, there are other Empire countries, such as Canada, Australia, and New Zealand, which are able to take advantage of these preferences to the detriment of exports from the United States.

The United Kingdom also grants a margin of preference on wine not exceeding 27° proof spirit, amounting to 2 shillings (49 cents) per gallon, providing it complies with the regulations affecting the grant of Imperial preferences. This clause should be of assistance to South African wine producers.

South Africa has enjoyed material preference in England since 1925 amounting to 4 shillings per gallon on most wines. Fortified wines usually test 29° to 30° proof (16.6 to 17 percent alcohol by volume).

SOUTHERN RHODESIA

Southern Rhodesia produces little deciduous fruit, but the area along the eastern border has a rainfall of more than 40 inches and is a mountainous but temperate area, and experience with home orchards indicates that a fruit industry might be established. The absence of rail communication is the most serious difficulty. The most favorable areas lie 50 to 150 miles from Umtali, which is on the railroad from Salisbury to Beira. There is small likelihood that the transportation difficulty can be solved for many years, but it is possible that eventually a deciduous fruit industry of considerable proportions may be established along the eastern border of the colony.

TREND OF PRODUCTION

The annual report of the division of plant industry of Southern Rhodesia, 1931, states that little progress is being made in the establishment of deciduous-fruit orchards in the colony. This may be partly because of the shortage of funds for buying trees.

Both deciduous and tropical fruits show a marked increase in the number of trees between the enumerations of 1928 and 1930 (table 67). Apple trees increased 28 percent, peach trees 1 percent, other deciduous-fruit trees 13 percent. Plums showed no appreciable change. Papaws (papayas), mangoes, and avocados showed appreciable increases. The combined increase in tropical fruits was 62 percent. The tropical fruits are grown at the low elevations, and the deciduous fruits are grown at elevations of 4,000 to 7,000 feet along the mountains at the eastern border area of the high inland plateau.

COSTS OF MARKETING

In 1932 ocean freight to European berth ports on deciduous fruit, tomatoes, melons, and vegetables was 70 shillings ($17.03) per ton of 40 cubic feet if shipped from Union berth ports or 90 shillings ($21.90) if shipped from Beira.

TABLE 67.—*Fruit trees: Number of bearing and nonbearing trees of each kind in Southern Rhodesia, 1928, 1930, and 1931*[1]

Year and maturity of tree	Deciduous					Tropical					Total fruit trees
	Apple	Peach	Plum	Other	Total	Papaw[2]	Mango	Avocado	Other	Total	
1928	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Bearing	19,821	28,964	8,437	11,221	68,443	8,858	2,955	349	1,951	14,113	82,556
Nonbearing	11,085	7,821	3,199	5,973	28,078	5,167	1,860	1,043	1,534	9,604	37,682
Total	30,906	36,785	11,636	17,194	96,521	14,025	4,815	1,392	3,485	23,717	120,238
1930											
Bearing	15,313	28,038	7,857	10,441	61,649	12,451	4,040	376	2,220	19,093	80,742
Nonbearing	24,206	9,216	3,764	8,972	46,158	12,480	3,285	1,272	2,352	19,389	65,547
Total	39,519	37,254	11,621	19,413	107,807	24,931	7,325	1,648	4,578	38,482	146,289
1931											
Bearing					64,743					21,597	86,340
Nonbearing					44,355					19,158	63,513
Total					109,098					40,755	149,85

[1] Not including citrus. See table 91.
[2] Papaws are known in the United States as papayas.

Southern Rhodesia Official Yearbook (*37, no. 2, p. 350; no. 3, p. 295*); and Summer Crop Returns (*36*).

TANGANYIKA

Stone fruits for local consumption are grown with some success in scattered areas—Lushoto, Iringa, and Morogoro. Stone fruits, apples, and strawberries do well in the western Usambara Mountains, and grapes are produced in the Arusha district (*40, Rept. 1930, p. 29*). It is not probable that a deciduous-fruit industry of any consequence will develop in this area, for the European population is rather small and the chief interests lie in other directions. Moreover, facilities for precooling and refrigerated transportation to England are lacking.

DRIED FRUIT

INTERNATIONAL SIGNIFICANCE

The Union of South Africa is the only African country south of the Equator engaged in the commercial production of dried fruit. The annual production amounts to about 10,000 short tons, but this quantity is unimportant relative to the total production of deciduous fruit in the country. It is also unimportant relative to the production in the United States, Australia, and the Mediterranean countries (table 68). This relative unimportance is most marked in the case of raisins, currants, figs, and prunes. It is only in the case of dried apricots that the crop entering into international trade is relatively large. Since dried fruit is not perishable and may be marketed at any time throughout the year, South Africa does not possess any material seasonal advantage by being in the Southern Hemisphere. This is in contrast to the situation that obtains with respect to fresh deciduous fruit and citrus fruit.

TABLE 68.—*Dried fruits: Exports from principal world sources, 1930–32*

Fruit and country to which exported	Union of South Africa [1]			United States			Mediterranean Basin [2]			Australia [3]		
	1930	1931	1932	1930	1931	1932	1930	1931	1932	1930	1931	1932
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Raisins and sultanas	1,206	3,202	3,262	64,348	62,550	61,106	75,141	54,181	84,273	30,663	44,580	32,988
United Kingdom	1,143	3,041	3,211	18,222	20,146	24,229	18,441	16,172	36,009	35,197	32,721	19,171
Canada	27	80	28	14,334	11,447	7,283	214	154	108	2,422	8,909	10,187
New Zealand		5			2,536					1,502	1,975	3,502
Germany	(4)	12		7,030	7,314	8,449	20,738	14,474	12,359			
Currants	(4)	(4)	1				[5] 80,465	[5] 73,181	77,998	16,651	16,107	15,126
United Kingdom							[5] 54,735	[5] 47,694	51,814	14,740	12,969	11,466
Germany							[5] 6,376	[5] 8,193	7,265			
Apricots	2,020	1,527	2,108	9,550	11,823	18,811	[6] 16	[6] 11	[6] 14	425	501	44
United Kingdom	1,562	925	1,602	509	621	1,394				317	377	21
Canada	92	43	78	716	518	916				77	85	10
New Zealand	310	269	419		1					11	34	11
Germany	45	23	8	3,046	4,347	5,899						
Peaches	630	161	354	1,923	4,241	4,245	(7)	(7)	(7)	196	204	10
Prunes	1,210	139	796	71,404	148,127	121,967	3,555	2,681	2,529	25	77	202
United Kingdom	981	63	672	14,072	19,912	21,378				2	20	19
New Zealand	6	2	5		703					18	53	161
Germany	211	64	112	22,394	48,815	31,269						
Canada				8,094	8,228	8,580						
Pears	152	37	119	1,827	4,018	3,039						
Apples	36	36	13	11,527	18,796	15,553				8	10	7
Figs	2	1	10				85,788	74,827	45,856			
Other	67	9	6	6,356	8,615	9,475				277	249	97
Total	5,323	5,111	6,609	167,025	258,170	234,196	244,965	204,881	210,070	57,245	61,728	48,475

[1] Exports by water; excludes ships' stores and small exports to neighboring territories.
[2] Spain, Portugal, France, Italy, Greece, Turkey, Algeria; these exports from Mediterranean countries are largely to other Mediterranean countries.
[3] Year ended June 30.
[4] Less than one-half ton.
[5] Greece only.
[6] France only.
[7] Peaches (France) included with apricots.

Statistical abstract of the United States; U. S. Department of Agriculture, Yearbook of Agriculture; Trade and Shipping.

The production of raisins in 1930 in the United States was 168,000 short tons, as compared with 4,839 short tons of raisins, sultanas, and currants in the Union of South Africa. Comparative figures for prunes are 254,000 tons and 1,876 tons, respectively, and for dried apricots 10,906 (1921) and 2,275 tons, respectively. The Mediterranean countries produced 218,400 tons of currants and other dried vine products. In exports, however, the disparity is less since the consuming population in South Africa is small.

TREND OF PRODUCTION

The production of dried fruit, especially raisins and sultanas, like the wine industry, is of long standing in the Union of South Africa. As early as 1891 the estimate of dried-fruit production in Cape Colony was 2,612,662 pounds and in 1904, 2,134,133 pounds (*30, p. 7*). Long before any fresh fruit was exported from the Union considerable quantities of dried fruit, chiefly raisins, currants, and figs, were shipped. Exports in 1882 amounted to 32,810 pounds. In 1885, apparently a record year, exports amounted to 231,145 pounds. Between 1888 and 1913 exports declined irregularly from 75,000 pounds to 12,000 pounds. It is only since the World War that dried-fruit exports have reached a large volume.

In 1918 the production of raisins, sultanas, currants, and dried grapes amounted to more than 3,000 short tons (fig. 47). There was a marked increase in the production of these dried products between 1921 and 1925, when a market for dried Hermitage grapes existed in the United States during the early part of the prohibition era. In 1922 the production of these products amounted to almost 8,000 tons, but in 1933 it had declined to scarcely 6,500 tons. The production of other dried fruits—chiefly apricots, peaches, and prunes—has increased considerably and roughly in proportion to the increase in production of fresh deciduous fruits. In 1918 the production of these other dried fruits amounted to approximately 2,000 tons, while in 1933 it amounted to 4,000 or 5,000 tons.

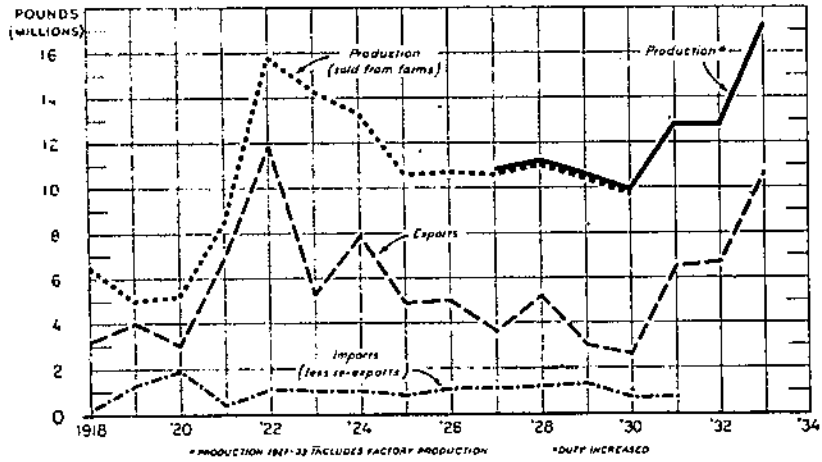

FIGURE 47.—PRODUCTION, IMPORTS, AND EXPORTS OF DRIED VINE FRUITS, UNION OF SOUTH AFRICA, 1918-33.

Raisins and sultanas increased notably in 1933.

Between the years 1918 and 1930 the trend of dried-fruit production can be accurately traced by means of the annual agricultural census reports, which set forth the quantity of dried fruit of each kind sold by farmers (fig. 48). Up to 1922 the census year ended April 30, before selling was completed, but thereafter the census year ended August 31, assuring added accuracy to the enumerations. The census returns on certain products are usually too low, judging from reports of cotton ginnings, tobacco received by the warehouses, and wool exported, but it is believed by the trade that this is offset, or more than offset in the case of dried fruits, by some farmers erroneously reporting fresh weights.

In addition to the dried fruit sold by farmers, a certain quantity of fresh fruit (chiefly apricots in Golden Valley) is delivered to drying factories. The census reports the dried fruit thus produced but without segregation by kinds of fruit. An independent inquiry was subsequently sent to all factories thus reporting to the census, from which information was obtained to approximate the segregation of factory-dried fruit.

In the Union of South Africa the dried-fruit industry is highly concentrated around a few points in the winter-rainfall area, near Capetown. Worcester and Robertson produce two-thirds of the raisins, sultanas, and currants. These points are separated from Capetown and the coast by a range of mountains which cause the rainfall to average only about 12 inches per year, as compared with 25 inches at Wellington and Capetown only a few miles away. Wellington is the center of the dried-apricot industry, and Tulbagh, nearby, is the center of the dried-prune industry. Dried-fruit production has also become established in a small way in several outlying areas. A large estate at Golden Valley, 120 miles inland from Port Elizabeth, is engaged in the production of dried fruits,

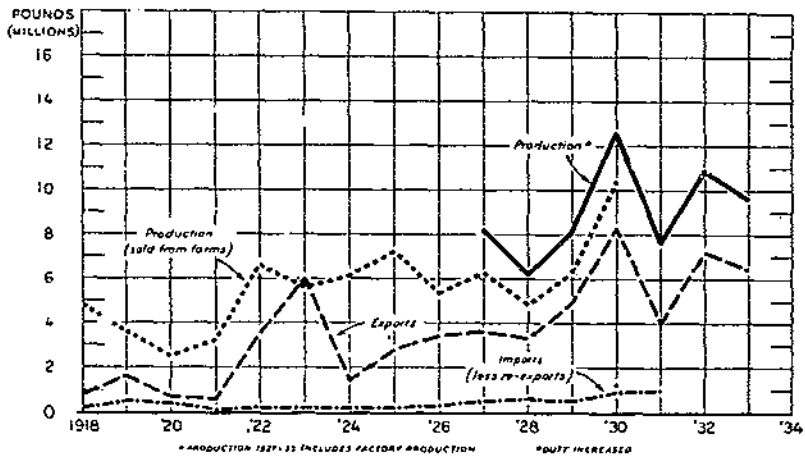

FIGURE 48.—PRODUCTION, IMPORTS, AND EXPORTS OF DRIED TREE FRUITS, UNION OF SOUTH AFRICA, 1918-33.

Dried tree-fruit exports have increased notably since 1928.

especially apricots, but the difficulties with both production and drying indicate that this area is not likely to expand its drying operations. There is an oasislike area near Upington on the Orange River in northern Cape Province (where irrigation water is relatively abundant and the rainfall is only 7 inches per year) which produces considerable quantities of raisins and sultanas, but the difficulties of marketing and the scarcity of suitable soils combine to limit the possibility of large expansion in this outlying district.

RAISINS

Grapes occupy a greater acreage than does any other single fruit. In 1930 the commercial acreage of grapes was 75,000, as compared with 115,000 acres of all deciduous fruits combined, 55,000 acres of citrus fruits, 13,000 acres of bananas, and 11,000 acres of pineapples. About two-thirds of the grape acreage is found in the six districts clustered around Paarl. Most of the grapes near Paarl are used for wine, toward Capetown they are used for export as fresh grapes, and toward Worcester and Robertson they are used for drying. The bulk of the production is within a radius of 50 miles from Paarl.

Between 1925 and 1930 the acreage of grapes in the Union increased from 58,000 to 75,000 acres. There was little increase in the older areas close to Capetown, but there was a remarkable expansion in the wine and raisin districts lying back of Paarl. These newer districts are deficient in rainfall and in irrigation water, but they have the advantage of being able to produce for drying, for wine, or for fresh export, according to the relative attractiveness of these alternative outlets. The difficulty of providing the necessary skill and vineyard facilities for exporting fresh grapes and the accumulating surplus of wines lead to the conclusion that a considerable proportion of the expansion would be for the production of sultanas and raisins in years when drying weather is favorable.

TABLE 69.—*Fruit, fresh equivalent: Disposition of South African production, 1930–32*

Fruit and year	Fresh		Dried		Canned [1]		Wine
	Exports	Local sales	Exports [2]	Local sales	Exports	Local sales	
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons* [3]
Grapes:							
1930	2,623		5,416	3,069			146,455
1931	3,202	[4] 20,000	13,882	3,060			160,138
1932							
Apricots:							
1930	31		10,846	350			
1931	38	100	8,175	350	480	[5] 1,120	
1932					600	[5] 1,400	
Peaches:							
1930	2,188		3,150	669			
1931	1,704	2,700	807	669		[6] 700	
1932						[6] 1,250	
Pears:							
1930	15,275		760	81			
1931	4,776	3,400	190	81	450	500	
1932					750	850	
Prunes:							
1930	117		2,654	561			
1931	82		302	561			
Nectarines:							
1930	248		25				
1931	209	200	32				
Plums:							
1930	2,582						
1931	2,687	650				1,250	
1932						1,250	
Apples:							
1930	410		182	83			
1931	1,124	6,000	177	83			
Seville oranges: 1931	28					[7] 290	
Miscellaneous:							
1930	31		130			3,860	
1931	60	1,500	92			4,750	
Total:							
1930	23,505		23,103	4,813			146,455
1931	14,000	34,550	28,637	4,813	930		160,138
1932					1,350		

[1] Practically all canned by 1 company; 1931 figures are 5-year averages.
[2] Includes some carry-over, particularly for raisins and sultanas in 1931.
[3] 1 leaguer of wine equals 1 ton of grapes.
[4] Based on census reports 1923–25.
[5] No jam exported.
[6] Of which 150 tons were clingstone.
[7] Same quantity 1932.

In 1931 the total production of grapes, fresh basis, was approximately 200,000 short tons, about 17,000 tons of which were used for drying, 23,000 tons for local sale and export as fresh grapes, and the remainder for wine (table 69). Only about 3,000 short tons were

exported as fresh grapes, while about 20,000 tons of those used for drying were exported. Furthermore, only a small percentage of the wine production is exported, from which it follows that, when viewed from the point of view of exports, raisins and sultanas are much more important than fresh grapes or wine.

The total quantity of dried fruit sold by farmers in 1930 was 10,039 tons, of which 4,839 tons consisted of raisins, sultanas, currants, and dried wine grapes (table 70). Loose raisins amounted to 2,726 tons, cluster raisins 276 tons, sultana raisins 1,500 tons, currants 308 tons, and dried wine grapes 29 tons. Most of the loose raisins were produced in Worcester district; most of the cluster raisins in Worcester and Wellington districts; and most of the sultanas in Worcester, Robertson, Montagu, Swellendam, and Ceres districts, with a considerable additional quantity from the vicinity of Upington on the Orange River. Nearly all the currants were produced in Robertson, Worcester, and Montagu districts. Dried wine grapes were not produced in large quantities in any district.

TABLE 70.—*Dried fruit: Production, Union of South Africa, 1910–11 and 1917–18 to 1932–33*

CENSUS RETURNS, EXCLUSIVE OF FACTORY PRODUCTION (NOT PREVIOUSLY DRIED ON FARMS)

Year	Total	Raisins [1]	Sultanas	Currants	Apricots	Peaches	Prunes [2]	Pears	Apples	Figs
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1910–11	6,725	2,356	168	11	636	2,575	[3] 641	178	116	54
1917–18 [4]	11,320	5,213	1,148	114	367	[3] 2,823	[3] 887	370	268	125
1918–19	8,567	4,094	821	68	103	1,708	[3] 1,021	347	233	172
1919–20	7,659	4,319	853	88	314	1,001	[3] 591	116	170	137
1920–21 [4]	11,687	6,559	1,835	78	160	1,824	742	192	165	132
1921–22	22,419	13,142	2,499	119	986	2,842	1,946	230	422	230
1922–23 [4]	19,883	10,395	3,714	170	1,143	2,594	1,312	266	217	243
1923–24 [4]	19,373	11,226	1,894	214	740	1,711	2,923	212	275	178
1924–25 [4]	17,786	8,108	2,164	200	1,008	2,097	2,463	211	248	207
1925–26	15,962	7,430	3,129	182	1,073	2,031	1,355	205	244	262
1926–27 [4]	16,922	6,839	3,515	218	1,058	1,774	2,100	79	159	280
1927–28 [4]	15,708	6,755	4,044	192	2,217	1,336	581	212	210	218
1928–29 [4]	16,727	6,571	3,369	431	2,034	1,724	1,364	124	237	273
1929–30 [4]	20,078	6,062	3,000	616	2,750	2,859	3,751	402	240	338

CENSUS RETURNS, INCLUDING FACTORY PRODUCTION (THE LATTER SEGREGATED ON THE BASIS OF SPECIAL QUESTIONNAIRE)

1926–27	18,996	6,923	3,649	218	3,508	1,841	2,253	107	217	280
1927–28	17,340	6,851	4,144	192	3,367	1,387	605	233	253	218
1928–29	18,664	6,649	3,494	431	4,084	1,786	1,506	150	291	273
1929–30	22,488	6,160	3,156	616	4,550	2,037	3,929	495	307	338

ESTIMATES, INCLUDING FACTORY PRODUCTION, MADE ON THE BASIS OF EXPORTS AND CALCULATED DOMESTIC CONSUMPTION

1930–31	20,400	8,500	3,900	450	4,000	1,500	1,200	250	300	300
1931–32	23,700	8,200	4,200	450	5,000	1,800	3,100	400	250	300
1932–33	26,850	9,500	7,350	450	4,800	1,500	2,400	300	250	300
1933–34	23,500	8,900	3,400	450	5,600	1,800	2,600	200	250	300

[1] Including stalk (cluster) raisins, loose raisins, dried Hermitage grapes, and other wine grapes.
[2] Including dried plums 1920–21 and subsequently.
[3] Prunes only.
[4] Native locations, etc., not enumerated.
[5] Principal districts only.
[6] Dried fruit sold, principal districts, European farmers, years 1910–11 to 1921–22, year ended Apr. 30 1922–23 to 1929–30 years ended Aug. 31.

From agricultural census reports; 1910–11, from Official Yearbook (17, *no. 11, p. 451*).

Raisin production has fluctuated more widely than has the production of any other class of fruit, having increased from 2,600 short tons in 1918 to 6,600 tons in 1922 and decreased to about 3,000 tons in 1928. Since that time production has increased to about 4,800 tons. The production of raisins is intimately related to the production of wine, varying in inverse proportion. This relationship is recognized by the Cooperative Wine Growers' Association, which has paid various subsidies for raisin exports, varying during recent years from ½ to 1 penny (1 to 2 cents) per pound, but with doubtful effect upon the stimulation of raisin production. There are certain varieties, notably White Hanepoot grapes, which may be used for the production of either raisins or wine, but the control exercised over prices by the Wine Growers' Association has apparently attracted the growers more than the payment of the bounty on raisins (table 71).

The production of sultanas has steadily increased during the last 15 years from 400 or 500 tons to around 3,000 tons per year. The trend seems to be continuing gradually upward. Sultanas are produced chiefly in the newer areas around Worcester and Robertson, where vineyard acreage has expanded most rapidly and where drying conditions are most favorable. The other new area on the Orange River produces sultanas of superior quality.

The production of currants has increased during the last 15 years from about 50 tons to about 200 tons per year. This expansion has been most marked during the last 5 years and has occurred chiefly in the Worcester and Robertson areas. No further expansion of significance is apparent at this time. There is no attempt to produce an exportable surplus of currants.

APRICOTS

Apricot production has increased more rapidly than has the production of any other fruit. Between 1911 and 1918 there was apparently a decrease in production, but since 1918 production has increased from about 150 tons to about 2,000 to 2,500 tons. Most of this development has occurred in the vicinity of Wellington, with considerable quantities in the adjoining districts of Paarl, Tulbagh, and Worcester. As many of the trees have not yet reached full bearing capacity the upward trend may be expected to continue. A considerable quantity of dried apricots is also produced in the Golden Valley area, situated 120 miles north of Port Elizabeth, and at Kendrew, nearby. The trees in this area are also increasing in bearing capacity, but the shallow soil and unreliable drying weather are likely to prevent any material expansion in this outlying area. In no case is there evidence of considerable increase in plantings, and it is doubtful whether the acreage of apricot orchards can be materially increased except at the expense of some other kind of fruit. There has been a tendency for the number of apricot trees in Worcester and Robertson districts to decrease as vineyard acreage increased, thereby concentrating still further the apricot industry in the immediate vicinity of Wellington. An insignificant, but increasing percentage of the apricot crop is being exported as fresh fruit. About 16 percent is used for the manufacture of jam, for

TABLE 71.—*Dried fruit: Exports, Union of South Africa, 1918–33*

Calendar year of harvest	Customs figures (South African produce)				South Africa Department of Agriculture, inspection figures, overseas trade											
	Overseas trade	South-West Africa, Southern Rhodesia, and Northern Rhodesia	Ship stores	Total	Total	Raisins[1]	Sultanas	Currants	Apricots	Peaches	Prunes[2]	Pears	Apples	Figs	Assorted	Miscellaneous[3]
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1918	3,700	[4] 217	69	3,986	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1919	5,331	[4] 199	60	5,590	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1920	3,406	[4] 260	29	3,695	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1921	7,294	[4] 205	34	7,533	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1922	14,799	[5] 554	36	15,389	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1923	10,639	[5] 614	3	11,256	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1924	8,835	428	3	9,266	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1925	7,300	437	2	7,739	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1926	7,860	495	[6]	8,355	[7]	[7]	[7]	[7]	[7]	[7]	[7]	[7]	[7]	[7]	[7]	[7]
1927	7,091	586	8	7,685	6,688	1,981	1,425		2,440	357	405	3	4	.....	73	.....
1928	8,790	577	[6]	9,367	7,976	2,244	2,762	1	2,488	248	1	88	47	.....	95	2
1929	7,445	634	[6]	8,079	7,320	1,557	1,232	4	3,442	383	605	[6]	23	23	50	1
1930	10,641	547	1	11,189	10,319	1,013	1,356	1	3,944	1,260	2,319	304	73	5	34	10
1931	10,216	708	0	10,924	9,973	3,735	2,557	1	2,901	322	267	74	71	[6]	27	18
1932	13,338	592	[6]	13,930	13,328	3,556	2,902	[6]	4,201	707	1,564	236	24	18	19	11
1933	16,631	639	[6]	17,270	16,543	4,824	5,680	1	4,244	416	1,142	104	.....	[6]	125	7

[1] Including loose, cluster, dried Hermitage, and other wine grapes.
[2] Including dried plums.
[3] Including nectarines, mebos (crystalized apricots), walnuts, etc.
[4] Exports to Southern Rhodesia and Northern Rhodesia only.
[5] Including preserved fruit.
[6] Less than 500.
[7] Not reported prior to 1927.

which purpose apricots are bought at prices to compete with the dried product, recently about 4 shillings per 100 pounds.

The quantity of dried apricots sold by farmers in 1930 was 1,375 tons, but the total production of dried apricots was about 900 tons greater than this on account of fresh apricots dried in factories. Most of the factory-dried apricots came from the Golden Valley area mentioned above. Over 40 percent of the farm-dried apricots came from Wellington district and most of the remainder from contiguous areas (fig. 49).

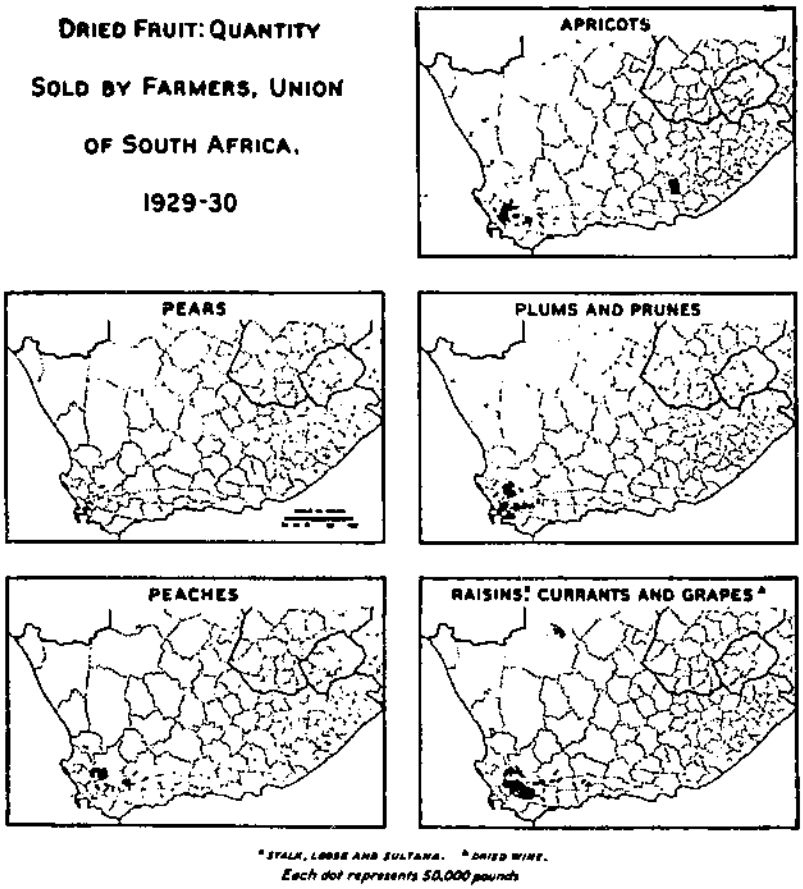

FIGURE 49.—The principal dried-fruit area is inland from Capetown and is distinct from the coastal fresh-fruit area.

The number of apricot trees in the Union in 1930 was 2,190,820 which was an increase of 7½ percent during the 4 years after 1926. Assuming 108 trees per acre, the commercial acreage of apricot trees in 1930 was 20,285 acres. This includes only those trees the produce of which is grown for sale. The total number of apricot trees, commercial and otherwise, in 1925 was 2,386,860, as compared with 1,161,173 in 1918, indicating an increase during those 7 years amount-

ing to 106 percent. Most of the suitable lands have been planted and plantings since 1929 have been scarcely more than sufficient to maintain the existing acreage.

PRUNES

In 1930 there were 412,120 prune trees in the Union, the produce of which was grown for sale. Assuming 108 trees per acre, this means an area of 3,816 acres, or less than half of the number of plum trees in the Union. A small quantity of Kelsey plums are dried and sold like prunes. The quantity of dried prunes and plums sold by farmers in 1930 was 1,875 tons. This was a bumper crop and nearly three times as large as that of the preceding year. About one-third of this production came from the Tulbagh district, but there were nine other districts in the same general vicinity, each of which produced, for sale, over 50 tons.

In 1927 there were 519,000 prune trees in western Cape Province, of which 306,000 were 7 years old or over, 154,000 were 4 to 6 years old, and only 60,000 were less than 4 years old. The production of prunes in 1928 was only 695,000 pounds or only 1½ pounds of dried fruit per tree, eliminating the trees under 4 years old. In 1930, which was a record year, the production from 383,000 trees of bearing age averaged 10 pounds per tree, but since that time scarcely half this average has been obtained.

The number of prune trees decreased from 646,170 in 1926 to 412,120 in 1930. In 1926, 22 percent were of nonbearing age, while in 1930 only 7 percent were of nonbearing age. The production per tree has been so low that large numbers have been pulled out and replaced with other kinds of trees. The 1930 census did not show a single important district in which the percentage of nonbearing trees was high enough to indicate an attempt at acreage expansion.

At one time it was expected that the production of prunes would increase to a position of prominence among South African dried fruits, but discouraging yields have nullified these expectations. Production increased from 300 tons in 1911 to about 1,900 tons in 1930, which was an unusually favorable year for production. Since 1930 production has ranged from 600 to 1,600 tons per year.

South African prunes are considered satisfactory on the English markets in regard to packing and grading, but the size, texture, and taste are faulty. Of the 1930 South African prune crop, 19.6 percent was first grade, bringing 5½, 4, and 2 pence (11, 8, and 4 cents), according to pack; 57.9 percent was second grade, bringing 1 to 1½ pence (2 to 3 cents) per pound; and 22.5 percent was third grade, bringing ½ penny (1 cent) per pound. It is held that proper spraying and cultural methods will increase the proportion of first-grade prunes.[15] The size of the fruit is unusually small, usually running from 60 to 90 per pound. There is also an increasing tendency to export the large-sized prunes as fresh fruit, and for this reason South Africa imports large-sized prunes from the United States at the same time that it is exporting its crop of small-sized prunes.

[15] Statement by O. S. H. Reinecke, horticulturist, Stellenbosch-Elsenburg College of Agriculture.

Yields are generally very low and erratic. Delayed foliation following warm, dry winters is believed to be a contributing cause, and this is beginning to be overcome by the process of oil spraying during the late winter months.

The number of prune trees sold by nurseries during each recent year represents only 3 or 4 percent of the number of trees enumerated on farms in 1930, and it is doubtful whether this is equal to the number of trees that die or are removed each year. No further expansion of prune production is to be expected, although the production will probably continue to fluctuate markedly from year to year.

PEACHES

The number of commercial peach trees in the Union in 1930 was 3,590,670, or 33,247 acres on the basis of 108 trees per acre. The number of noncommercial trees probably equals the number of commercial trees.

In 1931 the total commercial production of peaches in the Union was about 6,600 short tons, of which 4,400 tons were sold locally or exported as fresh fruit and about 700 tons were used by the canning industry. About 1,500 short tons were dried for local sale and export. This was a short crop; and since the quantities of peaches used fresh and for canning vary only slightly from year to year, the proportion of the crop dried is normally higher than the 1931 figures would indicate.

The quantity of dried peaches sold by farmers in 1930, a record year, was 1,429 tons. About 40 percent came from the districts of Ceres, Tulbagh, and Worcester, but a large number of districts contributed small quantities to this total, including several in Transvaal and Orange Free State.

Dried peaches constitute an important item in the dried-fruit consumption of South Africa so that with variations in size of crop the quantities for export fluctuate greatly. It is not looked upon with favor as a promising product for export, and only a small proportion of the dried-peach crop is exported except in years of unusually heavy production, as in 1930. Since 1911 the production of dried peaches has decreased from about 1,250 tons to about 700 tons per year. There have been no large plantings of peaches that are suitable for drying, like the Muir within recent years. On the contrary, many of these varieties have been replaced with those suitable for canning or for export as fresh fruit. The production of dried peaches will continue downward in trend.

PEARS

Dried pears do not constitute an important crop. Among many growers the production is limited to fruit that is blown to the ground when practically matured. Therefore, the quality of the dried pears produced in South Africa is inferior to the quality of the other classes of dried fruits.

There were 1,009,740 commercial pear trees in the Union in 1930, 9,349 acres on the basis of 108 trees per acre. The increase in the 4 years following 1926 amounted to only 1 percent, although the total number of pear trees, commercial and otherwise, had increased 47 percent in the 7 years between 1918 and 1925. In 1926, 47 percent

of the pear trees were of nonbearing age, as compared with 38½ percent in 1930.

Most of the pear crop is consumed locally or exported as fresh pears. About 1,000 to 1,500 short tons are used by the canning industry and only a small quantity is used for drying, but most of the dried pears are exported.

The quantity of dried pears sold by farmers in 1930, a record crop, amounted to 231 tons. Most of this production came from the Ceres, Worcester, Paarl, and Stellenbosch districts. The percentage of nonbearing pear trees in 1930 in the Ceres district was 40 percent, in the Worcester district, 25 percent; in the Paarl district, 14 percent; and in the Stellenbosch district, 23½ percent, from which it would appear that the considerable increase in pear production is likely to come from those districts that specialize in drying.

The production of dried pears has increased since 1911 from about 100 tons to about 200 tons per year. The production may increase still further during the next 5 or 10 years in proportion to the marked expansion in the production of fresh pears, but it is not expected to reach significant proportions.

APPLES

A small quantity of dried apples is regularly produced but the production at present, about 125 tons, is not more than was produced 15 years ago. The domestic demand for dried apples is limited, and exports are insignificant. No material expansion is expected in this direction despite the fact that apple production is expanding rapidly around Elgin and along the south coast toward Port Elizabeth. These apple-producing areas do not have suitable drying weather.

In 1930 there were 2,464,370 commercial apple trees in the Union, or 24,644 acres on the basis of 100 trees per acre. Most of the apple crop is consumed locally as fresh fruit, and a considerable quantity of fresh apples are exported. Only about 250 short tons of apples are used for commercial drying. In 1930 the quantity of dried apples sold by farmers was 120 tons, most of which came from the districts of Caledon, Ceres, and Worcester, in Cape Province, and Ficksburg in Orange Free State Province. The number of commercial apple trees was practically the same in 1930 as in 1926. There is nothing to indicate that the drying of apples will become an important industry.

FIGS

In 1930 there were 341,590 commercial fig trees in the Union, or 3,163 acres, assuming that there are 108 trees per acre, as compared with 466,130 commercial trees in 1926. This is a considerable reduction. In 1930 only 20 percent of the fig trees were of nonbearing age, as compared with 26 percent in 1926. This also indicates a check in the expansion of commercial production.

The quantity of dried figs sold by farmers in 1930 was 169 tons. Most of this quantity came from the Tulbagh, Ceres, and Montagu districts. The 1930 census indicates practically no nonbearing fig acreage in 1930 in the Ceres district, only 250 nonbearing trees in the Montagu district, but 36 percent nonbearing in the Tulbagh district. In no case does it appear probable that the bearing acreage of figs will be materially increased.

The production of miscellaneous dried fruits such as figs, nectarines, and quinces has increased from 25 tons in 1911 to about 250 tons at present, but there is little reason to expect that the production of these fruits will increase much beyond the present insignificant figures, although a slight expansion in the production of figs is likely to occur. Exports of these miscellaneous dried fruits are insignificant.

It is not to be expected that the production of dried fruits will increase much, if any, beyond the present level of 9,000 to 10,000 tons per year unless an unforeseen collapse of the wine market diverts production into raisin channels. The production of dried apricots will probably increase, and this is significant since exports of this product are relatively large in relation to the total international trade in dried apricots. The production of dried peaches will probably decline and possibly that of prunes as well. The production of dried apples, pears, and miscellaneous fruits, although increasing slightly, will not reach significant proportions.

The annual agricultural census was discontinued after 1930. Subsequent data have been approximated from exports and domestic consumption, the latter being estimated from data available between 1927 and 1930. In calculating domestic consumption no allowance could be made for differences in carry-over from one year to another. The average of 4 years was therefore obtained in order to minimize this source of error.

Customs-office statistics are only partly segregated, and it has been necessary to use data compiled by Government officials who inspect all dried fruit exported. Such figures cover only overseas exports and are usually slightly smaller than the customs figures. Furthermore, they apply to the date of sailing, whereas the customs figures apply to the date the documents are executed. This sometimes alters the year in which late December shipments are recorded.

These difficulties have been overcome with fair success so that table 72 is reasonably reliable.

TABLE 72.—*Dried fruit: Production, exports, and calculated domestic consumption, Union of South Africa, 1927–31*[1]

Commodity and year of harvest	Production (farm weight, dried)			Loss or gain in processing		Production final weight	Exports			Apparent domestic consumption	Additional imports
	On farms[2]	In factories[3]	Total	Percentage	Quantity		Overseas[4]	South-West Africa, Southern Rhodesia, and Northern Rhodesia[5]	Total		
Raisins:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1927	6,839	84	6,923	−5	346	6,577	1,981	121	2,102	4,475	49
1928	6,788	63	6,851	−5	343	6,508	2,244	118	2,362	4,146	134
1929	6,571	78	6,649	−5	332	6,317	1,556	130	1,686	4,631	164
1930	6,062	98	6,160	−5	308	5,852	1,013	112	1,125	4,727	157
Average	6,565	81	6,646	−5	332	6,314	1,698	120	1,818	4,496	126

[1] Not including imports and not corrected for differences in carry-over.
[2] Census enumeration of dried fruit sold by farmers.
[3] Census enumeration (total) segregated on basis of special questionnaire to factories for the year 1929–30.
[4] Reports of the South African Department of Agriculture (inspection returns).
[5] South-West Africa, Southern Rhodesia, and Northern Rhodesia; customs report; total segregated in following percentages: Raisins, 20.5; sultanas, 13.7; currants, 4.8; apricots, 9.6; peaches, 20.5; prunes, 22; pears, 2.1; apples, 3.4; and, figs 3.4.

TABLE 72.—*Dried fruit: Production, exports, and calculated domestic consumption, Union of South Africa, 1927–33*—Continued

Commodity and year of harvest	Production (farm weight, dried)			Loss or gain in processing		Production final weight	Exports			Apparent domestic consumption	Additional imports
	On farms	In factories	Total	Percentage	Quantity		Overseas	South-West Africa, Southern Rhodesia, and Northern Rhodesia	Total		
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*Per cent*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Sultanas:											
1927	3,515	134	3,649	−5	182	3,467	1,425	80	1,505	1,962	.....
1928	4,044	100	4,144	−5	207	3,937	2,782	79	2,841	1,096	.....
1929	3,369	125	3,494	−5	175	3,319	1,232	87	1,319	2,000	.....
1930	3,000	156	3,156	−5	158	2,998	1,356	75	1,431	1,567	.....
Average	3,482	129	3,611	−5	180	3,430	1,694	80	1,774	1,656	.....
Currants:											
1927	218	.....	218	.....	.....	218	0	28	28	190	1,080
1928	102	.....	102	.....	.....	102	1	28	29	103	1,073
1929	431	.....	431	.....	.....	431	4	30	34	397	1,149
1930	616	.....	616	.....	.....	616	1	26	27	589	474
Average	364	.....	364	.....	.....	364	2	28	30	335	946
Apricots: [a]											
1927	1,958	1,550	3,508	+8	281	3,789	2,440	56	2,496	1,293	.....
1928	2,217	1,150	3,367	+8	269	3,636	2,488	55	2,543	1,093	.....
1929	2,634	1,450	4,084	+8	327	4,411	3,442	61	3,503	908	.....
1930	2,750	1,800	4,550	+8	364	4,914	3,944	53	3,997	917	.....
Average	2,390	1,488	3,877	+8	310	4,188	3,078	56	3,135	1,053	.....
Peaches:											
1927	1,774	67	1,841	+8	147	1,988	357	120	477	1,511	.....
1928	1,337	50	1,387	+8	111	1,498	248	118	366	1,132	.....
1929	1,724	62	1,786	+8	143	1,929	383	130	513	1,416	.....
1930	2,859	78	2,937	+8	235	3,172	1,260	112	1,372	1,800	.....
Average	1,924	64	1,988	+8	160	2,147	562	120	682	1,465	.....
Prunes and plums:											
1927	2,100	153	2,253	+5	113	2,366	405	129	534	1,832	20
1928	581	114	695	+5	35	730	1	127	128	602	228
1929	1,364	142	1,506	+5	75	1,581	605	140	745	836	372
1930	3,751	178	3,929	+5	196	4,125	2,308	120	2,428	1,697	82
Average	1,949	147	2,096	+5	105	2,200	830	129	959	1,242	176
Pears:											
1927	79	28	107	+5	5	112	3	12	15	97	.....
1928	212	21	233	+5	12	245	88	12	100	145	.....
1929	124	26	150	+5	8	158	(1)	13	13	145	.....
1930	462	33	495	+5	25	520	304	11	315	205	.....
Average	219	27	246	+5	12	259	99	12	111	148	.....
Apples:											
1927	159	58	217	+10	22	239	4	20	24	215	.....
1928	210	43	253	+10	25	278	47	20	67	211	.....
1929	237	54	291	+10	29	320	123	21	144	176	.....
1930	240	67	307	+10	31	338	73	19	92	246	.....
Average	212	58	267	+10	27	294	37	20	57	237	.....
Figs:											
1927	280	.....	280	.....	.....	280	0	20	20	260	105
1928	218	.....	218	.....	.....	218	0	20	20	198	103
1929	273	.....	273	.....	.....	273	23	22	45	228	120
1930	338	.....	338	.....	.....	338	5	10	24	314	138
Average	277	.....	277	.....	.....	277	7	20	27	250	154

[a] Harvested in preceding December.
[1] Less than 500 pounds.

Compiled from official sources.

METHODS AND COSTS OF PRODUCTION

The geographical distribution of the fruit areas is related to the amount of rainfall or the availability of irrigation water, the suitability of the soil, and freedom from pests. The absence of rains during the drying period is an added factor which limits the drying areas to certain fruit districts and excludes the industry from the fruit districts closest to Capetown (table 73). Very little drying is done closer than Wellington. There apricots reign supreme, grown largely without irrigation and dried during the summer months of December and early January, before the early winter rains have begun. Behind the nearby mountains the rainfall is much less, and peaches, prunes, raisins, and sultanas, grown under irrigation, can be successfully dried during February and March, since the early winter rains are not of serious consequence. Pears are dried successfully during February, March, and April, in the arid Ceres district where early winter rains are insignificant, but in other leading pear districts, dried pears are merely byproducts of the fresh pear industry, and suitable drying weather must be chanced. The secondary area at Golden Valley, near Port Elizabeth, where chiefly apricots are grown, is subject to summer rains, and drying is often unsatisfactory. The production of sultanas on the Orange River in northern Cape Province occurs in the summer-rainfall area, but the annual rainfall, 7 inches, is so low that drying can be successfully accomplished.

TABLE 73.—*Rainfall and drying period: Dried-fruit districts, Union of South Africa, normal and 1932*

Month	Blooming and drying period [1] [2]	Rainfall											
		Wellington		Tulbagh		Ceres		Worcester		Robertson		Cookhouse	
		Normal	1932 [3]	Normal	1932	Normal	1932	Normal	1932	Normal	1932	Normal	1932
		Ins.	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*
January	Drying: A, B, C	0.71	1.31	0.51	0.16	1.05	2.14	0.29	0.03	0.63	0.08	1.61	5.55
February	B, C, D, E	.55	5.16	.38	4.11	.55	7.09	.35	2.59	.73	.65	2.42	1.08
March	C, D, E	.86	.90	.60	0	1.02	1.00	.52	0	.91	.17	2.30	.99
April		2.31	.66	1.01	0	2.86	.68	1.05	.05	1.24	.35	1.44	.33
May		3.85	6.24	2.59	2.72	5.90	4.12	.57	1.20	1.27	.97	.81	1.20
June		4.90	5.06	3.21	2.73	7.87	7.76	2.16	.68	1.57	1.32	.68	.25
July		3.56	2.91	2.65	2.59	6.00	7.17	1.70	1.04	1.30	.95	.42	.62
August	Blooming: D	3.50	3.44	2.55	1.55	5.83	3.37	1.54	0	1.27	.03	.56	0
September	A, B, C, D	2.32	3.14	1.84	2.16	3.97	1.65	1.16	1.89	1.23	4.47	.09	4.73
October	A, C, E	2.03	.81	1.58	.74	3.49	1.67	1.06	.29	.87	.53	1.31	3.02
November	E	1.11	.44	.80	.20	1.73	.84	.51	.18	.77	1.17	1.50	2.52
December	Drying: A, D	.73	1.01	.55	.35	1.25	.94	.38	.26	.61	.42	2.20	1.35
Total		26.40	31.11	18.87	17.61	41.52	38.55	11.38	8.21	12.56	11.16	16.44	22.03

[1] Golden Valley and Kakamas areas are 2 to 3 weeks earlier than the western Cape Province.
[2] A=apricots, B=peaches, C=pears; D=prunes; E=raisins.
[3] Wellington station closed; the figures given are for Vruchtbaar, nearby.

Raisins are produced from White Hanepoot (Muscat of Alexandria) or Rosaki (Waltham Cross) grapes. They produce raisins that are light amber, dark amber, or very dark in color depending upon whether the grapes are fully matured or partly green. It is

a common practice to gather all of the grapes at 1 picking, although the better growers gather the crop in 2 or 3 pickings. The grapes are lye-dipped lightly to hasten the drying. They are usually dried on trays in the shade for 4 or 5 days, or longer if the weather is cloudy. The fruit is turned on the third day. The trays are stacked during the first few days, especially in the case of rain or heavy dews. Raisins that have been finished off in the stack or shade, show better color and higher quality. The diseased portion of low-hanging bunches is cut away when harvesting is done, and other inferior bunches are culled out on the trays. When properly dried, the raisins are sweated in a closed stack, the contents of several trays on one, or they are bulked 6 inches deep on a clean dry loft to even up the moisture content. A common practice, now being discouraged, is to store and deliver the raisins in bags. Some growers use the Australian method of drying under shade on horizontal stretches of woven wire. An old method now becoming obsolete is to dry the raisins on hard-packed clay grounds.

Sultanas are golden-colored seedless raisins produced from Sultana or Sultanina (Thompson Seedless) grapes. Fully matured grapes are essential for producing the light-golden color required for first-quality sultanas. Until recently, only one-fourth of the sultanas were bleached by sulphuring, but during the last few years about two-thirds of the sultanas have been bleached. The sulphuring is done immediately after the fruit is dipped in lye. Each sulphuring chamber is usually 6 feet high, 4 feet wide, and 10 feet long, and 2 pounds of sulphur per chamber are used. The trays are stacked with strips between them to ensure thorough sulphuring. The trays are then stacked on the drying ground for part drying in the shade, as with raisins. Usually 4 or 5 days in the shade, then 2 days in the sun, and finally a finishing off, if necessary, in the stack, constitute the procedure. The fruit is turned on the tray on the second day. The unbleached sultanas are usually stacked in a strong draft for about 4 days immediately after being dipped and are then sun-dried. Shade drying is essential to produce the light-colored fruit, if the sulphur dioxide content is to be kept below the maximum allowed—0.075 percent. Culling is done on the tray before the fruit is scraped together and sorted according to color. The finished sultanas are sweated or evened up, as with raisins.

Currants are produced from Zante (Black Corinth) or Cape currant (seedless red muscadel) grapes. The latter are unfortunately not always without seeds, and some of the currants, especially those containing seeds, are too large, giving the finished product an uneven appearance as to size. The Cape currant also has a distinct muscat flavor, but the Zante is more tender and more delicately flavored. Currants are dried in the shade, either stacked or on wire frames constructed under cover. The currants are not lye-dipped. They are well dried before being evened up on the loft.

Apricots are chiefly of the Royal variety, but some Cape variety apricots are produced. The fruit is gathered from the trees, hauled to the sheds to be cut into halves and have the pits removed. It is then bleached in the sulphuring chambers and spread on the drying grounds in trays. The labor is performed mostly by native women in the cutting sheds and native men in the drying yards. The low

cost of labor makes up for the low yields per tree. At Golden Valley the native women cutters work in pairs and are paid 1½ pence (3 cents) each per half tray on week days and 2 pence (4 cents) on Sundays and holidays. Each tray contains about 50 pounds of fresh fruit. The best trees at Golden Valley yield 200 pounds of fresh fruit per tree but in the record year of 1930 the average production was only 33 pounds per tree, and since that time the yield has been only about half as much. Yields in the Wellington district are said to average 45 to 50 pounds per tree and an additional 10 pounds of culls. When it is considered that the apricots average 14 fruits per pound and that the field box contains 40 or 50 pounds of fruit, the low yield per tree is apparent. The trees are usually planted 20 feet apart each way. At Golden Valley no fertilizer is applied, but 2 winter irrigations and 1 summer watering are usually given. The low yields at Golden Valley are attributed to the shallow soil, injury by crown gall and fruit fly, and occasional frosts.

FIGURE 50.—Cooperative plant where most of the dried apricots, peaches, and pears are handled.

Around Wellington the land is hilly and the surface soil a coarse gravelly sand underlaid by clay or clay and gravel. Humus content is low, and the soil is somewhat acid. Stable and kraal manure is recommended at the rate of 2 or 3 bushels per tree and a winter cover crop of rye, lupins, or peas to be plowed under during July and August. Commercial fertilizers are applied at the rate of 200 or 300 pounds of basic superphosphate, 50 to 100 pounds of muriate or sulphate of potash, and 50 to 100 pounds of sulphate of ammonia per acre (about 100 trees). With minimum applications of these fertilizers, the cost per acre in 1933 is 14 shillings 6 pence plus railage, or with maximum applications, 26 shillings plus railage from the coast.

Peaches for drying are chiefly Muir and Elberta varieties. They are produced and dried similarly to apricots.

The prunes are chiefly the Agen variety, but other varieties are used. They are allowed to ripen and drop to the ground and are then dipped and dried in trays at the drying grounds. A few Kelsey plums are also dried.

Most of the pear trees are Bartlett and most of the dried pears are of this variety, but in practice only the smaller pears and the windfalls are dried, and the crop includes some other varieties.

There are 15 or 20 small packers of dried fruit, but most of the farm-dried fruit is delivered to a cooperative dried-fruit company, which has a plant at Worcester for processing and packing sultanas,

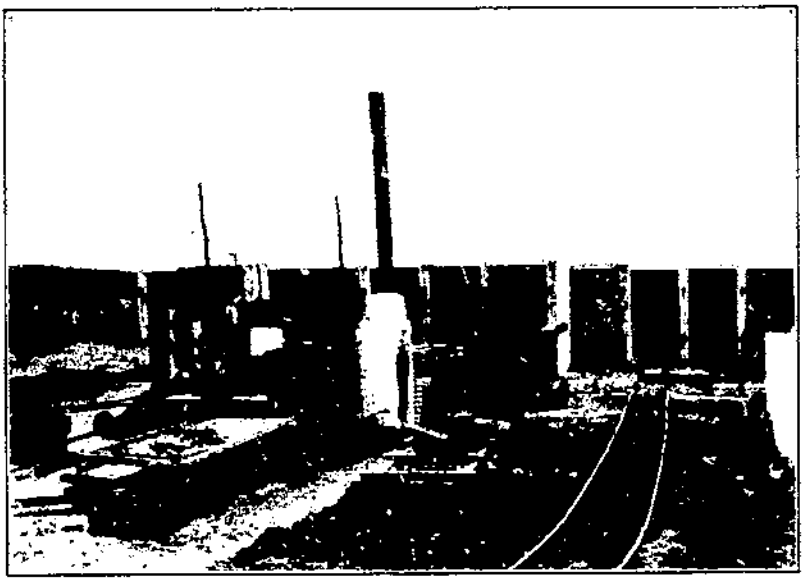

FIGURE 51.—Apricot sulphuring chambers and dipping tank near Ceres.

FIGURE 52.—Drying and sorting peaches near Ceres, January 31, 1933.

raisins, currants, and prunes and one at Wellington for apricots and other fruits.

There is no artificial drying outside of the reprocessing plants, since sun-drying is cheaper and is usually adequate (fig. 50, 51, and 52).

METHODS OF MARKETING

Most of the dried fruit is packed by this one cooperative dried-fruit company—in the case of raisins and pears over three-quarters and in the case of apricots, sultanas, and prunes, one-half or two-thirds. This cooperative association has a membership of approximately 1,400 dried-fruit growers, an increase of about 1,000 since 1926. The company has about £40,000 ($195,000 at par) of its own money and about £30,000 ($146,000) borrowed fr[illegible] the land bank invested in packinghouse, buildings, and plants. This is in addition to seasonal loans obtained from the land bank amounting to £100,000 to £150,000 ($487,000 to $730,000 at par) used to finance members pending the disposal of the fruit. The dried fruit handled in 1932 totaled 4,700 tons of which 3,300 tons were exported.

The numerous grades used for the export product are grouped into 3 to 5 grades in accordance with which settlement is made with the growers. In most cases, the second and third grades include the bulk of the crop (table 74).

TABLE 74.—*Dried fruit: Payments per pound to growers by the South African Dried Fruit Co., 1932*[1]

Fruit	Grade	Advance	Final	Total
		Pence	*Pence*	*Pence*
Raisins	1	2¾	3/8	2⅞
	2	1¾	3/8	1⅞
	3	1	3/8	1⅜
Malaga raisins		4	3/8	4⅜
Cluster raisins		3	3/8	3⅜
Unbleached sultanas	1	3	1	4
	2	2½	½	3
	3	1½	½	2
Apricots: Royal	1	5½	1½	7
	2	4	1	5
	3	2½	1	3½
	4	2	1	3
	5	1	1	2
Prunes	1	5½		
	2	4		
	3	1½		
	4	½		
Pears	1	5½		
	2	3½		
	3	2		
	4	1		
Figs	1	5		
	2	3		
	3	1½		
	4	½		

Fruit	Grade	Advance	Final	Total
		Pence	*Pence*	*Pence*
Almonds:				
Soft		6		
Jordan		3		
Hard		2		
Bleached sultanas	1	4	½	4½
	2	3½	½	4
	3	2½	½	3
	4	1½	½	2¼
Currants	1	4½		
	2	3½		
Apricots: Cape	1	4	1	5
	2	2½	1	3½
	3	1½	1	2½
	4	1	1	2
Peaches	1	4¼	2	6¼
	2	2½	1½	4
	3	1¾	1½	2¾
	4	1	1½	2½
Apples	1	4	2	6
	2	3	1	4
	3	2	1	3
	4	1	1	2
Kernels of fruit stones	1	3½		
	2	2½		
Walnuts	1	6		
	2	3		

[1] The price per pound in cents is approximately double the price quoted in pence.

According to the manager of the company, all advances in 1933 were the same as those in 1932, except those for currants, which were increased to 6 pence and 4½ pence.

The trend of prices between 1919 and 1930 shows that present prices are much lower than those obtained during 1920 to 1922 (table 75).

All dried fruit for export must be inspected by Government inspectors. A charge of 3 shillings per short ton is made. At least 1 percent of each consignment must be examined, and only those consignments conforming to a minimum specification may be exported.

The boxes may contain 5, 10, 14, 25, 28, 50, or 56 pounds of fruit net weight, although in practice 25-pound boxes are generally used. Each box must be properly labeled. The official regulations provide for 3 grades of loose raisins and 1 grade of stalk or cluster raisins; 3 grades of sultanas; 8 grades of prunes, ranging from 40's to over 120's; 6 grades of peaches; 6 grades of apricots; and 4 grades of pears. The best grade of loose raisins, good average quality, must be uniform in color, firm, full-flavored, and shall not pass through a sieve of 5/8-inch mesh. The best grade of apricots, Four Diamonds, must be naturally ripened, cleanly cut, of uniform color according to variety, and shall not pass through a sieve of 1¼-inch mesh (tables 76 and 77).

TABLE 75.—*Dried fruit: Wholesale price per pound, Union of South Africa, 1919–30*

[Cents per pound are approximately double the price in pence]

Year	Loose raisins	Cluster raisins	Sultanas	Currants	Apricots	Prunes[1]	Peaches	Pears	Apples	Figs
	Pence	*Pence*	*Pence*	*Pence*	*Pence*	*Pence*	*Pence*	*Pence*	*Pence*	*Pence*
1919	6½	14	9½	18	11	10	9	11	12	11
1920	8	14	9	16	19	10	11	11	13	18
1921	5	9	8	15	10½	9	7½	10	11	9
1922	6½	15	8	12	10	9	8	12	13	10½
1923	3	8	6	10	9	7	7	10	8	9
1924	3½	7	5	10	10	5½	8	10½	10½	9
1925	2¾	5	5	8¾	9½	4¾	7	9½	9¾	7¾
1926	3	6	5¼	8¾	10¼	5	8¼	11	8¾	7½
1927	4	7	5¾	9¾	10¾	6¾	8	10¾	9¾	7
1928	4	5¾	5	8½	9	6¼	7¾	9½	8½	7¾
1929	3¾	5½	4¾	8½	7¾	5½	6¾	9¾	8	6¾
1930	3½	5½	5¼	6¾	6¼	4¾	4¾	7¾	6¾	5¾

[1] Plums and prunes.

Union of South Africa Agricultural Census Report, 1929, (48); Official Year Book (47, No. 13, p. 397).

TABLE 76.—*Dried fruit: Exports from the Union of South Africa, by months, 1929–32*[1]

Month	Raisins				Sultanas			
	1929	1930	1931	1932	1929	1930	1931	1932
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
January	2,100	78	40,600	27,600	900	59,140	33,350	20,900
February		1,250	259,400			27,700	18,025	
March	100	1,924	196,750		9,800	3,025	200,625	205,400
April	74,342	3,900	511,750	105,475	137,760	21,050	491,900	950,225
May	163,029	125,475	864,015	950,275	439,350	260,000	1,024,355	844,350
June	119,494	157,825	705,589	1,297,425	189,000	148,068	450,297	495,895
July	101,136	82,545	444,295	717,190	207,007	251,742	198,850	159,400
August	387,471	214,050	370,774	213,750	160,204	265,000	90,275	112,525
September	305,101	214,854	295,192	143,050	37,200	80,170	20,648	125,050
October	349,515	118,582	17,596	21,100	4,750	175,582	14,247	3,058
November	69,855	53,541	3,436	3,404	3,381	34,655	800	3,825
December	3,478	30,250	25,050	70,300	51,100	75,000	1,150	751
Total	1,555,681	1,013,274	3,735,347	3,555,639	1,232,202	1,341,132	2,568,522	2,901,885

[1] Not including overland exports to South-West Africa, Southern Rhodesia, Northern Rhodesia, Belgian Congo, etc. (about 3 percent).

TABLE 76.—*Dried fruit: Exports from the Union of South Africa, by months, 1929–32*—Continued

Month	Currants				Apricots			
	1929	1930	1931	1932	1929	1930	1931	1932
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
January					343,775	427,415	354,600	792,950
February					629,150	673,875	643,375	769,750
March	200	250			704,750	510,975	706,225	818,100
April					418,750	435,950	402,950	642,500
May			300		417,525	364,825	376,375	297,325
June	200	150		120	259,025	275,028	237,425	232,950
July	1,175				340,375	272,025	27,875	202,525
August	875				94,350	335,975	34,375	185,250
September	1,500	150	48		81,200	204,410	59,025	145,400
October	25		598	108	41,125	249,575	14,150	68,200
November	200		56		11,823	59,900	4,350	32,200
December	225				100,250	70,331	40,700	[1] 103,900
Total	4,200	550	1,002	228	3,442,098	3,930,284	2,901,425	4,291,050

Month	Peaches				Pears			
	1929	1930	1931	1932	1929	1930	1931	1932
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
January	50	41,375	5,925	9,000			625	
February	10,800	122,050	44,850	15,100		1,525	125	
March	29,250	180,575	37,700	151,300		3,525	250	
April	40,450	87,125	44,525	91,700		13,900		17,325
May	49,900	193,000	52,250	80,275		42,800	31,250	84,700
June	11,050	162,025	70,425	212,325		57,275	16,700	54,075
July	81,050	129,750	20,425	60,800		35,025	16,650	26,020
August	143,550	91,475	8,750	26,550		20,750	8,700	33,575
September	21,475	57,010	14,850	17,175	125	38,600		8,625
October	13,325	73,825	20,000	8,550		46,700		
November	2,000	13,725	2,625	34,575		37,225	50	11,050
December	300	85,000			50	4,750		150
Total	383,200	1,216,935	322,325	707,350	175	300,075	74,350	236,120

Month	Apples				Prunes and plums			
	1929	1930	1931	1932	1929	1930	1931	1932
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
January			150		50	54,066		25,500
February			8,225			55,575		20,000
March	150	2,850				204,130	5,000	
April		8,000	100			638,753	2,500	79,150
May	1,400	8,000	14,700	5,000	300	695,857	2,600	121,325
June	5,000	22,036	31,300	2,500		291,240	500	162,400
July	250	4,150	875	5,000	500	245,735	2,150	720,470
August	15,120	5,175	3,800	10,050	10,000	48,413	250	157,115
September	345	2,155	200	750	304,725	25,200	50	191,400
October	50	4,225	10,550		58,788	25,396	4,590	100
November	325	5,475		223	125,255	34,569	95,560	
December	320	7,650	750		105,420	575	153,580	86,800
Total	22,960	71,216	70,650	23,523	605,038	2,319,440	266,780	1,564,350

Month	Miscellaneous [2]				Almonds, kernels and walnuts			
	1929	1930	1931	1932	1929	1930	1931	1932
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
January	800	1,348	3,900	50				
February	410	836	1,840	1,250				
March	5,500	4,500	5,695	575			200	
April	17,215	1,450	2,196	6,375			3,400	
May	23,288	2,772	8,825	10,953		200		
June	2,570	1,994	5,713	3,200				
July	5,811	6,707	1,750	3,036		225		
August	5,087	4,174	3,000	9,108				50
September	2,900	4,017	2,425	8,497		100	40	
October	3,650	4,955	3,404	672		252		
November	6,749	12,172	1,909	3,395		90		50
December	125	3,525	1,175	682				
Total	74,605	48,448	41,022	47,883		867	3,640	100

[1] Mostly new crop.

[2] Miscellaneous includes assorted fruits, nectarines, quinces, figs, and mebos (crystallized apricots).

South Africa Agricultural Department, Crops and Markets.

TABLE 77.—*Dried fruit: Exports to specified countries from the Union of South Africa, 1931–32*

Commodity	Year	Total [1]	United Kingdom	New Zealand	Canada	Germany	Dutch East Indies	Belgian Congo	Mozambique	Other [2]
		1,000 lb.	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*
Raisins [3]	1931	6,403	6,081	10	161	24	2	6	11	108
	1932	6,526	6,422	....	56	.....	14	6	9	19
Apricots	1931	3,054	1,851	539	86	45	(4)	2	2	529
	1932	4,217	3,205	338	146	15	4	2	2	5
Prunes	1931	277	127	4	.....	127	(4)	4	5	10
	1932	1,591	1,345	10	.....	224	.....	5	5	2
Peaches	1931	(5)	.....	.....	.....	.....	.....	.....	.....	.....
	1932	709	534	144	23	.....	.....	(4)	1	7
Pears	1931	(5)	.....	.....	.....	.....	.....	.....	.....	.....
	1932	238	226	6	3	.....	1	(4)	1	1
Apples	1931	(5)	.....	.....	.....	.....	.....	.....	.....	.....
	1932	26	23	.....	.....	.....	.....	2	(4)	1
Figs	1931	2	(4)	.....	.....	.....	.....	1	1	(4)
	1932	19	17	.....	.....	.....	.....	(4)	1	1
Other	1931	480	271	132	28	24	1	6	10	8
	1932	12	4	2	.....	(4)	(4)	(4)	5	1
Total	1931	10,215	8,330	685	275	220	3	19	29	655
	1932	13,338	11,776	1,000	228	239	19	15	24	37

[1] Customs-office figures do not coincide with figures of the South African Department of Agriculture.
[2] Chiefly the Netherlands, Sweden, Kenya, Mauritius, and French possessions.
[3] Includes sultanas and currants.
[4] Less than 500 pounds.
[5] Included with other dried fruits.

GOVERNMENT AIDS

The South African Government extends some encouragement to the dried-fruit industry but less than to the other agricultural industries. After England abandoned the gold standard in September 1931, the South African Government paid various rates of export subsidy to producers of primary products. An export subsidy rate of 10 percent, retroactive to July 1, 1931, was paid for all classes of dried fruit. The subsidy is calculated on the value in the open market at the port of shipment at the time of export, including the cost of packing and packages. A strong but unavailing plea was registered that the export-subsidy rate be increased to 20 percent, the same as for fresh fruit. After South Africa also abandoned the gold standard, the subsidy rates were generally reduced, and after February 14, 1933, the rate was only 7 percent, but the subsidy rates on fresh deciduous fruit were continued at the figures previously established.

The Ottawa agreements of 1932 resulting from the Imperial Economic Conference probably benefited the dried-fruit industry in South Africa more than any other agricultural industry. The United Kingdom imposed a duty on dried fruit from foreign countries amounting to 10 shillings 6 pence per 112 pounds, applicable throughout the year, as against the previous rate of 7 shillings. The United Kingdom also agreed that the general ad valorem duty of 10 percent imposed by section 1 of the Import Duties Act of 1932 on specified foreign goods will not be reduced except with the consent of the Government of South Africa. This clause includes dried fruits other than currants not otherwise specified and fruit preserved by chemical or artificial heat other than fruit preserved in sugar.

CITRUS FRUIT

INTERNATIONAL SIGNIFICANCE

The production of citrus fruits in South Africa is not large in comparison with that in some other countries, but its rapid increase since 1925 commands attention (table 78). The fact that the consuming population is small occasions the export of an unusually large proportion of the production. This is a second reason for reckoning seriously with the South African citrus situation.

TABLE 78.—*Citrus fruit: World production, average 1927–28 to 1931–32*

	Oranges	Lemons	Grapefruit		Oranges	Lemons	Grapefruit
	1,000 boxes	*1,000 boxes*	*1,000 boxes*		*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
United States	46,000	7,000	13,500	Uruguay	2,000	(1)	(1)
Spain	38,000	1,600	50	Greece	700	160	(4)
China	10,000	(1)	(1)	Ecuador	[3] 300	(4)	(4)
Italy	10,700	13,000	(1)	Philippines	300	(5)	100
Japan	12,000	(1)	(1)	Syria	250	100	(1)
Mexico	3,400	400	[3] 40	Southern Rhodesia	[3] 200	(4)	[4] 20
Union of South Africa [2]	3,000	100	200	Jamaica	[3] 200	(5)	[3] 150
Australia	2,400	320	35	Cyprus	200	(1)	(1)
Algeria	1,800	110	(1)	Turkey	200	100	(4)
Palestine	3,400	11	[3] 500	Tunis	100	25	(4)
Brazil	[3] 2,500	(1)	[3] 25	Cuba	[3] 2,000	(1)	250
Paraguay	[3] 1,000	(4)	(1)	Mozambique	75	(1)	50
Puerto Rico	[3] 1,000		[3] 1,000	Other	6,875	1,074	1,061
Argentine	500	(4)	10	World	150,000	24,000	17,000

[1] Not available. [2] 1927–29. [3] Commercial crop. [4] Small. [5] Mostly wild.

UNION OF SOUTH AFRICA

TREND OF PRODUCTION

Oranges have been grown in the Union of South Africa for a long time. Shortly after the occupation of the Cape and the arrival in 1652 of Jan van Riebeck, the first Governor, oranges were brought to the Cape via St. Helena. They were planted and gave rise to the Cape Seedling, which was planted later in large numbers in the districts of Clanwilliam, Oudtshoorn, Graaf-Reinet, the Lange Kloof Valley, and the Gamtoos Valley. Today very old and large seedling trees can be found in these places. Much of the fruit is exported.

The good prices realized by South African oranges during the World War gave a decided impetus to the industry, and in 1918 there was great activity in the citrus areas. Millions of Washington navels, Valencias, du Rois, and grapefruit trees were planted. Citrus nurseries multiplied but were unable to supply the demand. This increased activity in the nursery business, and the great desire to sell trees, afforded little time and opportunity for carrying out the principles of bud selection, and during the first few years thousands of worthless trees were planted. Since 1925 further expansion has been small and has shifted slightly toward grapefruit.

Between 1926 and 1930 the number of orange trees increased 7 percent, grapefruit trees 25 percent, lemon trees 2 percent, and tangerine trees decreased 11 percent. Orange trees dominate the total so that the increase in all citrus trees amounted to 6 percent (table 79).

TABLE 79.—*Citrus fruit trees: Number in the Union of South Africa, 1911, 1918–21 and 1924–30* [1]

Year	Orange		Tangerine		Lemon	Total
	Grafted	Seedling	Grafted	Seedling		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
1911 [2]	[3] 985, 601	(4)	[3] 404, 189	(4)	172, 850	1, 562, 640
1918 [2]	1, 227, 405	548, 237	174, 971	266, 933	248, 330	2, 515, 892
1919 [5]	887, 470	356, 440	127, 280	165, 400	144, 080	1, 683, 760
1920 [5]	964, 840	327, 570	109, 850	213, 450	108, 320	1, 772, 030
1921 [5]	1, 371, 615	430, 375	149, 470	226, 610	160, 710	2, 347, 780
1924 [5]	2, 471, 520	488, 270	145, 080	175, 500	225, 050	3, 505, 920
1925 [5]	[3] 3, 559, 280	(4)	[3] 341, 000	(4)	270, 540	4, 171, 720
1926 [5] [6]	[3] 3, 633, 130	(4)	[3] 307, 340	(4)	192, 920	[7] 4, 328, 090
1930 [5] [6]	[3] 3, 887, 350	(4)	[3] 272, 260	(4)	196, 800	[7] 4, 590, 610

[1] Excludes native reserves and locations.
[2] All districts.
[3] Grafted and seedling trees combined.
[4] Principal fruit-growing districts only.
[5] All districts, including urban areas.
[6] Trees, the produce of which is grown for sale.
[7] Including grapefruit trees: 1926, 194,700; 1930, 244,110.

Union of South Africa Official Year Book (*17, no. 12, p. 429*); and Agricultural Census 1929–30 (*40, report no. 70*).

The analysis of the issues of citrus nursery stock during the 2 years, 1931 and 1932, (table 60) indicates that the number of trees issued from nurseries was a very small percentage of the number of trees on farms—scarcely enough to account for replacements. Orange trees issued from nurseries in relation to the number of trees on farms in 1930 dropped from 4 percent in 1931 to 3 percent in 1932; grapefruit from 6 percent to 3 percent, tangerines from 3 percent to 2 percent, and lemons from 4 percent to 2 percent. One nurseryman in the eastern Transvaal recently stated that he had sold 20,000 citrus trees at bargain prices and destroyed the remainder of his citrus nursery stock. There was some interest in citrus planting on new irrigation schemes in Zululand and portions of Natal, but enthusiasm was dampened by reports of extensive planting in Brazil and a realization that the number of trees already planted in South Africa will produce increasing quantities of fruit which can be marketed in England only with greater difficulty. Some citrus orchards on less productive lands have been taken over by the land bank and others have been abandoned, including a large estate at Plaston consisting of 50,000 orange trees. There is a tendency to concentrate efforts on a smaller number of trees and to increase yields and decrease costs on the propositions that hold greatest promise.

Most of the expansion of citrus exports has occurred since the World War and most notably between 1928 and 1930. Since that time total citrus exports have not changed materially, but grapefruit exports have sprung into prominence. Considering the increasing age of the trees and the very limited expansion of acreage at the present time, it is expected that by 1937 the Union of South Africa will be exporting about 3,000,000 boxes or about 50 percent more than at present (fig. 53).

No reliable information is available showing the total production of citrus for both domestic consumption and exports. On the basis of information gathered by the Perishable Products Export Control

Board, domestic consumption appears to have been about 800,000 boxes of commercial fruit in 1925 and 1926. The South African Department of Agriculture determined in 1928 that domestic sales were about equal to the exports of that year (879,861 boxes). Considering increased per-capita consumption, domestic sales in 1931 and 1932 may be estimated to be about 1,000,000 boxes. This is mostly inferior fruit culled from the export fruit at packing houses and marketed in hessian pockets (burlap sacks) weighing about 30 pounds.

There are three sets of export statistics to which consideration may be given: (1) Exports of citrus fruit through Union ports as reported in the Official Year Book of the Union of South Africa; (2) citrus exports through Union ports and through Lourenco Marques as reported by the Perishable Products Exports Control Board, which

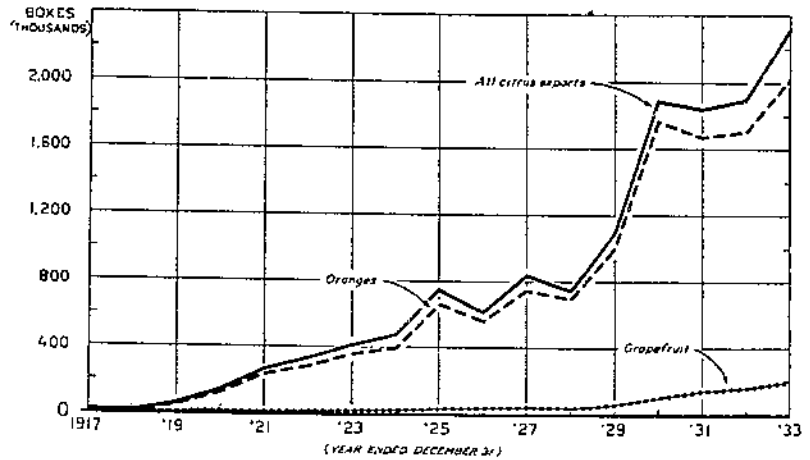

FIGURE 53.—EXPORTS OF CITRUS FRUITS, UNION OF SOUTH AFRICA 1917–33.

Orange exports greatly exceed grapefruit exports. Production in 1930–33 was about 1,000,000 boxes.

has to do with all fruit exported overseas; (3) the annual statement of the Department of Customs and Excise, covering only fruit from the Union of South Africa, excluding exports to South-West Africa, Southern Rhodesia, and Northern Rhodesia, and excluding fruit used as ships' stores (table 80). During 1930, 1931, and 1932 Rhodesian exports through Union ports amounted to 156,390, 118,014, and 86,673 boxes, respectively, as compared with the total exports from Southern Rhodesia amounting to 164,908, 155,540, and 151,610 boxes, respectively. Owing to the foot-and-mouth disease embargo, about 12,000 boxes in 1931 and 50,000 boxes in 1932 were exported from Southern Rhodesia through Beira instead of through Capetown.

METHODS OF PRODUCTION

The citrus estates in the Union vary in size from plots of 5 acres or less to one extreme case of 560,000 trees under one management. Most of the large estates were started with the intention of selling

5-acre plots to new settlers or to absentee owners, but in many instances few plots were sold, few settlers took charge of their plots, and the estates came to be operated as large units. Shortly after the World War nine large estates were started, ranging in extent from 32,000 trees to 560,000 trees, and representing about one-third of the total citrus trees in 1930. One of these was located near Port Elizabeth, one in Natal Province, and the others in northern and eastern Transvaal Province. Irrigation facilities were provided for each of these developments.

TABLE 80.—*Citrus fruit: Exports from the Union of South Africa, 1927–32, and forecasts 1933–37*

Source and year	Oranges	Grapefruit	Tangerines	Lemons	Total	Actual total
Through Union ports:[1]	*1,000 boxes*	*1,000 boxes*	*1,000 half cases*	*1,000 boxes*	*1,000 boxes*	*Boxes*
1927	869	38	34		941	940,594
1928	835	32	12	1	880	879,861
1929	1,121	64	17	1	1,203	1,202,585
1930	1,883	103	19	5	2,010	2,009,988
1931	1,620	139	23	5	1,787	1,786,903
Control board figures:[2]						
1929	1,102	84	9	1	1,196	1,202,585
1930	1,910	105	10	5	2,030	2,009,988
1931	1,621	141	17	5	1,784	1,786,903
1932	1,781	156	19	20	1,976	[7] 1,976,476
Customs figures:[3] [4]						
1927	749	37	53	(5)	839	838,703
1928	694	32	23	1	750	749,880
1929	1,002	57	30	4	1,093	1,092,907
1930	1,702	101	21	5	1,889	1,888,975
1931	1,675	140	17	5	1,837	1,837,385
1932	1,702	158	17	20	1,897	1,896,929
Estimates:[6]						
1933	2,017	260	19	20	[7] 2,310	
1934	2,200	298	14	25	2,027	
1935	2,350	270	20	20	2,660	
1936	2,540	285	20	20	2,865	
1937	2,735	300	20	20	3,075	

[1] Union of South Africa Official Year Book (*47 no. 12, p. 424; no. 13, p. 389*). Shipping tons of 40 cubic feet converted to boxes by assuming 35 half boxes of tangerines per shipping ton and 18 to 17.661 boxes of other fruit per shipping ton. Most of the Southern Rhodesia exports passed through Union ports until 1932, when the percentage dropped to about 50 percent. On the other hand, exports of Union fruit through Lourenco Marques, Mozambique, assumed importance in 1931 and 1932.

[2] Including exports through Lourenco Marques and Rhodesian citrus exported through Union ports.

[3] Union fruit only excluding ships stores and exports to South-West Africa and the Rhodesias.

[4] Trade and shipping, Union of South Africa.

[5] Less than 500 boxes.

[6] Estimates made by agricultural attaché.

[7] Drought reduced the 1932 crop and damaged the set of fruit for the 1933 crop in northern Transvaal and in Natal.

The date at which this extensive expansion occurred is significant from the viewpoint of future production. The number of trees planted in certain years on two estates in northern Transvaal is as shown in table 81.

The southwestern districts consisting of Paarl, Groot Drakenstein, Wellington, and Somerset West are chiefly devoted to deciduous fruits, but they have some modern orange, grapefruit, and tangerine groves. The yield per tree is high, and the quality of the fruit is good (fig. 54).

The western districts—Clanwilliam, Piquetberg, and Porterville—comprise one of the oldest citrus-growing areas in South Africa. The citrus groves are found along the Oliphants River Valley and

in the foothills of the Cedarberg Mountains. Many of these groves consist only of seedling trees, and as these farms are somewhat isolated and often remote from the railway, they are relatively unimportant for export fruit.

TABLE 81.—*Citrus fruits: Number of trees planted in 1918–28 on two estates in the northern Transvaal*

Year	Trees planted		Year	Trees planted		Year	Trees planted	
	Estate no. 1	Estate no. 2		Estate no. 1	Estate no. 2		Estate no. 1	Estate no. 2
	Number	*Number*		*Number*	*Number*		*Number*	*Number*
1918	12,058	...	1923	113,754	39,185	1927	.....	18,959
1919	17,504	...	1924	94,575	64,957	1928	.....	6,623
1920	18,002	...	1925	104,972	60,048			
1921	52,012	...	1926	4,961	39,176	Total	561,486	293,977
1922	55,050	5,020						

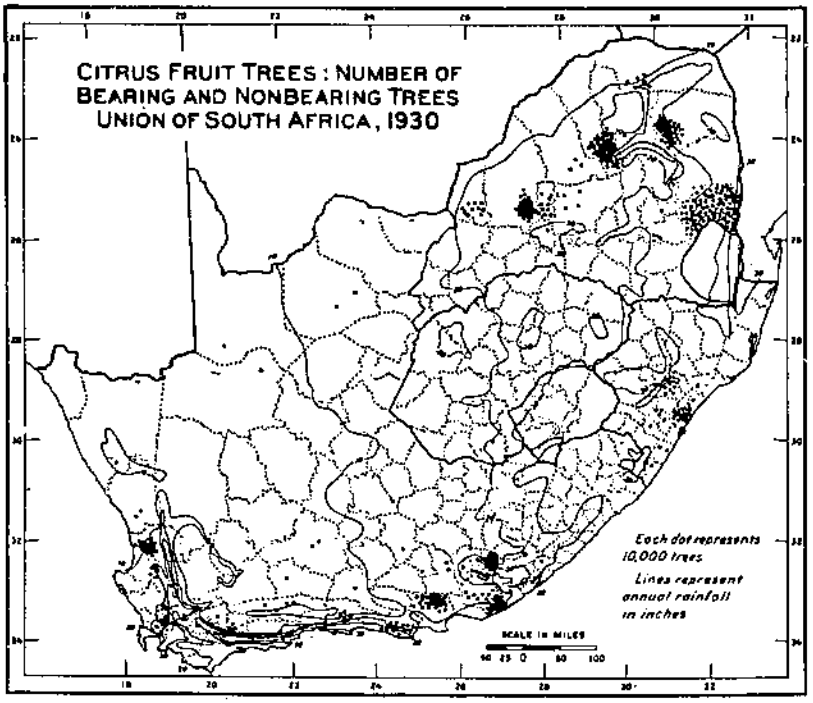

FIGURE 54.—The principal areas are around Port Elizabeth and in Transvaal Province. Grapefruit trees are confined to the Port Elizabeth and eastern Transvaal areas.

The southern districts include Montagu, Robertson, Swellendam, and Mossel Bay. Citrus groves are scattered throughout this large area, but the total export is less than 20,000 boxes—about half the output of a small, modern packing house. This precludes the possibility of deriving the benefits of large-scale operation. Washington navels and seedlings predominate, but the production of Valencias is increasing.

The northern district includes only a few citrus groves along the Orange River, chiefly at Upington, Keimoes, and Kakamas. The soil is ideal and the water plentiful, but low temperatures are often experienced in the winter. The output in 1931 was only about 7,500 boxes.

The eastern Cape district includes the Sunday's River Valley and is one of the largest citrus-exporting areas. It is the most important grapefruit-producing area but also produces large quantities of Washington navel and Valencia oranges.

The Sunday's River Valley, extending from Kirkwood to the sea, has many fine citrus groves of Washington navels, Valencias, and grapefruit. A large Government irrigation reservoir, Lake Mentz, stores water for the valley. The land was covered with bush, which had to be cleared at great expense. The Sunday's River Valley is probably the most favored citrus-producing area in South Africa. The soil is mostly alluvial and rich; the climate is dry, and the rainfall low, resulting in the production of good-keeping navels, Valencias, and grapefruit. As long as there is a good supply of water in Lake Mentz these climatic conditions are favorable to citrus growing. The packing house is less than 60 miles from Port Elizabeth, which means quick dispatch of packed fruit to the port, and low railage charges on packed fruit to the port and on packing material from the port. Citrus growing in the Sunday's River Valley, therefore, has a good chance of being profitable.

But the Sunday's River citrus area is threatened with early extinction (some say in 20 years) owing to the rapid silting up of the storage reservoir, Lake Mentz. There is a possibility that this action may be overcome by improved engineering technic, or by tapping other sources of water supply. A more serious threat is the recent appearance of alkali injury to trees. The water, after being released from the dam and before being diverted into the canals, picks up so much seepage water along the stream bed that its alkali content is injuriously high. Perhaps this will be overcome by using only a high-level canal which originates above the seepage water for conducting the irrigation water to the orchard laterals.

The eastern district includes the Kat River Valley. The valley is narrow, and suitable land is scarce, but the small areas of alluvial soil are excellent for citrus growing. This is the most important Washington navel-producing area in the country. The climate is dry, as in the Sunday's River Valley, and the quality of fruit is excellent (fig. 55).

In Natal Province the Muden and Golden Valley district in the Mooi River Valley is rapidly becoming an important citrus-producing area. There are about 130,000 citrus trees around Muden, of which one company has about 75,000. This company earned a profit at prices prevailing during 1930–32 if interest on the heavy original investment is partly ignored.

In northeastern Transvaal there is an important estate of approximately 234,000 citrus trees, of which 8,500 are grapefruit trees and the remainder are half Valencia and half Washington navel trees. In the same area many excellent small groves also occur. This area has exceptionally high rainfall—about 50 inches per year—nearly all of it in the summer months, October to March. Irriga-

tion water is abundant and is available at low cost. There is no need for pumping or storage dams.

In northern Transvaal is found an estate of 560,000 orange trees (fig. 56). This estate was laid out in 5-acre plots, consisting of 250 navel and 250 Valencia (or rarely, du Roi) trees, some of which have been sold to absentee owners, but nearly all of the estate is operated as one unit. The estate has almost 6,000 acres of excellent reddish brown sandy loam of good depth and is admirably suited to citrus growing except for scarcity of irrigation water (fig. 57). The estate was formerly covered with dense bush, which was cleared away at considerable expense. An elaborate irrigation system was

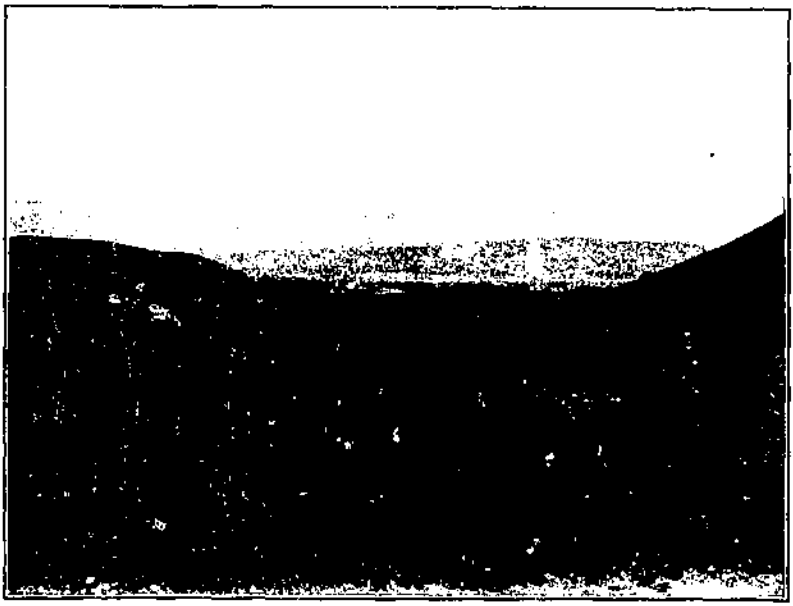

FIGURE 55.—Citrus groves in the Kat River Valley, eastern Cape Province, occur in small pockets of river-bottom land. Many of the trees are still young. Pumping plants supply water when the river is dry.

established consisting of 3 dams, 80 miles of concrete fluming, and a large pumping plant. The 3 dams have a capacity of 1,500,000,000, 600,000,000, and 100,000,000 gallons, respectively. The packing house is said to be the largest in the world. The estate has 18 miles of narrow-gage railway, and 3 engines are kept busy during the harvesting season.

The Rustenburg district in western Transvaal is one of the largest citrus districts in the Union. In the past, seedling trees predominated, but more recently Washington navel and Valencia have been planted in large numbers. Most of these groves are irrigated by small individual irrigation systems, but the Oliphant's Neck irrigation system, completed a few years ago, now serves a large part of this citrus area (fig. 58).

During the 1930–31 season the Rustenburg packing house exported approximately 40,000 boxes of citrus fruit, packed from 78,000 lug boxes received at the house. This indicates a fairly small propor-

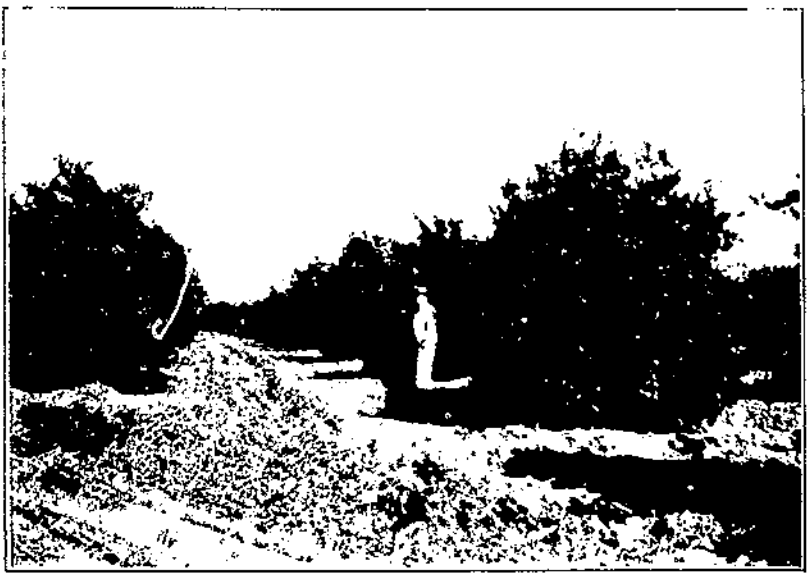

FIGURE 56. Valencia orange trees 8 years old on a citrus estate in northern Transvaal Province. The trees are given 4 or 5 irrigations each year, totaling 12 or 15 acre-inches.

FIGURE 57. Orange trees defoliated by drought, northern Transvaal, September 1932. Shortage of irrigation water is a serious factor in this district.

tion of culls, since the lug boxes contain approximately 40 pounds of fruit and a packed case approximately 70 pounds.

One of the oldest citrus-growing areas in the Union is the Marico district extending from Zwartruggens to Zeerust with Groot Marico about in the center. The majority of the plantings are seedlings.

This is rather a backward area and most of the groves are rather small. The growers have not adopted up-to-date methods of citrus growing, but as a result of the rigid Government inspection at inland points they have learned to pack well, although their packing houses are crude. In 1931 there was not a modern packing house in the whole area.

Citrus production in the northern Transvaal is particularly sensitive to rainfall during September and October when the new crop is setting. There is normally little rainfall between May and September and, since irrigation water is limited, the trees suffer if the coming of the summer rains in September or October is delayed. This

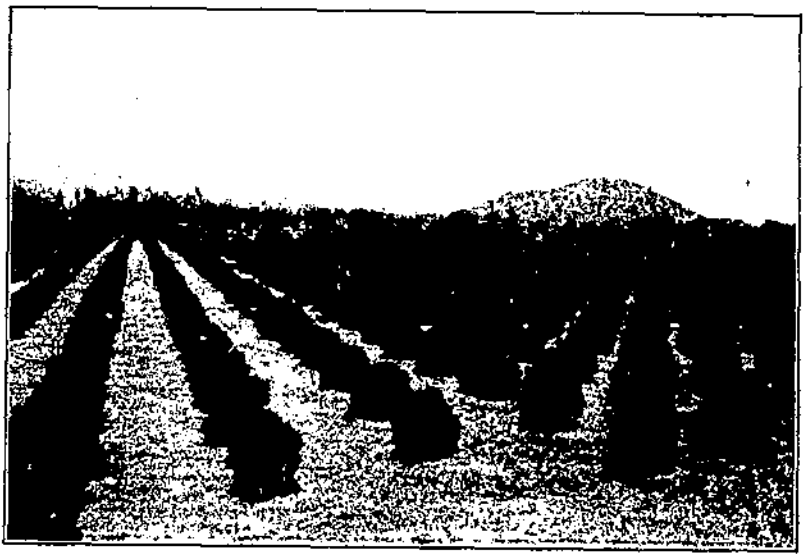

FIGURE 58.—Citrus grove near Pretoria, Transvaal Province. Production will increase with increasing age of the trees.

is in contrast to the situation in the Clanwilliam and Piquetburg area which lies in the winter-rainfall belt, where the months just preceding September usually have enough rain so that the trees are well supplied with moisture, even though the spring months of September and October may be unusually dry. The important citrus areas near Port Elizabeth and East London also have abundant rainfall during the critical months of September and October (table 82).

Throughout the Union yields, generally speaking, are pitifully low. The low yields are caused largely by deficient rainfall and irrigation water; partly by inferior soils in some areas; partly by the prevalence of red scale, thrip, fruit fly, false codling moth, and hail damage; and in many instances, by inadequate cultural practices (table 83).

During the 1930 season decay was prevalent in oranges, particularly in Washington navel. Investigations at Zebediela indicated that insects and mechanical injury caused the beginning of most of the decay. Wasty oranges found in the packing house were usually among the bottom-layer oranges in lug boxes. The practice is to allow 2 days for the oranges in lug boxes to reach the wilting room

TABLE 82.—*Citrus fruit: Seasonal operations and rainfall, normal and actual, in important districts, 1932*

Month	Seasonal operations				Rainfall											
					Transvaal						Natal		Cape			
					Rustenburg		Pietersburg		Barberton		Weenen		Uitenhage		Montagu	
	Navels	Valencias	Seedlings	Grapefruit	Normal	1932	Normal	1932	Normal	1932	Normal	1932	Normal	1932	Normal	1932
					Ins.	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*
Jan.					5.02	2.21	4.18	1.40	6.29	1.51	5.20	3.98	1.20	2.12	0.57	0.04
Feb.					4.24	4.15	3.38	1.03	4.23	5.64	4.24	5.35	1.81	.42	.60	.74
Mar.					4.20	2.00	2.88	2.32	4.16	1.56	3.00	2.89	2.01	3.15	.83	.10
Apr.					.98	1.12	.80	2.01	1.80	1.64	1.59	.21	1.74	.20	1.15	.20
May.	P				.72	.17	.45	1.00	.95	1.19	.54	1.36	1.20	.00	1.64	.82
June	P		P	P	.11	0	.05	0	.25	.28	.19	0	.07	.44	1.52	1.02
July	P		P	P	.33	0	.10	0	.20	0	.19	0	.85	2.12	1.52	1.43
Aug.	BP	BP	B	BP	.51	.04	.27	0	.53	.02	.75	0	1.08	1.00	1.40	.06
Sept.	B	BP	B	B	.69	.07	.38	0	1.09	.25	1.15	1.40	1.01	3.68	1.24	5.71
Oct.		BP			2.45	.07	1.00	.88	2.40	2.31	2.40	1.73	1.82	2.03	.90	.53
Nov.					3.69	1.22	3.20	1.45	4.03	4.17	3.80	3.40	1.51	4.40	.86	.67
Dec.					4.29	4.20	4.05	5.00	4.75	5.64	3.82	3.00	1.71	.87	.55	.10
Total					27.14	15.85	21.64	16.29	31.70	23.51	28.93	24.51	17.57	26.33	12.00	12.32

B = Blooming. P = Picking.

TABLE 83.—*Oranges and grapefruit: Bearing trees and exports, important districts in the Union of South Africa, 1930*

District	Oranges					Grapefruit			
	Bearing trees, 1930 [1]	Exports, 1930			Percentage of 1926 production exported [2]	Bearing trees, 1930 [1]	Exports, 1930		
		Total		Per tree			Total		Per tree
	Number	*Tons* [3]	*Boxes* [4]	*Boxes*	*Percent*	*Number*	*Tons* [3]	*Boxes* [4]	*Boxes*
Western Transvaal; Rustenburg, etc.	[5] 406,040	18,409	331,362	0.71	45	2,110	81	1,458	0.69
Northern Transvaal:									
Nylstroom	[5] 20,630	238	4,284	.21	10	190	------	------	------
Zebediela	[5] 389,290	21,085	379,530	.64	82	1,240	------	------	------
Louis Trichardt	[5] 26,330	316	5,688	.22	15	130	32	576	4.43
Northeast Transvaal; Letaba	[5] 289,910	4,714	84,852	.29	3	7,830	66	1,188	.15
Eastern Transvaal; White River, etc.	[5] 598,650	14,553	261,954	.44	55	40,590	1,637	29,466	.73
Eastern Natal:									
Durban-Maritzburg	[5] 57,650	259	4,662	.08	25	760	5	90	.12
Golden Valley	[6] 103,590	9,931	178,758	[6] 1.73	68	1,430	170	3,060	2.14
Southwestern Cape	[7] 42,100	700	12,600	.30	29	2,490	425	7,650	3.07
Western Cape	[8] 172,010	854	11,772	.07	10	18,926	64	1,152	.06
Southern Cape	[7] 85,800	1,992	19,656	.23	22	9,600	58	1,044	.11
Orange River	[8] 27,860	454	8,172	.29	39	70	1	18	.26
Karoo	[8] 95,010	97	1,746	.02	------	2,560	------	------	------
Eastern Cape	[7] 541,900	24,068	444,624	.82	60	67,430	2,959	53,262	.93
Total	3,117,010	97,170	1,749,060	.56	[9] 30	145,380	5,403	98,964	.68

[1] Commercial only. Agricultural census 1929-30 (*46*).
[2] Percentage exported in 1930, although unknown, would be different. Yield per tree cannot be accurately gaged by reference to previous column.
[3] Shipping tons of 40 cubic feet. South African Department of Agriculture, Bulletin 100 (*44*).
[4] 18 boxes per shipping ton.
[5] Half or nearly half navels; remainder mostly Valencias (or seedlings in western Transvaal, du Roi in Golden Valley).
[6] Obviously above the true average.
[7] Mostly navels.
[8] Mostly seedlings.
[9] About 65 percent of total production was exported in 1930.

from the groves and to allow 5 days in the wilting room. The lug boxes were customarily treated with potassium permanganate solution, but this has been replaced by a disinfectant of borax solution because of its more persistent antiseptic action. Wasty fruits develop much more rapidly among culls than among the fruit from which the culls were removed. The chief causes for culls were coarseness, suspected insect injury (such as oleocellosis markings that might be fly stings), color, hail marks, and scale. Obviously culls were left on the trees, but in the test lots 32 percent of the fruit in the lug boxes was culled, and considerably more than this percentage was culled in the ordinary packing operations.

The percentage of wasty fruits after handling, packing, transporting, and storage, averaged 4 percent for the lots handled by the Government officials and 8 percent among the lots drawn from the regular output in the Zebediela packing house. These results indicate that the scientific methods already in use among South African citrus growers and shippers will be still further improved in an effort to meet, in England, the competition of the best fruit that reaches those markets.

Ethylene gassing is being profitably introduced in those cases where the greener fruit is past its prime by the time it is well colored on the tree. It also lightens the peak load in the packing house by starting the season earlier.

Most of the oranges are packed in central packing houses, cooperatively owned and operated. The equipment is modern, and the pack produced is commendable. Every consignment of fruit must be inspected by Government inspectors and must pass minimum specifications as to quality and packing. The standard California orange box is used except for tangerines, which are exported in half boxes.

Most of the Washington navels are packed 126, 150, or 176 per box and the Valencias 150, 176, or 200 per box. Oranges so large as to pack only 96 per box are exported only when price conditions are favorable. Very few Washington navels smaller than 216 and very few Valencias smaller than 252 are exported. Grapefruit usually vary from 54 to 126 per box (tables 84 and 85).

TABLE 84.—*Citrus fruit: Quantity by district or origin, handled by the cooperative exchange, 1931–32*

Variety	Cape Province				Transvaal Province						Natal Province		Total	
	Eastern		Western		Western		Northern		Eastern					
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Washington navel	163	204	14	9	23	21	158	162	44	34	45	21	447	451
Valencia	57	89	4	2	11	14	325	270	66	108	55	76	518	559
du Rol								4		(1)		1		5
Seedling [2]	3	29	4	2	24	44	9	54	1	5		1	41	135
Grapefruit	56	50	8	7	1	(1)	1	(1)	20	25	2		88	82

[1] Less than one-half.
[2] du Rols combined with seedlings in 1931.

TABLE 85.—*Citrus fruit: Sizes by district of origin, handled by the cooperative exchange, 1931–32*

Variety and count per box	Cape Province				Transvaal Province						Natal Province		Total	
	Eastern		Western		Western		Northern		Eastern					
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
Washington navel:	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
84–80	1	2	(1)	(1)	1	(1)	(1)	(1)	(1)	.....	(1)	7	(1)	1
90	5	9	(1)	2	4	6	8	11	2	1	5	18	5	15
112	8	11	1	6	7	8	15	15	7	2	8	17	10	11
126	18	23	10	17	34	21	33	23	25	12	18	23	21	21
150	24	22	16	19	27	19	26	22	27	23	23	16	25	20
176	10	14	17	18	15	16	14	13	10	21	16	9	16	13
200	10	9	16	12	6	10	8	7	12	16	10	5	10	8
216	8	5	13	15	1	2	(1)	(1)	3	4	6	2	5	3
226	(1)	(1)	(1)	.....	3	7	4	5	2	8	4	1	2	3
252	5	3	13	8	1	5	2	3	5	7	6	1	4	3
288	2	1	7	3	1	4	(1)	1	1	4	3	(1)	2	1
324–360	(1)	1	2	(1)	(1)	2	(1)	(1)	(1)	2	1	1	(1)	1
Valencia:														
80	(1)	(1)											(1)	(1)
90	1	1	.....	(1)	.....	1	(1)	(1)	(1)	(1)	(1)	(1)	2	(1)
100											(1)		(1)	
112	2	1	(1)	1	.....	1	3	(1)	(1)	(1)	1	(1)	1	1
126	11	6	2	7	1	1	8	5	9	3	3	3	8	3
150	19	14	9	15	20	5	19	10	19	13	10	9	18	11
176	18	24	11	15	23	9	25	15	23	18	16	15	23	17
200	14	8	12	16	21	16	17	22	16	19	12	16	16	18
216	16	22	20	16	2	2	1	(1)	9	4	16	12	5	6
226	(1)	4	1	1	14	13	14	14	7	14	6	13	10	12
252	11	11	27	20	11	20	8	16	10	16	18	18	10	16
288	6	5	12	8	5	14	3	8	5	8	10	11	4	8
324	2	2	3	1	3	10	2	5	2	3	5	5	2	4
344	(1)	1	(1)	.....	(1)	(1)	(1)	(1)	(1)	(1)	(1)	2	(1)	(1)
360	(1)	1	(1)	(1)	(1)	6	(1)	3	(1)	2	3	1	1	3
420–440	.....	(1)	.....	.....	.....	2	.....	.....	(1)	(1)	.....	(1)	(1)	1
du Roi: [2]														
96								(1)						(1)
112								1						(1)
126								6		(1)		(1)		4
150								20		5		2		15
176								16		19		7		15
200								20		18		15		20
216								3				14		5
226								6		18		12		8
252								15		20		26		18
288								6		12		19		10
324								4		3		2		3
344												2		(1)
360								3		5		1		2
Seedling:														
80		2			(1)	(1)							(1)	(1)
90		7	(1)	2	(1)	1	1	7	(1)	(1)			(1)	5
112		9		5	(1)	1	2	7	(1)	(1)			(1)	5
126	(1)	17	1	12	5	4	13	13	17	1			7	10
150	(1)	19	5	17	14	10	23	17	25	4		1	15	15
176	4	15	9	17	23	16	27	17	22	10		4	21	16
200	5	11	14	14	18	16	18	16	12	19		11	16	15
216	19	8	15	11	12	11	2	.....	9	9		20	11	6
226	(1)	(1)	4	3	8	10	8	10	5	10		1	6	8
252	26	6	22	11	11	15	6	7	6	21		37	12	10
288	21	3	13	6	6	0	2	4	3	12		18	7	6
324	14	2	14	2	2	5	(1)	1	(1)	8		1	4	3
344	2	(1)	(1)	(1)	(1)	(1)				(1)		(1)	(1)	(1)
360	9	1	3	(1)	1	2	(1)	1	1			1	1	1
420–442	.....	.....	(1)	.....	.....	(1)	(1)	.....	.....	(1)	.....	.....	(1)	(1)
Grapefruit:														
28		(1)												(1)
36	1	(1)	(1)						(1)	(1)			(1)	(1)
46	2	3	(1)	(1)			1	9	1	1	(1)		2	2
54	13	16	1	3			5	26	4	2	1		9	10
64	18	20	3	5		1	6	26	4	6	2		13	18
70	13	15	3	8		3	18	19	9	7	3		11	12
80	27	3	10	15	6	6	22	9	14	15	11		22	8
96	14	22	23	20	11	22	23	5	22	23	22		17	23
100	1	1											(1)	1
112	6	7	33	27	31	14	15	2	19	20	24		12	12
126	4	5	21	12	30	33	7	1	10	18	23		10	10
150	1	2	6	4	13	21	3	1	8	8	14		4	4

[1] Less than one half.
[2] du Rois combined with seedlings in 1931.

Fruit Growers' Cooperative Exchange of South Africa, Ltd., annual reports, 1931–32 (9).

COSTS OF PRODUCTION AND MARKETING

The future expansion of citrus acreage will depend upon comparative costs of production and their relation to normal selling prices. The Union of South Africa has the advantage of cheaper land and labor, but has the disadvantage of low yields and high transportation costs to overseas markets. The advantages seem greatest and the disadvantages least with respect to those citrus areas that are close to the eastern coast. The orange areas in Transvaal Province and in Southern Rhodesia are at a comparative disadvantage. Transportation by rail from Southern Rhodesia points to Capetown is 1 shilling 11 pence (47 cents at par) per box, but the cost of transporting packing material from Beira to citrus areas in Southern Rhodesia is less than such costs to Transvaal points. Otherwise the cost of picking, packing, shipping, and selling a box of oranges in London is much the same in Southern Rhodesia as in the Transvaal. Wages to native labor in Southern Rhodesia are much less than in Transvaal and the Cape and yields are higher. In Natal and Southern Rhodesia native packers are employed; in the Transvaal mostly white packers are employed, and in the Cape some houses employ white girls and others employ Cape colored packers.

The cost of picking, packing, shipping, and selling a box of oranges in the United Kingdom or on the Continent varies considerably. These charges amount to 11 to 12 shillings ($2.68 to $2.92 at par) per box for fruit shipped from Transvaal Province or from Southern Rhodesia; they amount to 9 to 10 shillings ($2.19 to $2.43 at par) per box for fruit from eastern Cape Province. If 3 shillings (73 cents) is included for the cost of production up to picking, the total cost is approximately 14 shillings ($3.41 at par) per box in London. Table 86 presents fragmentary evidence showing in general the composition of these aggregate costs of producing and marketing South African oranges. Since extreme items would not be likely to occur coincidentally, the probable range in cost for oranges lies between $3 to $4 per box delivered to the jobber in London. In 1931 many sales were at prices below these costs, but the losses were much less than those suffered by producers of most other agricultural products.

The comparative cost of producing oranges in the Union of South Africa, Brazil, Palestine, and California, is difficult to ascertain because of differences in methods of computation. Table 87 presents such evidence as is available. It shows that costs per acre are considerably less in the Union of South Africa than elsewhere. This advantage is at least partly offset by lower yields per acre.

The net returns obtained on a successful estate near Port Elizabeth, and on a large estate in Transvaal, are presented in tables 88 and 89. These figures may not be absolutely typical but they are valuable for comparative purposes. The figures from Port Elizabeth include that part of the consolidated packing cost which was credited to the grower's share of capital in the association called the Sunday's River Citrus Cooperative.

PRICES

Overseas prices for South African citrus fruits during 1932 were higher than the year before, especially during the first part of the season, at which time Washington navels predominate. Net re-

turns in the Union of South Africa were not correspondingly higher for the reason that while the same subsidy of 2 shillings (49 cents at par) per case was paid in both years, the loss on foreign exchange was much heavier in 1932 (table 90). A large part of the 1931 returns reached South Africa before England abandoned the gold standard. From May to August, which is the navel-orange season, the average for 1931 was 15 shillings 6 pence ($3.77) per case as compared with 19 shillings 9 pence ($4.80) per case in 1932, after allowing for both subsidy and exchange loss. During the Valencia season after the end of August, the average price in 1931 was 15 shillings 2 pence ($3.69) as compared with 13 shillings 2 pence ($3.20) in 1932 after allowing for exchange and subsidy. The decided advantage enjoyed by early-season oranges, navels, is a new factor in the situation and may revive the lagging interest in the navel variety despite its low yields in nearly every South African producing area except the eastern Cape Province.

TABLE 86.—*Oranges: Cost per box, from two sources of information, Union of South Africa, 1932*

Item	Source of information: Source A [1]		Source B, Transvaal	
	Shillings	*Dollars* [2]	*Shillings*	*Dollars* [2]
Growing charges	3 to 4	0.73 to 0.97	(3)	(3)
Picking and transportation	0.25 to 0.25	.06 to .06	(3)	(3)
Packing charges	2 to 4	.49 to .97	3.21	[4] 0.78
Inland railage	.25 to .50	.06 to .12	(3)	(3)
South African charges (dock insurance, inspection, levy, etc.)	1 to 2	.24 to .49	1	[5] .24
Overseas charges (freight, dock handling, commission at 5 percent, etc.)	5 to 6	1.22 to 1.46	5.79	[6] 1.41
Total	11.5 to 16.75	2.80 to 4.07	10	2.43

[1] H. Clark Powell, University of Pretoria.
[2] Conversions at par.
[3] Not included in estimates.
[4] Included with packing charges.
[5] Of which, box, 31 cents; strapping, paper, and nails, 8 cents; railage on box shooks up country, 10 cents.
[6] Of which, cold storage, 7 cents; wharf and harbor dues, 8 cents; inspection, 2 cents; levy, 7 cents.
[7] Of which, ocean refrigerator freight, 62 cents; overseas handling charges, 21 cents; commission, 24 cents.

TABLE 87.—*Oranges: Cost of production per acre, compared internationally*

Item		Union of South Africa, 1926 [1]	Brazil, 1929 [2]	California [3] 1929	California [3] 1930	Palestine, 1927 [4]
Yield per acre	boxes	135	[5] 187	253	151	400
Labor, man and work animals	dollars [6]	19.41	10.32			
Total cost of production	do. [6]	[7] 75.13	[8] 105.94	[7] 315.91	[7] 208.37	[9] 513.40
Total cost of production, including interest	do. [6]	[7] 136.28	[8] 128.61			[9] 665.06
Net return	do. [6]	185.46	105.28			243.31

[1] Union of South Africa Department of Agriculture Bulletin 62 (49). Eleven groups roughly weighted.
[2] Report, Vice Consul Lee, July 22, 1931.
[3] California Citrus League annual report (1).
[4] Government of Palestine Leaflet 9 (27).
[5] On the basis of 200 oranges per case.
[6] Conversions at par.
[7] Including picking and hauling but not packing. Picking (California, 1930) cost 12.1 cents per box and packing 56.7 cents.
[8] Including packing.

TABLE 88.—*Citrus fruit: Prices netted per lug box on the tree, 1 farm, Union of South Africa, 1927–31*

Year	Grapefruit		Navels		Valencias	
	Pence	*Dollars*[1]	*Pence*	*Dollars*[1]	*Pence*	*Dollars*[1]
1927	54¾	1.11	59½	1.21	31¾	0.64
1928	36½	.74	56	1.13	48	.97
1929	36¾	.75	[2] 29½	.60	40¾	.83
1930	51¾	1.05	46¾	.94	52	1.05
1931	25½	.51	36½	.74	[2] 27½	.56

[1] Conversions at par.

[2] Poor fruit running large sizes.

H. Clark Powell, University of Pretoria.

TABLE 89.—*Oranges: Returns per box obtained by a grower in Transvaal Province, 1927–29*

Variety and year	Gross returns			Charges			Net		
	s.	*d.*	*Dollars*[1]	*s.*	*d.*	*Dollars*[1]	*s.*	*d.*	*Dollars*[1]
Washington navels:									
1927	14	1	3.43	12	6	3.04	1	7	0.39
1928	21	9	5.29	12	1	2.94	9	8	2.35
1929	13	4	3.24	11	2	2.72	2	2	.53
Valencias:									
1927	21	10	5.31	12	11	3.14	8	11	2.17
1928	20	11	5.09	11	3	2.74	9	8	2.35
1929	17	0	4.14	11	11	2.90	5	1	1.24

[1] Conversions at par.

South African citrus producers look upon Brazil as a more serious competitor than California, because Brazil is now the chief supplier of summer oranges, and because it is claimed that Brazilian oranges can be sold at a profit at 14 shillings ($3.41 at par) per box, including 3 shillings 6 pence duty, 2 shillings 6 pence freight, and 1 shilling 6 pence (85, 61, and 37 cents, respectively) for costs in the United Kingdom.

It is pointed out that Brazil's citrus exports to Great Britain during 1931 totaled 1,700,000 boxes of oranges and 57,000 boxes of tangerines. The previous record for Brazil was approximately 500,000 boxes. Receipts from Brazil in 1931 not only exceeded the previous record of that country, but also exceeded receipts from the Union of South Africa and Southern Rhodesia.

The fall in prices in 1931 as compared with those during the 1930 season was more pronounced for the smaller than for the larger sizes. According to the Empire Marketing Board the average price for the 1931 season was about 2 shillings 6 pence (61 cents) per box below that of the preceding season. Except from August to the end of September the prices seem to have been even lower than in 1929. Prices at the end of the season dropped from 15 shillings ($3.65) to 5 or 6 shillings ($1.22 or $1.46) per box.

South African early citrus in 1932 brought more than it did in 1931. This is attributed to several factors: Reduced supplies, better quality, hot weather, and less competition from strawberries.

South African citrus growers usually expect a rise in prices in London during September, but in 1932 prices fell considerably. Toward the end of September, South African Washington navel oranges were selling in London at 10 to 14 shillings ($2.43 to $3.41 at par)

per case, seedlings 10 to 12 shillings ($2.43 to $2.92) and Valencias 12 to 13 shillings ($2.92 to $3.16). These prices were only slightly more than the cost of marketing, and the high average obtained during the first half of the season was correspondingly lowered.

TABLE 90.—*Oranges and grapefruit: Price per box received by the South African Cooperative Citrus Exchange, 1930–32*

Fruit and month	1930			1931			1932		
	Quantity sold	Price		Quantity sold	Price		Quantity sold	Price	
		Gross	Net f. o. b. South African port		Gross	Net f. o. b. South African port		Gross	Net f. o. b. South African port
Oranges:	*1,000 boxes*	*Dollars*	*Dollars*	*1,000 boxes*	*Dollars*	*Dollars*	*1,000 boxes*	*Dollars*	*Dollars*
May							(1)	3.81	2.57
June	34	3.67	2.53	48	3.02	1.68	66	4.30	3.02
July	112	3.47	2.15	137	2.80	1.52	175	4.01	2.59
August	266	3.43	2.13	277	3.04	1.76	238	4.52	3.22
September	223	4.36	3.00	159	3.61	2.27	162	4.01	2.70
October	201	3.97	2.57	231	3.53	2.19	236	3.08	1.88
November	230	4.62	3.18	213	4.16	2.65	393	3.43	2.15
December		4.82	3.20		3.73	2.23		(2)	(2)
Average [4]	1,066	4.03	2.59	1,066	3.45	2.11	1,270	[3] 3.89	[3] 2.61
Grapefruit:									
May							1	5.80	4.40
June	2	6.90	5.49	12	3.30	2.01	5	5.98	4.56
July	9	4.72	3.34	10	2.88	1.62	23	3.59	2.31
August	15	3.89	2.51	28	2.35	1.13	22	4.50	3.26
September	39	4.16	2.96	20	3.18	1.90	15	6.55	5.19
October	9	4.18	2.80	18	3.36	2.09	34	3.59	2.39
November	(1)	4.14	2.88	13	3.51	2.19	13	2.80	1.52
December								(2)	(2)
Average [4]	74	4.34	2.92	101	3.02	1.70	113	[3] 4.20	[3] 2.94

[1] Less than 500 boxes.
[2] Insignificant quantity—prices not known, but higher than in November.
[3] Preliminary.
[4] Weighted average for season.

Conversions at par.

METHODS OF MARKETING

Under the present system of citrus-fruit production, the entire crop is marketed between the first of May and the last of November, with peak shipments occurring in the months of June to September (fig. 59). Chambers have been installed at several packing houses for treating fruit with ethylene gas. It is hoped in this way to obtain Washington navel oranges of sufficient juice and sugar content, and artificially colored, for shipment as early as March. These extra-early oranges would not necessarily be exported since the local markets are almost bare of oranges at that season.

It is also suggested that the season be lengthened at the other end by allowing out-of-season fruit to remain on the trees for picking during November and December in the case of Washington navels, and December and January in the case of Valencias. However, this is contrary to accepted methods of controlling fruit fly and false codling moth.

A rapid increase in the local consumption of oranges was revealed by the 1927 citrus census. This report showed that in 1924 there were 658,146 boxes of oranges and 3,530 boxes of grapefruit sold lo-

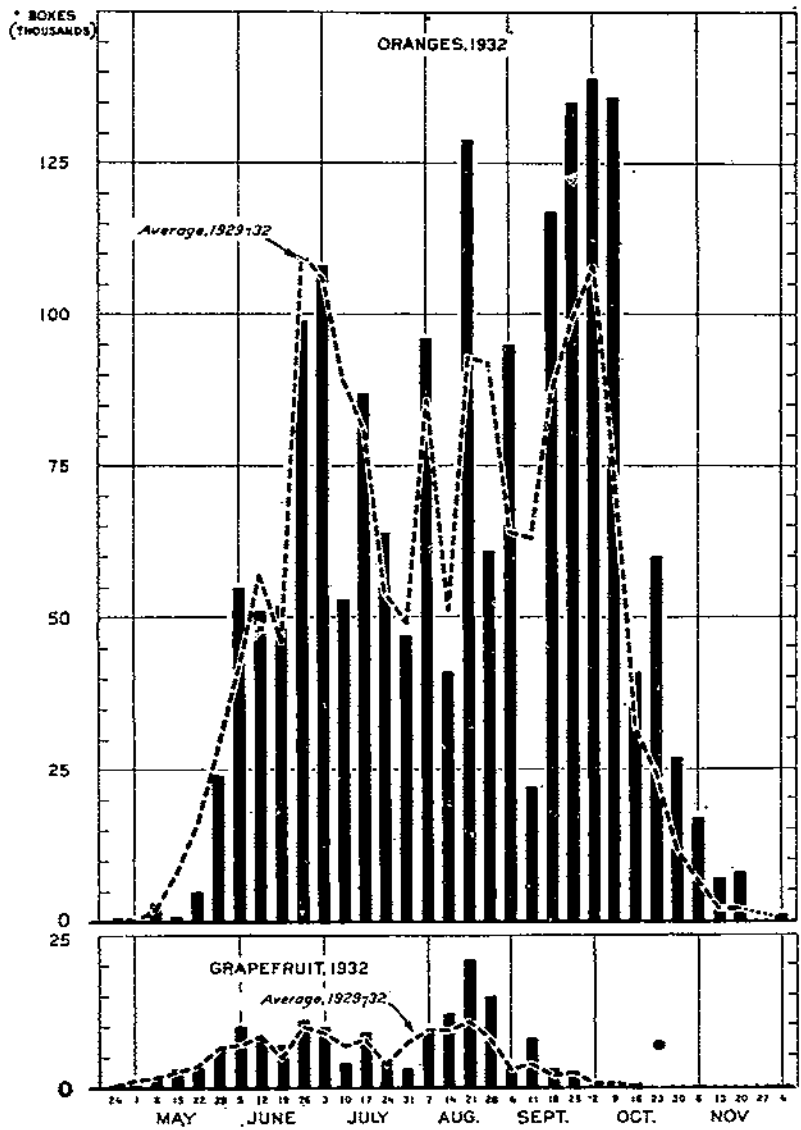

FIGURE 59.—WEEKLY SHIPMENTS OF CITRUS FRUITS FROM THE UNION OF SOUTH AFRICA.

The principal citrus-fruit movement is from July to October in competition with summer oranges from California.

cally, while in 1925 there were 875,552 boxes of oranges and 4,108 boxes of grapefruit and in 1926, 1,202,998 boxes of oranges and 55,862 boxes of grapefruit sold locally.

The importance of local markets to citrus producers in South Africa is indicated by the fact that the Western Province Citrus Exchange established at Paarl in 1930, sells practically all of its fruit on the local markets.

A considerable number of local citrus-fruit marketing associations have been organized since 1920. These local associations federated in 1926 to form the South African Cooperative Citrus Exchange, Ltd. On January 1, 1932, the exchange had 38 member associations. A few of the largest estates do their own packing, and some small growers in outlying areas grade and pack their own citrus fruit with the aid of a home-made bicycle-wheel grader, but in all of the principal areas the packing is done centrally and cooperatively, and the local associations own most of the packing houses. The local associations may also fumigate and pick the fruit for the members.

The central exchange buys packing material for the member associations and markets the fruit. Originally, the South African Cooperative Citrus Exchange, Ltd., and the South African Cooperative Deciduous Exchange, Ltd., marketed their fruit through a federal body, the Fruit Growers' Cooperative Exchange of South Africa, Ltd. The latter in turn originally appointed the Overseas Farmers' Cooperative Federation, Ltd., as its sales representative in England. The latter did not actually sell the fruit forwarded to it, but selected the agents and markets to which the fruit was distributed upon arrival, and guaranteed the cooperatives against credit losses. Within recent years the Fruit Growers' Cooperative Exchange (the federal body) has acted merely as a shipping agent, and most of the functions of marketing have been performed by the citrus and the deciduous exchanges for themselves. The citrus exchange no longer employs the Overseas Farmers', but has its own representative in London to allocate the fruit among the selling agents. Some of the fruit growers name certain overseas fruit dealers to distribute their fruit overseas, and this fruit is designated as "nominated" and must be assigned to the marketing agents named. The remainder of the fruit is allocated by the overseas representative among the agents in the various markets in accordance with market demands and prevailing conditions. The proportion of Union citrus fruit shipped through the exchange since its inception was: in 1927, 24 percent; in 1928, 45 percent; in 1929, 62 percent; in 1930, 67 percent; in 1931, 76 percent; and in 1932, 74 percent.

The citrus exchange pays for several services in addition to the usual marketing services. It has appropriated liberally for research as to the causes of waste in shipping and appropriates for a parity fund to guarantee owners of individual lots of fruit against loss when such lots are used for exploring new markets. In such cases the London parity is guaranteed. During 1931, £5,000 ($24,333) was earmarked for developing new markets and nearly all of this was debited against the parity fund.

The citrus exchange is financed out of the Government export levy on citrus fruits of 5 shillings ($1.22) per shipping ton of 40 cubic feet, amounting to over £25,000 ($122,000) in the 1931 season. As all citrus exports must contribute to the levy fund, there is nothing to be gained by remaining outside of a member cooperative. The federal body, the Fruit Growers' Cooperative Exchange, conducts a

shipping-agency service for the citrus exchange and for the deciduous exchange as well. It charges 1 shilling 3 pence (30.4 cents at par) per shipping ton of citrus (minimum 7 shillings 6 pence—$1.82 at par) for clearing and forwarding. It charges 1 shilling per shipping ton of imported supplies for clearing and forwarding. In addition, it operates repacking depots at Capetown, Port Elizabeth, and Durban for repacking and salvaging rejected fruit. The repacking is done for 2 shillings (49 cents) per case less a refund of any profits at the end of the season. Likewise any profit made by the Fruit Growers' Cooperative Exchange on its shipping-agency service for the year is redistributed among the cooperative companies concerned. The Government railway and harbours administration provides cold-storage facilities for which a charge is made of 5 shillings ($1.22) per shipping ton per week or fraction thereof. It also charges an equal amount for wharfage.

The Perishable Products Export Control Board is a governmental body which arranges for shipping space. Its expenses are borne by four cooperative groups in the following proportions: Citrus, ten-twentieths; deciduous, seven-twentieths; eggs, two-twentieths; and dairy, one-twentieth. The total expenses during 1931 were £4,550 ($22,143).

The Government has enacted several export control laws which specify the grade requirements for export fruit. Government inspectors are maintained at each of the ports to inspect systematically all fruit arriving for export. Fruit that is not up to specifications in every respect must be repacked at one of the repacking depots maintained by the Fruit Growers' Cooperative Exchange or must be sold on the local markets. Oranges must show 70 percent color and a sugar-acid ratio of 6.5 to 1 for Washington navels, 5.5 to 1 for Valencias, and 5 to 1 for seedlings, must test 42 to 45 percent juice content according to variety and must weigh 64 to 67 pounds net according to count. Grapefruit must test 33 to 37 percent (seedless varieties) of juice and must weigh 53 to 57 pounds net.

Ocean-freight charges during recent years have been at the rate of 52 shillings 6 pence per shipping ton of 40 cubic feet (about 70 cents per box), but by special arrangement through the Perishable Products Export Control Board an ocean-freight equalization plan is in operation which allows for a lower freight rate on condition that unused space is paid for. The difference between the equalized and the actual rate of freight in 1931 was 7 shillings 7 pence ($1.84) per ton. This amount is refunded by the control board to the shippers concerned, minus certain losses arising from bank exchange. The expenses of the federal body are paid by the citrus exchange and the deciduous exchange in the same proportion as the proceeds of the respective levies bear to each other. The proportions for 1931 were: Citrus, 77.85 percent, and deciduous, 22.15 percent. After deducting revenue earnings the cost to the citrus exchange of maintaining the federal office in 1931 was only £357 ($1,737).

GOVERNMENT AIDS

Under the terms of article 2 and schedule B of the draft agreement between Britain and South Africa, as arranged at the Imperial Economic Conference of 1932, oranges and grapefruit will be exempt

from the duty of 3 shillings 6 pence (85 cents) per hundredweight of 112 pounds to be imposed by the United Kingdom for an initial period of 5 years on raw oranges imported from foreign sources between April 1 and November 30, and 5 shilling ($1.22) per hundredweight to be imposed upon imports of raw grapefruit. This prolongs the preference rate on oranges (formerly 10 percent for the entire year) which was recently granted to South Africa, but in times of low prices, the fixed preference will be even more effective. The dates cover the entire exporting period for South African citrus fruits.

SOUTHERN RHODESIA

TREND OF PRODUCTION

The first citrus plantings on a commercial scale in Southern Rhodesia were made in 1910 by a well-known company. Its three estates at Mazoe (near Salisbury), Premier (near Umtali), and Sinoia (northwest of Salisbury) produce nearly all of the export fruit grown in the colony. The Mazoe and Premier estates have been particularly successful as they were located on exceedingly fertile soil with an abundance of irrigation water available.

The growth of the citrus export movement from Southern Rhodesia has been rapid. In 1916, when the first shipments were made to England, only 1,336 boxes were exported. In 1919 exports were only 3,043 boxes and in 1920, 7,551 boxes. During the next 5 years this development was rapid. Exports increased from 18,616 in 1921 to 19,369 in 1922; 42,976 in 1923; 52,961 in 1924, and 68,784 in 1925. Exports were reduced in 1926, on account of thrips damage, to 34,945 boxes. Exports since that time have consistently exceeded 100,000 boxes. In 1927 exports were 129,871 boxes; in 1928, 174,907; in 1929, 159,278; in 1930, 164,908; in 1931, 155,450, and in 1932, 159,248, according to the annual report of the Department of Agriculture of Southern Rhodesia. Nearly all of the commercial production is exported. In 1931 total production in the main producing areas was 181,359 boxes.

The number of citrus trees increased only slightly between 1928 and 1930, and the number of orange trees actually decreased 1.6 percent (table 91). There are approximately 1,000 growers of citrus fruit in Southern Rhodesia. Only 4 or 5 estates are of commercial importance, and the total citrus acreage is approximately 2,318 acres. The Washington navel oranges proved unsuccessful at Mazoe and are being replaced by a new variety, Premier seedling, so that the reduction in the number of orange trees shown in 1930 is probably only temporary. A small increase in the number of citrus trees in Southern Rhodesia may be expected in especially favorable years in response to favorable prices.

There was no expansion of citrus-fruit planting in 1931, and exports showed no increase (*36, Rept. Div. Plant Indus., 1931*). The quantity shipped by railroad for export was 168,455 cases, of which 53,167 cases were exported through Beira. The previous season's total was 182,838 cases, of which 29,174 cases were shipped through Beira. The remainder was shipped through Union ports. The increased shipments through Beira were occasioned by a partial embargo in 1931 against shipments through the Union on account of

foot-and-mouth disease in the Mazoe citrus area. The decrease in total shipments was attributed to frost injury in some groves, low prices overseas, and poor crops of Washington navel. In 1931, 14,964 cases were shipped to new markets, as compared with 10,937 cases the previous year. The new markets exploited were:

	Boxes
Canada	9,627
France	1,460
Germany	2,025
Sudan	400
Italy	900
India	412
Port Said	90
Greece	50

FIGURE 60.—Valencia orange tree 12 years old on Mazoe estate in Southern Rhodesia. Yields per tree are high.

TABLE 91.—*Citrus trees: Number in Southern Rhodesia, 1928, 1930, and 1931*

Kind of fruit	1928			1930			1931		
	Bearing	Non-bearing	Total	Bearing	Non-bearing	Total	Bearing	Non-bearing	Total
Oranges	143,261	29,213	172,474	135,664	34,121	169,785	.....	.....	.....
Other citrus	18,261	5,868	24,129	18,968	8,269	27,237	.....	.....	.....
Total	161,522	35,081	196,603	154,632	42,390	197,022	159,424	37,471	196,895

Southern Rhodesia Summer Crop Returns (*85, p. 8*); Official Year Book (*37, no. 5, p. 203; no. 8, p. 354*).

A well-known company has about 70,000 citrus trees of various ages at Mazoe, about 10,000 at Premier estate, and about 10,000 at Sinoia where the company has also a citrus nursery.

The Mazoe citrus estate is about 25 miles from Salisbury and is a particularly fine proposition (figure 60). The soil is admirably suited to citrus, and there is plenty of available land, suitable for citrus fruits, that could be planted. A magnificent dam at Mazoe with a capacity of 18,000 acre-feet provides sufficient water for an estate five times the size of the present one. Washington navels and Valencias were grown chiefly at the Mazoe estate at first, but it soon became evident that the Washington navel was not suited to that area, and during the last few years the Washington navel trees are being pulled out to be replaced with Premier seedling (fig. 61). There are 2,060 Jaffa orange trees in bearing and 3,000 nonbearing at Mazoe and, in addition, 5,162 bearing Mediterranean Sweet orange trees. These, together with about 2,000 Seville trees, are regarded as the midseason varieties. Exports have increased from 34,862 boxes in 1924 to 100,000 in 1932. Exports were reduced in 1926 by thrip damage.

FIGURE 61.—Premier seedling orange tree on Mazoe citrus estate, near Salisbury, Southern Rhodesia; 35,000 Washington navel trees were replaced by this new improved variety.

CITRUS EXPORTS FROM MAZOE CITRUS ESTATE, 1924–32

Year:	*Boxes*
1924	34,862
1925	35,076
1926	11,861
1927	94,913
1928	125,418
1929	127,708
1931	100,000
1932	100,000

The Mazoe estate has a better yield per tree than any other large estate studied. The 30,000 Valencia trees in 1932 averaged 3.76 export boxes per tree. The age of the trees ranges from 8 to 18 years. The yield per tree in the younger groves averaged about 1.5 boxes. The maximum yielding capacity of the older trees does not yet seem to have been reached. The 11,000 midseason-variety trees

yielded less per tree, but the average age of the trees was less. The 6,000 young Premier trees, budded in 1932, will more than replace the Washington navels that have been removed. The number of trees on this estate can be increased since the Mazoe Dam provides an abundance of water. The soil in the Mazoe Valley is a rich red loam, much of which is now used for growing corn. The plan is to continue growing corn as long as it will yield with irrigation, but without fertilizer, 30 bags (107 bushels) per acre. Corn is said to have been grown continually on this land for about 15 years without reducing the yield below this average. The company maintains a fairly large staff of competent scientists in charge of the estate for the purpose of demonstrating in a convincing way the

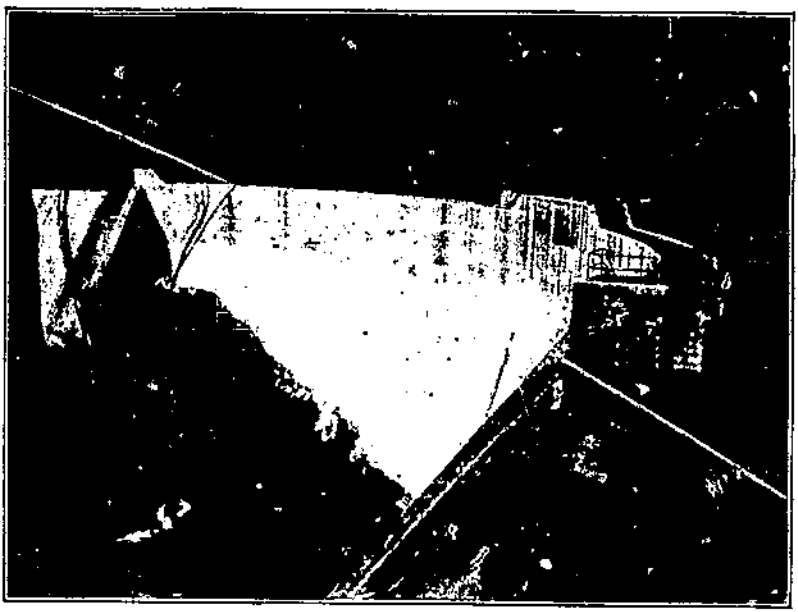

FIGURE 62.—Mazoe Dam near Salisbury, Southern Rhodesia. This dam, 100 feet high, retains enough water to irrigate 6,000 acres.

possibility of establishing a citrus industry in this area. It must be said, however, that few other areas in the colony offer the same advantages for citrus production that are to be found at the Mazoe estate (fig. 62).

The Sinoia estate is to be abandoned because it has not been as successful as the Mazoe and Premier estates. The Premier estate in 1932 exported 1,050 boxes of grapefruit, as compared with 650 boxes in 1931. The increased production is chiefly due to the increasing age of the trees. The quality of grapefruit produced at Premier, only 200 miles from Beira on the Indian Ocean, is probably improved by the influence of the moist breezes from the ocean.

The Valencia oranges at the Premier estate in 1932 amounted to about 15,000 boxes, as compared with 12,500 boxes in 1930. The pack in 1931 was much less owing to frost. There are 5,000 Valencia trees ranging from 10 to 17 years of age. The 3,300 Washington

navel orange trees of the Premier estate were a failure and have been pulled out. The land has been planted to wheat and will be set in 1933 and 1934 with 4,500 trees of the new variety Premier seedling developed at this estate. The Jaffa variety is also being removed, to be replaced by the Premier seedling.

The Premier variety originated as an odd tree that occurred in a Valencia grove. It has been propagated by budding, and the trees that have thus far come into bearing show uniform characteristics. The most desirable feature is the early maturity. Washington navel oranges of the Premier estate mature during April, but cannot be picked until the rains have ceased, usually the first week of May. As the Premier oranges are matured by the first week of May, they will take the place of the early movement of Washington navels. The Valencias are not harvested until August or September. The Premier variety may be a discovery of world-wide importance. It is similar to the Valencia in appearance but has only 4 to 8 seeds. One tree has been selected which produces oranges with typically only 3 seeds. The sugar-acid ratio in the first week of May was 7.56:1, although the fruit still showed a tinge of green color. By comparison, the Valencia oranges do not attain the required ratio of 6.5:1 until late August or September, after which the ratio gradually increases to 8:1. The tinge of green on the early-maturing Premier variety is not a handicap, since all export fruit, both oranges and grapefruit, are treated with ethylene gas. The Premier oranges exported overseas have been found to hold up much better than Washington navels. The tree grows upright and open, but it does not look like a seedling. The fruit grows in clusters like grapefruit, and the leaders usually bear little fruit. The yield per tree is equal to or better than that of Valencias. For example, 110 Premier trees produced, in 1932, 350 export boxes of oranges.

METHODS OF MARKETING

There are 11 exporting growers of citrus fruits in Southern Rhodesia and 5 in Mozambique. All of them are members of the Rhodesian Cooperative Fruit Growers' Association, Ltd.

Most of the export fruit is produced on the three largest estates, each of which has its own packing house; the Mazoe estate has two. The fruit is packed in boxes of standard size. Most of it is Valencia oranges, although there are some Washington navels, Mediterranean Sweets, Jaffas, and a few grapefruit from the Premier estate. The Rhodesian export growers of citrus fruit organized in 1922 the Rhodesian Cooperative Fruit Growers' Association, Ltd., which is affiliated with the South African Cooperative Citrus Exchange and the Fruit Growers' Cooperative Exchange of South Africa, Ltd., through which the marketing facilities and services are obtained. In 1932 only 13 percent of the Rhodesian exports were handled by the South African Cooperative Citrus Exchange.

During 1932 the Rhodesian Cooperative Fruit Growers' Association exported overseas 170,668 boxes of oranges and 8,681 boxes of grapefruit. About one-tenth of the oranges and 87 percent of the grapefruit originated in Mozambique. Most of the Rhodesian fruit was shipped to the United Kingdom, but the fruit from Mozambique, in order to avoid the heavy duties imposed by Great Britain, was

marketed in Canada, France, Germany, India, and a number of other countries. The net returns to growers were slightly higher than in 1931, varying between 7 shillings and 9 shillings 6 pence ($1.70 to $2.31 at par) per box f. o. b. port of shipment.

The cost of packing material ranges from 2 shillings to 2 shillings 6 pence (49 to 61 cents) per case and the cost of exporting and marketing in the United Kingdom is 7 shillings 3 pence ($1.76 at par) per case via Beira to 9 shillings 3 pence ($2.25 at par) per case via Capetown. The cost of production probably averages between 3 shillings and 6 shillings ($0.73 to $1.46 at par) per case so that an overseas price of 15 shillings ($3.65 at par) is considered necessary to meet average costs. Southern Rhodesia abandoned the gold standard simultaneously with England so that there was no loss on foreign exchange.

Prior to 1931 most of the citrus fruit was shipped through Capetown in order to shorten the time in transit and take advantage of the excellent cold-storage, handling, and inspection facilities at Capetown, but restrictions on account of the Rhodesian outbreak of foot-and-mouth disease caused large quantities to be shipped through Beira in 1931 and especially in 1932. As yet there is no cold-storage plant at Beira, although there is talk of building one, as it is thought that the Rhodesian traffic in fresh fruit and chilled beef will be permanent.

By shipping through Beira, Rhodesian citrus fruits avoid a levy of 9 pence (18 cents) per box which is collected at Union ports and paid to the South African Citrus Exchange. This saving is not a clear gain. If fruit is shipped through Beira the regular lines are unable to allot refrigerated space at Beira until the Union Government's requirements are known. This is about 28 days before sailing from Capetown and only 9 days before ships using the western route reach Beira. Within these 9 days the association must communicate with the growers, arrange allocation of space, arrange for railage with the shipping agents, and have the fruit reach the port 2 days before sailing. This rush is inconvenient and hazardous. It has been recommended that a shipping board be set up to represent the users of the port at Beira and to obtain better service and prevent violent fluctuations in rates at short notice. One of the directors of the Rhodesian Fruit Growers Association expressed the opinion that the fruit sent through Beira in 1931 arrived at destinations in as good condition as that sent through Capetown. The fruit has been sent to Beira in ventilated freight cars, more recently in refrigerated cars. Railroad and ocean-freight charges were cheaper than if the fruit had been shipped through Capetown. The possibility of establishing cold-storage facilities at Beira is being investigated so that in the event that shipments through the Union are interrupted in the future, Rhodesian citrus fruits will have adequate handling facilities at Beira.

MOZAMBIQUE

According to Consul Cameron, oranges have been grown for local consumption in the Portuguese colony of Mozambique for 40 years, but it is only since 1931 that exports have justified segregation in the customs' statistics from the general heading of "fresh fruit."

Irrigated citrus acreage is officially reported to the extent of 569 acres in Lourenco Marques district and 193 acres in Manica and Sofala districts, near Beira. These statistics are incomplete, and the total irrigated acreage is more nearly 900. The acreage of both irrigated and nonirrigated citrus fruit, according to the 1929–30 census, was 3,240 acres, embracing 202,700 trees of which all but a few were in the districts just mentioned.

The total acreage was composed of 1,685 acres of oranges, 443 acres of tangerines, 591 acres of grapefruit, 321 acres of lemons, and 200 acres of other kinds. The total number of trees consisted of 97,800 orange, 32,000 tangerine, 34,300 grapefruit, 23,000 lemon and 15,600 other.

Young trees accounted for a large proportion of the total. In addition, 59,900 young trees were reported in nurseries. The following classification shows that 110,300 trees were in full bearing, 26,000 trees in first-year bearing, 36,800 trees 2 or 3 years old, and 29,600 trees were planted in the year of the census, 1929–30. The figures indicate that although grapefruit trees constitute only 17 percent of the total citrus trees, the proportion of nonbearing trees is twice as high for grapefruit as for orange (table 92).

TABLE 92.—*Citrus trees: Number in Mozambique, 1929–30*

Kind of tree	Full-bearing trees	Trees not in full bearing			Percentage of full bearing
		First-year bearing	Planted in 1929–30	Other	
	Number	*Number*	*Number*	*Number*	*Percent*
Orange	63,200	12,200	10,100	12,300	35
Tangerine	16,900	4,300	5,500	5,300	47
Grapefruit	10,100	7,400	6,700	10,100	71
Lemon	12,600	1,300	3,500	5,600	45
Other	7,500	800	3,800	3,500	52
Total	110,300	26,000	29,600	36,800	46

1929-30 census, Mozambique.

Of course, many of these trees have since come into bearing. In 1933, orange trees in full bearing probably numbered about 80,000 and grapefruit trees about 35,000. The latter figure allows for a probable understatement in the census returns for grapefruit. Since 1930 the rate of planting of orange trees is understood to have slowed down, whereas grapefruit planting has increased sharply. Small growers obtain their young trees from the Government experiment stations, but large growers grow their own nursery stock or buy trees from agents of nurserymen in the Union. Recent issues of trees by nurserymen form no indication of planting in Mozambique.

The 1929–30 census shows the total production and quantity sold in each district. These figures, given in kilograms, have been converted to boxes by multiplying by 2.2046 and dividing the result by 70 to convert the quantities into statistical boxes of 70 pounds, although it must be remembered that the tangerines were probably sold in half boxes so that the actual number of boxes of tangerines was approximately double the number shown (table 93).

TABLE 93.—*Citrus-fruit production and sales in various districts, Mozambique, 1929–30*

Kind of fruit	Districts							
	Lourenco Marques		Manica and Sofala		Five others		All districts	
	Production	Sales	Production	Sales	Production	Sales	Production	Sales [1]
	Boxes	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Boxes*
Oranges	34,259	29,027	91,765	90,663	3,432	787	129,456	120,477
Tangerines	2,815	1,917	2,311	2,226	1,873	516	6,999	4,659
Grapefruit	7,771	7,522	12,418	12,418			20,189	19,940
Lemons	712	497	315	154	239	126	1,266	777
Other	7,818	7,629	94	Nil			7,912	7,629
Total	53,375	46,592	106,903	105,461	5,544	1,429	165,822	153,492

[1] The difference between production and sales represents plantation consumption and wastage.

1929–30 census, Mozambique.

Total sales in Mozambique are only about 5 percent as great as the total commercial crop of the Union, but the rate of expansion seems at present to be more rapid.

Exports from Mozambique are reported in kilograms (table 94). They have been converted into boxes in the way mentioned above.

TABLE 94.—*Citrus-fruit exports from Mozambique, 1928–31*

Kind of fruit	1928, Lourenco Marques	1929, Lourenco Marques	1930			1931		
			Lourenco Marques	Beira	Total	Lourenco Marques	Beira	Total
	Boxes	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Boxes*
Oranges	5,001	11,081	20,266	16,793	37,059	21,249	10,100	31,349
Tangerines		123				164		164
Grapefruit			7,402		7,402	21,487	1,049	22,536
Lemons	884	1,807	2,120	2	2,122	2,141		2,141
Limes		9,630					3,888	3,888
Total	5,975	22,641	29,788	16,795	46,583	[1] 45,041	[2] 15,037	60,078

[1] 1932 exports were 46,846 boxes (25,932 oranges, 20,914 grapefruit), chiefly to London.
[2] Rhodesian fruit exported through Beira in 1931 amounted to more than 100,000 boxes.

In 1930 the cold-storage plant at Lourenco Marques handled 18,465 boxes of citrus fruit produced in Portuguese territory; in 1931, 45,965 boxes of such fruit and 1,938 boxes of Transvaal fruit; in 1932, 46,529 boxes of the former and 25,990 boxes of the latter. There is no cold-storage plant at Beira, but the fruit is handled direct from refrigerated cars to the boats. It was predicted that exports of Portuguese-grown fruit through Lourenco Marques in 1934 would exceed 100,000 boxes. Exports are chiefly to England in refrigerated boats; some reshipments are made to Italy and France. Exports from Mozambique are made earlier than those from the Union of South Africa. Most of the exports are made between April and July, as compared with May to October in the Union.

Further expansion of the industry is expected, especially of grapefruit, and particularly where irrigation is possible. In the Manica

and Sofala districts, irrigation is unnecessary, and serious drought occurs only once in 4 or 5 years, but these districts are subject to occasional frost. Further north the rainfall is more dependable, and there is no frost, but development of the industry must await the extension of the railroads into these districts. Furthermore, it must be recognized that most of the citrus areas of Mozambique are in fever areas less suitable for white occupation than the citrus areas in the Union of South Africa.

The two districts in which citrus production is likely to be expanded are the Lourenco Marques district, in the extreme southern part of the colony, and the strip between Beira and the Rhodesian border.

TANGANYIKA

The production of citrus fruits in Tanganyika is not on a commercial basis.

Around Muhesa in Tanga Province, in the northeast, the Government started a substation primarily to encourage citrus growing among natives. A local market exists among the large employers of native labor in this Province and in Kenya. A citrus nursery was started in 1928; the Binti Juma orange from Zanzibar and 10 varieties of oranges, tangerines, grapefruit, and lemons have been budded on rough lemon stock. In 1930 the director of agriculture (*13*) reported:

> The small citrus production in the neighborhood of Muhesa in the hands of natives is not developing and cannot be expected to do so when the people are too slothful to save their citrus trees from grass fires.

Various citrus diseases also inhibit production.

There was no establishment of grapefruit or other citrus-growing industry during 1930, although the experiment station at Morogoro maintains a number of varieties of grapefruit and other citrus fruits and keeps available a limited amount of bud wood for propagation (*40. Rept. 1930*). It is possible to ship citrus fruit at a time when British and continental markets are somewhat bare of supplies—September and October.

NYASALAND

Citrus fruit has been grown noncommercially in Nyasaland for many years. Officials of the Nyasaland Department of Agriculture are now showing evidence of considerable interest in the possibility of developing a commercial citrus industry. In May 1933 negotiations were entered into for a prominent citrus authority in the Union to visit Nyasaland and make recommendations for the establishment of citrus groves in Nyasaland.

KENYA

The 1932 agricultural census for Kenya shows that at the end of February 1932 Kenya, with its 2,100 European farmers owning over 5,000,000 acres of land, had only 2,799 acres of orchards containing 223,820 fruit trees (table 95). The number of fruit trees increased from 195,716 in 1931, although the acreage reported in 1931 was slightly larger than that in 1932.

TABLE 95.—*Fruit: Acreage and trees owned by Europeans in Kenya, total 1925–32, and by districts 1932*

Year, month, province, and district	Acreage in orchards	Fruit trees		
		Deciduous	Citrus	Other kinds
Kenya:	*Acres*	*Number*	*Number*	*Number*
1925, June	[1] 2,516	110,223	49,527	27,129
1928, July	[2] 2,560	122,888	36,297	24,151
1930, July	[3] 2,460	114,647	32,645	27,387
1931, February	2,929	119,983	34,518	41,215
1932, February	2,799	120,241	39,654	63,925
Coast Province:				
Digo	4		265	12
Mombasa	35	49	820	1,436
Kilifi and Malindi	23		85	
Lamu and Tana	42		100	4,000
Teita	16	12	132	64
Total	120	61	1,402	5,512
Ukamba Province:				
Machakos and Kitui	567	46,384	6,712	1,024
Kikuyu Province:				
Nairobi	24	361	369	286
Kiambu	561	18,735	10,214	28,053
Thika (Fort Hall)	105	520	2,153	1,387
Nyeri, North	106	2,317	1,873	1,660
Embu and Meru	6	16	110	150
Total	802	21,949	14,719	31,536
Naivasha Province:				
Naivasha	157	12,781	847	786
Laikipia	24	1,104	230	118
Total	181	13,885	1,077	904
Rift Valley Province:				
Nakuru	271	14,218	2,349	5,645
Ravine	29	276	214	1,506
Total	300	14,494	2,563	7,151
Nzoia Province:				
Nandi	25	1,620	191	314
Uasin Gishu	321	13,273	4,837	5,108
Trans Nzoia	283	5,824	3,144	8,343
Total	629	20,717	8,172	13,765
Nyanza Province:				
Kavirondo:				
Central	6	40	114	50
North	21	181	485	327
South	1	5	20	17
Kisumu-Londiani	128	1,270	3,554	2,302
Kericho	44	1,255	836	1,337
Total	200	2,751	5,009	4,033

[1] Including 435 acres of bananas and 84 acres of pineapples.
[2] Including 391 acres of bananas and 121 acres of pineapples.
[3] Including 259 acres of bananas and 118 acres of pineapples.

Kenya Colony and Protectorate, agricultural census, 1932, (*14, Rept. 18, p. 46*).

The quantity for sale is exceedingly small, and in 1930 fruit sales from farms amounted to 402 short tons in addition to 12,530 bunches of bananas and 44,102 pineapples. Bananas show a decrease, but pineapples increased over 1928 about 50 percent and other fruit 115 percent.

UGANDA

Citrus fruit has not been grown commercially in Uganda, but in 1929 the Uganda Government undertook the propagation of citrus trees for distribution free of charge to prospective growers. Very slight progress has been made to date. During 1931 the Government distributed only about 400 citrus trees, chiefly grapefruit and oranges. The inland character of the country makes commercial production difficult except for local demands. In this respect Uganda is similar to Southern Rhodesia, although in the latter country annual exports exceed 150,000 boxes.

TOBACCO

PRODUCTION IN SOUTH AND EAST AFRICA

South and east African countries are important as actual and potential sources of tobacco, competing in Europe with American-grown tobacco. They are not important consumers of American-grown tobacco. South Africa has never imported more than 9,000,000 pounds and has recently imported only about 3,000,000 pounds per year.

The production of tobacco in south and east African countries is about 50,000,000 pounds per year. This is small in comparison with the 1,000,000,000 to 1,500,000,000 pounds produced in the United States, but since the consuming capacity of these countries is small in comparison with the potential producing capacity, the tobacco situation is of genuine importance. The exportable surplus amounts to approximately 30,000,000 pounds, as compared with 500,000,000 pounds normally exported as leaf tobacco from the United States. Furthermore, tobacco exports from these countries are increasing, while exports from the United States are decreasing. American tobacco meets very definite competition on European markets with tobacco from these various sources, and this competition is likely to become keener in view of the fact that production in these countries is increasing rapidly and that practically all of the increased production must be for export.

In south and east Africa it is customary to designate all non-Turkish tobacco as Virginian type, although it differs widely in characteristics. Most of the Virginian tobacco grown in the Union of South Africa and Swaziland is air-cured, and this varies from a thin light leaf used for cigarettes to a heavy dark leaf used for smoking or snuff. The Rhodesian tobacco of Virginian type is mostly flue-cured and does not differ widely from flue-cured tobacco grown in the United States; but a considerable part is dark fire-cured, and a small part is air- or sun-cured. The Nyasaland tobacco is grown mostly by natives (blacks) on their own lands. It is of a heavy dark fire-cured type. However, Europeans in Nyasaland also grow considerable tobacco, mostly flue-cured, but some of it fire-cured. The other countries produce chiefly dark-fired tobacco, grown mostly by natives, and their production has not yet become important (fig. 63).

Turkish tobacco is grown to some extent in the Union and in Southern Rhodesia. It is always air cured.

Production in the Union has always been primarily for domestic consumption but, with the advent of flue curing, some is being exported. An export-quota law went into effect in 1933, requiring 25 percent of certain types to be exported.

Production in the other countries has been primarily for export to the United Kingdom, where the tobacco competes with American tobacco. The imposition of preferential duties by the United Kingdom has encouraged production and exportation from the Rhodesias and Nyasaland.

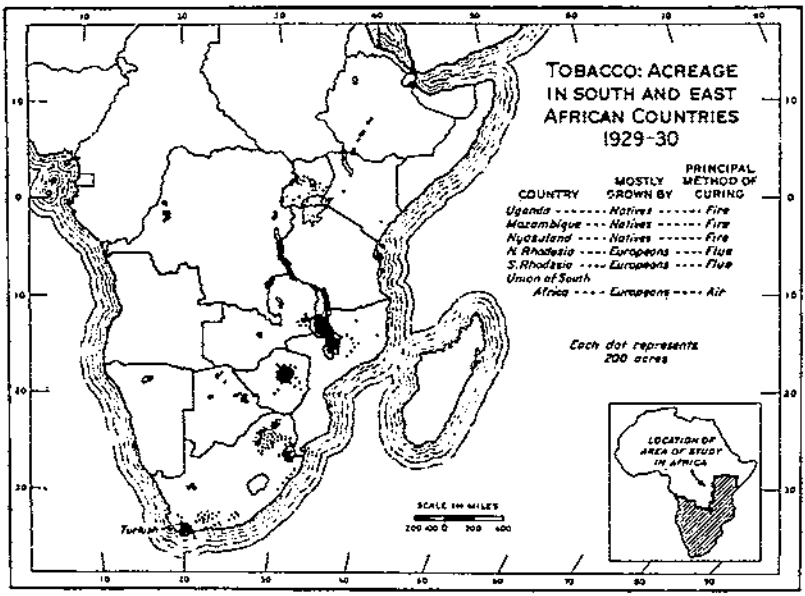

FIGURE 63.—The principal tobacco-producing areas are in the Union of South Africa (air-cured), Southern Rhodesia (flue-cured), and Nyasaland (fire-cured).

From September 1, 1919, an Imperial preferential tariff of five-sixths of the full rate (81⅔ pence against 98 pence—$1.65 against $1.99, at par—per pound of foreign tobacco) was granted to the British countries. On July 1, 1925, the preferential rate was changed to three-fourths—73½ pence ($1.49) against 98 pence ($1.99). On April 12, 1927, it was changed to 81½ pence ($1.65) as against 106 pence ($2.15). On September 11, 1931, it was changed to 89½ pence ($1.81) against 114 pence ($2.31). These rates apply to unstripped leaf tobacco containing 10 percent or more of moisture.

The most rapid expansion of tobacco acreage in all of these African countries occurred between 1925 and 1927. Prices in the United States were declining between 1922 and 1926, but were higher in 1927 and 1928. Prices in South Africa were rising between 1925 and 1928 but declined thereafter. These circumstances led to the remarkable expansion in these African countries—from less than 20,000,000 pounds in 1917–18 to almost 70,000,000 pounds in 1927–28.

All types of tobacco shared in the expansion, but the expansion of Rhodesian flue-cured tobacco from almost nothing in 1917–18 to 24,000,000 pounds in 1927–28 was most marked. Consumption of Rhodesian tobacco (chiefly flue-cured) rose from 1,000,000 pounds in 1926 to 4,000,000 pounds in 1928; but consumer tastes could not be quickly changed to accept Rhodesian tobacco, and therefore tremendous stocks of unsold tobacco accumulated. Production in Rhodesia was therefore abruptly curtailed. Consumption of Rhodesian tobacco in the United Kingdom has gradually increased to about 10,000,000 pounds per year, and Rhodesian production is again increasing but is not yet back to the 1927–28 level. After the collapse of the Rhodesian market in 1927–28, Southern Rhodesia turned partly to the production of dark-fired tobacco, but production only reached 2,000,000 pounds and then receded.

In Nyasaland production (chiefly flue cured) by Europeans increased from about 3,000,000 pounds in 1917–18 to 10,000,000 pounds in 1926–27, after which it steadily declined without the revival noted elsewhere. However, production (fire cured) by natives increased steadily, with practically no interruption, to 13,000,000 pounds in 1931–32.

In the Union of South Africa production increased only about 50 percent during the boom and declined about the same amount thereafter. Extreme fluctuations in acreage and production have not occurred in the Union, where production is chiefly for domestic consumption. Legal measures tend to stabilize the price and production in the Union. The Union Government, by legalizing compulsory cooperation in the marketing of tobacco in the principal areas in 1925, has helped to stabilize prices in the Union. Again, the Union Government in 1933 required 25 percent of all tobacco (other than the unimportant Turkish and flue cured) purchased by dealers to be exported, thereby disposing of an accumulated surplus and maintaining prices locally. This last method cannot add more than 10,000,000 pounds to the export supply without materially reducing the price that can be paid to producers in the Union.

The Union manufactures about 17,000,000 pounds of tobacco per year, of which all but about 3,000,000 pounds are produced in the Union. Most of the 3,000,000 pounds of imported tobacco originates in Southern Rhodesia and Northern Rhodesia. Any material increase in production of tobacco in the Union will be reflected in increased exports.

During 1932 the Union exported 25,000 pounds of cigarette and 47,000 pounds of other manufactured tobacco. No cigars were exported. Unmanufactured tobacco was exported only to the extent of 29,000 pounds. The cigarettes were exported almost entirely to Belgian Congo. The other manufactured tobacco was exported in about equal quantities to the United Kingdom, Australia, New Zealand, and Kenya, with smaller quantities to Tanganyika and other possessions. The unmanufactured leaf tobacco was exported chiefly to the United Kingdom and Mozambique. The exports of tobacco other than cigarettes were less in 1932 than at any time since 1910, but because of recent legislation these exports will probably increase. Between 1910 and 1923 these exports increased from approximately 100,000 pounds to over 2,000,000 pounds. Since that

time they have been less than 1,000,000 pounds per year, except in 1930, when an accumulated supply of inferior tobacco was marketed at bargain prices.

Southern Rhodesia, with only about 50,000 white people, consumes little tobacco. In 1932 no cigars were exported, and exports of cigarettes, chiefly to Northern Rhodesia, amounted to only 113,000 pounds. Exports of other manufactured tobacco, chiefly to Northern Rhodesia, amounted to 73,000 pounds. These items were small in comparison with the exports of unmanufactured tobacco, 13,000,000 pounds, chiefly to the United Kingdom. Exports from Southern Rhodesia were less than 5,000,000 pounds per year until the tobacco boom of 1927 and 1928, when exports reached 15,000,000 pounds per year. In 1930 exports declined to 7,000,000 pounds, but again reached 13,000,000 pounds in 1932, with indications of further increases to come.

Nyasaland in 1932 exported 15,000,000 pounds of tobacco, almost entirely to the United Kingdom. Of this quantity, 11,000,000 pounds was leaf tobacco and 4,000,000 pounds strips. This was the largest quantity ever exported from Nyasaland in 1 year. Exports increased from 2,000,000 pounds in 1912 to 5,000,000 pounds in 1921 and 12,000,000 pounds in 1928. There was no further increase until the record exports of 1932.

Northern Rhodesia exported, through Nyasaland, in 1932 a total of 900,000 pounds of tobacco. This was considerably more than during 1931, but represented a decline from the 1,700,000 pounds exported in 1929. Tobacco from Northern Rhodesia was exported to the United Kingdom and the Union of South Africa.

There are three sets of factors which may cause tobacco exports from these countries to increase from the present level of 30,000,000 pounds to a level of 100,000,000 pounds or more.

(1) Prices. If the price level in the United States is raised above parity with that of other countries, quality considered, and if our export price is on a par with the domestic price, foreign demand will shift to South African tobacco. If greater tariff preferences are extended to South African countries, production then will be further stimulated. If the Union of South Africa continues its compulsory export-quota plan, some increase in South African exports will be certain.

(2) Natural resources. The northern extension of the Nyasaland railroad is opening up new areas suitable for tobacco. Tobacco may displace other crops on irrigated lands in the Union, and the irrigated area may be slightly increased. The cultivation of a desire for money among any large part of the 30,000,000 natives in these countries will expand native production of tobacco for sale and export. Within 25 years this has created a native cotton-growing industry in Uganda amounting to about 250,000 bales per year. In even less time it has developed a native tobacco-growing industry in Nyasaland amounting to about 10,000,000 pounds per year. The natives' power to produce has only started to develop.

(3) Technical changes. If consumer preferences in Europe can be gradually changed, and if it is in the interest of the manufacturer to do so, more South African tobacco will be used in manufacturing the tobacco blends. This is steadily happening in the case of

Rhodesian tobacco. If the quality of the South African tobacco can be changed to resemble more closely American tobacco a similar result will follow. The Union of South Africa has recently started to flue-cure instead of air-cure part of its tobacco crop. Officials in Southern Rhodesia are experimenting with various fertilizers and treatments to alter the flavor and burning qualities of Rhodesian tobacco. In several countries improved varieties are being introduced. Skill in curing is also being constantly improved.

Unless the price factor is strongly in favor of South Africa, tobacco exports from these countries will increase haltingly. It requires a long time under normal price relationships, for the development of the natural resources, land, and labor, to multiply tobacco exports. It usually takes even longer for technical changes to alter greatly the volume of exports (table 96).

TABLE 96.—*Tobacco: Acreage and production, by type, south and east Africa, 1927–28*

Country	On land occupied by Europeans		On land occupied by natives	Total production	Type [1]			
	Acreage	Production			Air-cured	Flue-cured	Fire-cured	Turkish
	Acres	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*
Union of South Africa	40,420	21,751	1,351	23,102	21,920	[1] 10	.....	1,172
Swaziland	1,865	1,294	1	1,295	1,295	.....	.....	.....
South-West Africa	[1] 2	1	.....	1	1	.....	.....	.....
Southern Rhodesia	46,622	24,943	(2)	24,943	[3] 127	24,263	102	451
Northern Rhodesia	[4] 7,000	[5] 3,000	(2)	[5] 3,000	[6] 300	2,700	.....	.....
Nyasaland	22,475	9,112	5,407	14,519	.....	7,000	7,519	.....
Mozambique	3,558	1,037	[7] 200	[1] 1,237	100	100	1,037	.....
Tanganyika	.....	.....	[8] 22	[8] 22	.....	.....	16	6
Kenya	(2)	(2)	200	200	.....	.....	200	.....
Uganda	18	[1] 10	[10] 800	[1] 810	.....	.....	810	.....
Total	121,960	61,148	7,981	69,129	23,743	34,073	9,684	1,631

[1] Approximate.
[2] Unknown but unimportant.
[3] Including sun-cured and Inyorka.
[4] Approximate; 1925–26 was 4,936 acres; 1928–29 was 3,232 acres
[5] Approximate; 1925–26 was 2,070,000 pounds; 1929–30 was 1,318,000 pounds.
[6] Sun-cured.
[7] Approximate; 60,000 pounds of native-grown tobacco was sold to Europeans.
[8] Approximate; production in 1930 was 22,000 pounds.
[9] Approximate; 10,000 to 20,000 pounds exported annually. Chiefly consumed locally by natives.
[10] Approximate; native-grown acreage was 2,108 acres.

From official sources. Year beginning July 1.

UNION OF SOUTH AFRICA

TREND OF PRODUCTION

Tobacco growing in the Union of South Africa dates back to the early colonial days at the Cape. It spread northward and inland into various areas with the progress of European settlement. Until the present century most tobacco growers in what is now the Union of South Africa manufactured their tobacco crop into roll tobacco, a process of fermenting, rolling, and coiling the leaf. The roll tobacco was then sold for use as pipe tobacco or snuff. Some roll tobacco is still manufactured, chiefly in the Oudtshoorn district, but most of the Union's crop is now sold to manufacturers in the Union for making cigarettes and pipe tobacco for consumption in South

Africa. Turkish-tobacco production for cigarette manufacture has also developed within the last 30 years.

In 1910–11 the Union produced 15,000,000 pounds of tobacco, of which about 50,000 pounds was Turkish. There was no material increase until 1925–26 although Turkish production climbed up to 1,000,000 pounds. There was a moderate expansion between 1925 and 1928—up to 23,000,000 pounds, including Turkish—after which production dropped to the previous level owing to the impossibility of selling the surplus leaf that had been exported. With the surplus finally sold and under the protection of a duty on Rhodesian tobacco in excess of 2,400,000 pounds (3 shillings 6 pence—85 cents per pound of leaf), production again increased in 1931–32. The following crop would also have been large except for severe drought and shortage of irrigation water (fig. 64).

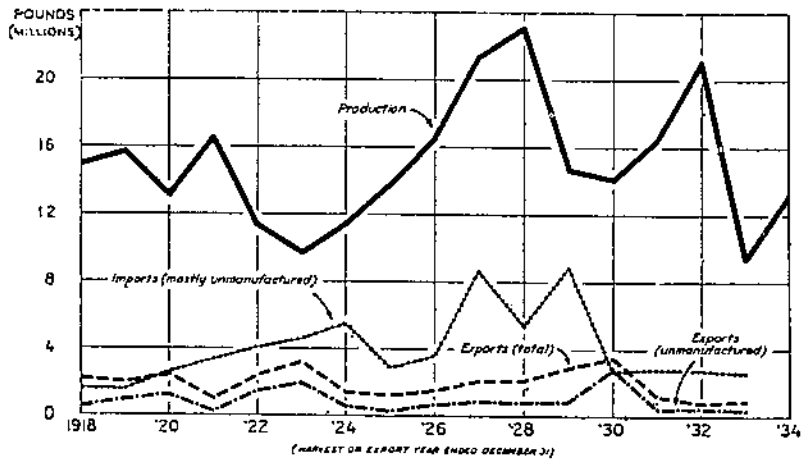

FIGURE 64.—PRODUCTION, IMPORTS, AND EXPORTS OF TOBACCO, UNION OF SOUTH AFRICA, 1918–34.

Tobacco production increased rapidly from 1923 to 1928. Progress was arrested in 1929 by low prices and in 1933 by drought.

Turkish tobacco increased to 1,685,000 pounds in 1930–31 and greatly exceeded local requirements. Exportation of this type was not feasible. Growers were prevailed upon to cut production to 400,000 pounds in 1931–32, and to almost nothing at all in 1932–33 pending liquidation of the accumulated surplus.

Most of the production is by European growers using native laborers, but around 250,000 pounds per year are grown by natives living on the farms of Europeans and about 1,000,000 pounds grown by natives living in native reserves, locations, missions, or on native farms. Information is incomplete but there is no evidence of any increase in the production of tobacco by natives in the Union. Such an increase need not be expected because in the Union (but not in other south African countries) most of the tobacco, Turkish excepted, is grown with irrigation. The irrigation schemes are European-owned.

Nearly all of the Union's tobacco crop is air-cured. There is no fire-curing. Flue-curing, long recommended, was seriously begun in 1930. In 3 successive years the number of flue-curing barns

increased from 8 to 88 to 150 and (in 1933) 400 or 500. The Government and the tobacco manufacturers subsidized the construction of a large number. As a result flue-cured tobacco amounted to 80,000 pounds in 1931 and 1,350,000 pounds in 1934. Except for drought, a much larger crop of flue-cured would have been marketed in 1933.

The slower rate of expansion of tobacco exports from the Union is ascribed to the fact that the Union's tobacco has not proved popular with European buyers. The growing of flue-cured tobacco will probably open the way for at least a moderate export demand. If so, production will expand in the western Transvaal (table 97).

TABLE 97.—*Tobacco: Acreage and production, Union of South Africa and Swaziland, 1910–11 to 1932–33*

ACREAGE

Year beginning July 1	Union of South Africa					Swaziland	
	On land occupied by Europeans		On land occupied by natives		Total	On land occupied by Europeans	On land occupied by natives
	Virginian types	Turkish	On European-owned farms	On native reserves			
	Acres	*Acres*	*Acres* [1]	*Acres* [1]	*Acres* [1]	*Acres*	*Acres*
1917–18	23,125	(2)					
1919–20	25,809	(2)					
1920–21	26,563	(2)					
1921–22	19,324	(2)					
1922–23	17,643	1,657					
1923–24	19,410	2,105				243	24
1924–25	22,167	1,393				352	13
1925–26	24,355	1,890				671	3
1926–27	37,327	2,011				1,033	10
1927–28	37,914	2,506				1,865	5
1928–29	21,008	2,830				1,839	11
1929–30	19,341	2,759				497	(3)
1930–31						439	59

PRODUCTION

	1,000 lb.	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*
1910–11					14,961		
1917–18	12,502	(3)		2,429	14,931		
1918–19	14,183	(3)		(3)			
1919–20	11,643	(3)		(3)			
1920–21	15,007	(3)		1,614	16,621	286	(3)
1921–22	9,813	(3)		(3)		274	(3)
1922–23	8,048	519	(4)	1,104	9,671	322	(3)
1923–24	9,860	816	(4)	730	11,406	271	8
1924–25	12,072	691	(4)	959	13,722	255	1
1925–26	14,261	1,015	129	1,111	16,516	700	(3)
1926–27	19,129	763	311	1,177	37,380	1,214	1
1927–28	20,579	1,172	260	1,082	23,102	1,294	1
1928–29	12,157	1,089	(4)	(4)		1,281	2
1929–30	[5] 11,962	[5] 1,611	(4)	(4)		595	(3)
1930–31	[6 7] 14,789	[5] 1,685	(4)	(4)		531	60
1931–32	[6 7] 20,700	[5] 400	(4)	(4)		(3)	(3)
1932–33	[5 7] 9,265	35	(4)	(4)		(3)	(3)
1933–34	[6 7] 13,725	175	(4)	(4)		(3)	(3)

[1] Not enumerated.
[2] Included with figure in preceding column.
[3] Not available.
[4] Included in European production.
[5] Less than 500 pounds.
[6] Estimated on basis of cooperative receipts representing over 70 percent of the crop; census figures for 1929–30 used as a basis for estimating the remaining 30 percent. In previous years census enumerations were below actual deliveries; in 1930, 9 percent for Virginian, 15 percent for Turkish.
[7] Including 80,000 pounds of flue-cured in 1930–31; 507,000 pounds in 1931–32, 533,000 pounds in 1932–33 and 1,350,000 pounds in 1933–34.

Union of South Africa agricultural census reports and agricultural officer, Mbabane, Swaziland.

A small quantity of tobacco is grown in Swaziland near the Piet Retief district in the Union. Nearly all of this production is by Europeans. Acreage increased from 267 acres in 1923–24 to 1,865 acres in 1927–28 but then dropped to 489 acres in 1930–31. Production varied accordingly from 279,000 pounds up to 1,295,000 pounds and then back to 591,000 pounds. This tobacco is marketed in the Union. In fact, it is marketed under the compulsory cooperation law of the Union. It may be considered as an additional part of the Union's supply.

The production of tobacco has been attempted in South-West Africa, but the 1923–24 crop of 130,000 pounds is the highest reported, and since then production has been insignificant.

FIGURE 65.—Early-planted tobacco near Brits, Transvaal Province. The bottom leaves have been damaged by hail. The plants had already been topped when photographed Jan. 23, 1932.

METHODS AND COSTS OF PRODUCTION OF VIRGINIAN-TYPE TOBACCO

Virginian-tobacco production is scattered throughout the entire coastal area and throughout the Transvaal, particularly in the western Transvaal. The Virginian-tobacco production is centered in Transvaal, particularly in the magisterial districts of Brits and Rustenburg, lying just northwest of Pretoria (fig. 65). Minor producing areas are in eastern Transvaal in the vicinity of Barberton, along the coast just north and south of Durban, in the Kat River Valley between East London and Port Elizabeth, in the vicinity of Oudtshoorn (which is between Port Elizabeth and Capetown), and to a slight degree in the irrigated areas around Piquetburg and Clanwilliam. These minor areas produce chiefly a heavy dark tobacco used for pipe tobacco, snuff, or the native trade.

The principal tobacco-producing region in western Transvaal is characterized by gently rolling land at elevations approximating 4,000 feet above sea level, a frost period of about 70 days, and an

annual rainfall of about 25 inches, most of which falls in the summer months between November and March (table 98). As irrigation is almost always necessary, the tobacco areas follow the small rivers, most of which are dry until the summer rains come. In a few instances storage reservoirs normally provide water at all seasons. The soil is the calcareous yet sticky black turf, red loam, or brown sand.

TABLE 98.—*Normal rainfall and seasonal tobacco operations, Transvaal, Union of South Africa*

Month	Rainfall at—			Tobacco operation
	Rustenburg	Brits	Nylstroom	
	Inches	*Inches*	*Inches*	
January	4.51	4.32	5.62	Top and sucker.
February	3.86	3.74	3.55	Spray and sucker.
March	4.13	4.32	4.22	Harvest and cure.
April	1.09	1.78	1.17	Sow wheat.
May	.83	1.12	.64	Market tobacco.
June	.11	.10	.14	Do.
July	.31	.16	.17	
August	.55	.40	.54	Sow tobacco seed beds.
September	.62	.70	.45	
October	1.70	2.13	1.88	Harvest wheat.
November	3.59	3.70	3.71	Plant tobacco and corn.
December	3.87	4.01	3.84	Cultivate tobacco.
Total	25.17	26.54	25.93	

In the Brits tobacco area there are about 800 settlers who have acquired land from the Government under the Hartebeestpoort irrigation project. In addition, there are about 600 private owners with private water rights who own over half of the land in this area. The 800 settlers produced about 1,000,000 pounds of tobacco in 1931 and the 600 private owners about 700,000 pounds.

The future of tobacco production can be better judged if a typical tobacco farm can be visualized showing tobacco production in relation to the other competing enterprises.

Tobacco farms in the Union are usually well diversified as to sources of income. The average tobacco farm in the western Transvaal, as determined by a farm-management study, consists of 676 acres including 28 acres of irrigable land, 49 acres of dry land, 1 acre of orchard, and 598 acres of grazing land. About 17 acres of grazing land per animal unit is required, not considering the cattle and other livestock belonging to native squatters who live on the owner's farm. Livestock valued at $1,067 consists chiefly of 2 or 3 spans of 8 to 14 oxen (worth about $30 per ox), a few oxen being fattened for slaughter, 9 cows, and an occasional team of horses, donkeys, or mules. Horses and sheep are unprofitable owing to certain diseases that occur in this region. Dairy products, poultry, and hogs are produced for home consumption. Machinery averages $638 per farm, improvements $2,927, and the land itself $6,661 (about $10 per acre) (*23*).

Tobacco averages 9.7 acres, wheat 10.2 acres, corn 18.9 acres, and other crops 3.6 acres per farm. Over half the tobacco growers have less than 6 acres of tobacco. The average yield (1927–28)

on 131 tobacco farms was 687 pounds per acre, worth 11 cents per pound, although 8 farms had over 1,400 pounds per acre worth 14½ cents per pound. Wheat yielded 16 bushels and corn 10 bushels. Corn is seldom grown on irrigated land.

The tobacco land is usually rested a year after the wheat crop is harvested. The average income in 1927–28 consisted of tobacco $740, wheat $181, cotton $55, other crops $171, livestock sales $138, livestock products $23, and other receipts $31. The value of home-used products was $236. Expenses for hired labor, $487, were 40 percent of total farm expenses. The average wage rate was $1.21 per day for Europeans and 41 cents per day for natives. The net income averaged $548, which even in that year of favorable prices was not sufficient to cover the interest and the value of family labor. Only 7 out of 131 farmers earned over $1,000 for their own labor.

The average cost of producing tobacco was $91 per acre, of which man labor was 52 percent, animal labor 2.2 percent, fertilizer 7.3 percent, and interest on land 11.7 percent (including tobacco land resting as well as in crop). It required about 72 days of man labor and 58 days of animal labor per acre of tobacco. Fertilizer consisted of 3½ tons of kraal manure and 247 pounds of commercial fertilizer. The cost per pound in this particular year and on these farms averaged 13 cents, which was 2 cents more than the average price received. The cost per acre is generally considered to be about $75, as compared with $100 for Turkish tobacco grown near Capetown (*53, p. 155*).

The most remarkable feature in the management of these farms is the use of so many oxen at so low a cost per day, 3.6 cents per ox. A span of 14 oxen costs only one-tenth as much per day as a team of four horses in Virginia. Oxen are eventually fattened for slaughter and do not depreciate in value. Grazing, sometimes forage, and interest, constitute the principal costs of animal labor. The low cost of man labor (41 cents a day for natives) is also surprising to Americans.

The average presents a somewhat distorted picture owing to the inclusion of large farms in the Nylstroom (Waterburg) district. Around Brits (below the Hartebeestpoort Dam) there is much less grazing land, little corn is planted, and there is almost no dry land cropping, while the value of the land per acre is much higher ($35 to $75 per acre). Tobacco yields around Brits are 15 to 20 percent higher than the average quoted above.

Practically all of the tobacco produced in the Union is air-cured and dark. There is no open fire-curing. The principal varieties grown for air-curing are Piet Retief Swazie, Groot Swazie, and Kort Swazie, while Joiner is an important light tobacco and Sterling an important red tobacco.

The most common tobacco grown for air-curing is Boer grown from a seed of unknown origin, from which improved strains are now being selected. Swazi-boer tobacco is one of these strains. It is a leaf of considerable body and high wax content and produces tobacco that cures with a dark or light color, depending upon the characteristics of the soil. Two varieties of tobacco are beginning to be flue-cured in the Rustenburg-Brits area—Hickory Pryor and Amorilla. The former is grown from seed obtained in the

United States, while the latter is grown from seed obtained originally from Brazil. Amorilla is, in many respects, similar to white burley, such as is grown in the United States.

Higher prices are paid for the light tobacco because of color preference on the part of the consumer, in spite of the fact that dealers claim the dark tobacco is often sweeter, and much better flavored than the light. In the Rustenburg area nearly 40 percent was classed as light leaf in 1930, but for the entire Union the percentage was only 12. An effort was made in the Rustenburg area to produce 50 percent light tobacco in 1930, but this goal was not reached, owing to heavy rains that occurred during the ripening and curing season.

With proper care and attention seed sown in July and August will give plants in October and November, which are usually the best months for planting. Seed beds are burned, prepared, planted, and covered with cloth, as in the United States. From 5,000 to 7,500 plants are set per acre. Tobacco plants are transplanted to lands from which winter wheat has been harvested. Lack of moisture often delays part or all of the planting, and additional seed beds are planted in September. In the Rustenburg area on January 29, 1932, some of the tobacco crops had been harvested for 3 or 4 weeks, while other crops, planted later, showed only 2 to 4 leaves, and there was still talk of planting additional fields if rains were obtained within the next 2 weeks.

The acreage planted to tobacco depends partly on the success of the farmers in getting an ample supply of plants from their seed beds. This in turn depends upon the germination of seed, the effects of drought, earth fleas, and wildfire. The weather at harvesting time determines in some measure the proportion of the crop that will be of the cigarette type, heavy rains being unsuitable (*7, p. 489*).

The application of phosphates, and to a small extent potash, increases the percentage of cigarette leaf, while nitrogen decreases it. Lime had no bad effect on the quality of the leaf produced on the acid soil. Kraal manure gives the largest yield, and the largest profit, but it gives a lower percentage of cigarette leaf than does the complete fertilizer. A combination of kraal manure and phosphates gives the highest yield of good-quality tobacco, providing the nitrogen content is not too high.

Delivery of Virginian tobacco to the warehouses begins in April and reaches its peak in July. Most of the flue-cured tobacco in the Union is cured and delivered in February to April. The air-cured tobacco takes longer to cure, but most of it is cured by June. It is delivered over a period extending to September or October (figs. 66 and 67).

Tobacco produced in the Union is generally considered too low in quality for export without Government aid. Before 1922, apart from Turkish tobacco, the quantity of cigarette leaf obtained from the Union crop was from 15 to 18 percent in the large producing districts of the Transvaal, from 10 to 12 percent in Oudtshoorn districts, and only 5 percent in some other districts. The bulk of the tobacco was suited only for various grades of pipe and roll tobacco. The imposition of an excise duty, at the same time overproduction

occurred, destroyed the demand for inferior grades, and reduced demand for the darker types of tobacco. Farmers, therefore, found it advantageous to adopt improved methods of curing which would result in a higher proportion of cigarette leaf (fig. 68).

FIGURE 66.—A typical grass-thatched shed used for air-curing tobacco near Rustenburg, Transvaal Province. The shed was being filled on February 1, 1932.

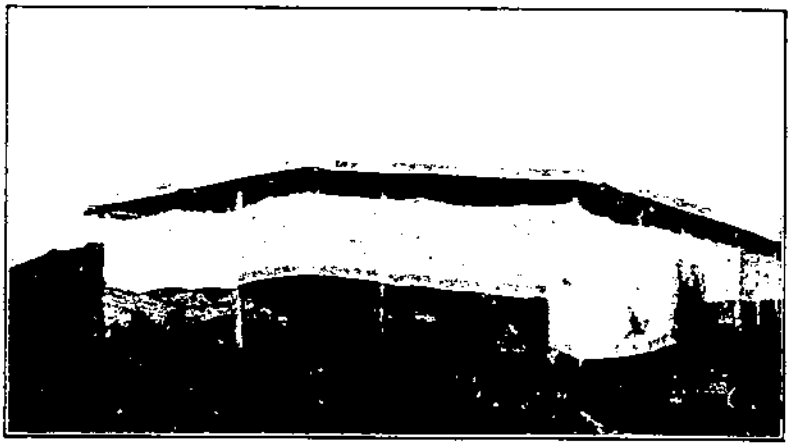

FIGURE 67.—A typical air-curing shed roofed with corrugated iron. Photographed May 16, 1931, near Brits, Transvaal Province, when filled with tobacco. These sheds permit rainy weather to discolor part of the tobacco.

Most of the Union tobacco crop, except Turkish, is cut with whole stalk rather than primed or cut with split stalk. Experiments have shown, however, that the percentage of cigarette leaf has been increased by the practice of priming.

Some of the air-curing sheds are built of grass; except in wet weather these give satisfactory results (fig. 66). Tobacco grown on the black turf soils in Rustenburg tends to turn yellow on the land

and to cure out a better color in a corrugated-iron curing shed in which curing is hastened. Virginian types grown in the summer-rainfall area are particularly subject to damage through excessive rains during the drying period. The tobacco may actually rot in the shed, or the leaves may become darkened and unfit for the cigarette trade, which prefers yellow-cured leaves, so that the tobacco must be used for pipe tobacco. When the tobacco is properly conditioned the leaf is graded into several grades according to color and other quality characteristics. These separate grades are stacked in bulks about 6 feet wide and about 6 feet high, where they remain for 6 or 8 weeks before being baled and sent to market or to the cooperative warehouse.

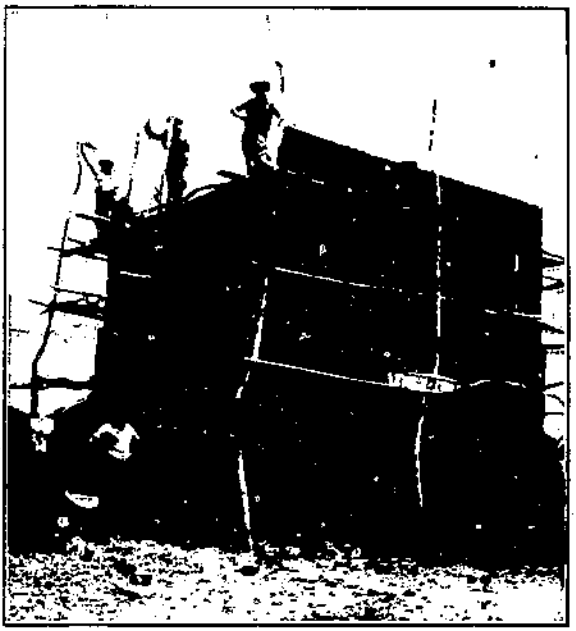

FIGURE 68.—One of about 500 new flue-curing tobacco barns built near Rustenburg during 1930 to 1933.

Tobacco pests and diseases cause considerable annual loss. Tobacco leaf beetle (*Lema bilimeata*) occurs generally throughout South Africa excepting in the Turkish-tobacco area. Wildfire (*Bacterium tobacum*) and angular spot occur in Turkish-tobacco districts and Virginian districts in Transvaal as well as in Rhodesia. Tobacco mosaic appears both on Virginian and Turkish tobacco. Tobacco wilt, caused by fungus (*Fusarium oxysporum*), has occurred in the Kat River Valley.

Tobacco yields per acre in the Union of South Africa, as reported by the census, are conspicuously low. They are not influenced by yields on the acreage grown by natives since the census does not enumerate native acreages. The averages are based entirely on European production. Variations during the 7-year period for which such information is available are enlightening (table 99).

METHODS AND COSTS OF PRODUCTION OF TURKISH TOBACCO

Turkish-tobacco production is confined to six magisterial districts located within 80 miles of Capetown in the winter-rainfall area. The principal districts are Stellenbosch, Somerset West, Paarl, Wellington, and Tulbagh. The southern portion centers around Stellenbosch and Somerset West, the northern portion around Malmesbury and Tulbagh. The southern area has produced in recent years 75 percent

of the Turkish-tobacco production of the western Cape Province. The expansion of Turkish-tobacco acreage and production has been more moderate, but contraction has already set in because exportation of South African Turkish tobacco has not been found to be possible.

TABLE 90.—*Tobacco: Yields per acre, on land occupied by Europeans, Union of South Africa, 1922–23 to 1929–30*

Year beginning July 1	Virginian type	Turkish type	Year beginning July 1	Virginian type	Turkish type	Year beginning July 1	Virginian type	Turkish type
	Pounds	*Pounds*		*Pounds*	*Pounds*		*Pounds*	*Pounds*
1922–23	456	313	1925–26	586	536	1928–29	502	385
1923–24	507	372	1926–27	512	380	1929–30 [1]	618	585
1924–25	545	496	1927–28	542	467			

[1] Calculated on production as estimated from deliveries instead of as enumerated by the census.

The peculiar geographical advantages which determine the location of Turkish-tobacco growing in these areas are: (1) Annual rainfall of approximately 25 inches, most of which comes during the winter, (2) hot and dry summers with infrequent rains, (3) proximity to the coast, and (4) suitable soils, including red loam, red clay loam, blue-gray loam, and sandy loam, all of which are free from excessive clay, are well drained and not too wet.

Turkish-tobacco seeds were introduced from Turkey in 1903. In 1904, 2 acres of Soulook variety were planted and produced nearly 1,000 pounds. In 1908, production amounted to 10,000 pounds; in 1909, 16,000 pounds; in 1910, 56,700 pounds. The 1930–31 crop of Turkish tobacco in the Union amounted to approximately 750,000 pounds. The price ranged from 24 to 67 cents per pound according to quality, averaging approximately 55 cents per pound. In 1921 the production was still less than the demand in the Union, but in Southern Rhodesia Turkish-tobacco production, only recently begun, had already approached an annual production of 500,000 pounds (*39*).

In 1923 Soulook was the only variety grown although it constitutes only 25 percent of the proper Turkish cigarette. Macedonian and Thracian types supply about 50 percent of the Turkish tobacco used and Samsoun makes up the remaining 25 percent of the blend (*39*).

Turkish-tobacco varieties now include Soulook, a heavy-bearing variety of excellent quality, and Dubek, the hardiest of all Turkish-tobacco varieties. It is considered desirable to grow several recognized varieties of Turkish tobacco, not only Soulook, but the Kavalla, Samsoun, and Bafra which are necessary for the proper blend in Turkish cigarettes.

Seed beds are prepared, fertilized, and planted in May and June. If this midwinter season is too dry, the plants are watered by hand. The tobacco lands are well cultivated during the winter rainy season, fertilized with 1½ to 3 tons of sheep manure per acre, plowed repeatedly, and in September fertilized with 300 to 500 pounds of fertilizer per acre. In September the tobacco plants are transplanted 8 inches apart in rows 3 feet apart. The rainfall after September is usually very small. Thereafter the land is regularly cultivated, but the plants are not irrigated and are not topped.

Harvesting begins in November and continues to the last of February. The leaves are picked at intervals of about 12 days, beginning at the bottom. Three or four leaves are picked each time. The leaves are then classed according to size, strung on needles, and stripped off onto strings tied to reeds. The leaves are then wilted for 3 or 4 days in a cool, dark room with moderate ventilation for the development of a yellow color. They are then transferred to the racks in the open for further drying. Canvas may be used to protect the leaves from wind and excessive sun. After 15 or 20 days the reeds of tobacco are spread on grass lawns, dry grass, or canvas, constituting the drying camp. The leaves are turned every morning and left until the midrib is quite dry. The tobacco is then stacked in a shed, graded, and baled into bales weighing about 80 pounds. These bales are sent to the Cooperative Tobacco Growers' Co. which, under compulsory cooperation, handles all of the tobacco.

The average tobacco farm, as revealed in a farm-management study, contained 400 acres, of which 143 acres were in crops consisting of 18 acres in tobacco, 44 acres in wine grapes, 13 acres in fruit trees, 59 acres in grain (chiefly wheat and oats), and 9 acres in other crops. Livestock is unimportant and consists usually of a few mules, 1 or 2 horses, a few cows, and a number of pigs and fowl. On a few farms dairy and poultry farming is carried on as a supplementary enterprise.

These 69 tobacco farms ranged in size from 8½ acres to 3,950 acres, but 40 of them had less than 315 acres, and only 11 had less than 104 acres.

The acreage of tobacco per farm on these 69 farms varied widely. One farm had less than 6 acres, while eight farms had more than 27 acres. The most common acreages were approximately 11 acres and, again, 24 acres. Half of the farms had less than 17 acres of tobacco. Tobacco farming was most profitable when combined with wine production as the labor distribution is then more equal. Tobacco is harvested from December to February or March, whereas wine making begins in February or March. Only 10 of the farms had no vineyard, and 1 farm had as much as 190 acres. On the other hand 23 farms had no orchard; and the largest orchard on these farms was only 74 acres.

Of these farms, 17 grew no grain, but 5 farms grew more than 200 acres, the maximum being 468 acres. The grain farms occur chiefly in the northern area near Malmesbury.

The average value of these farms was £7,416 ($36,091), of which £4,812 ($23,418) was land, £1,913 ($9,310) buildings and improvements, £417 ($2,029) equipment, and £274 ($1,333) livestock. The average value per acre of land was $49. In the southern area, where the farms are smaller and better suited for fruit growing, the average value was $68 per acre, while in the northern semigrain area, the average was $21.

The year 1929–30 must have been a profitable year in this area. Operator's earnings averaged $1,353 after allowing 5 percent interest on capital. Receipts averaged £1,598 ($7,777), of which 52 percent was from tobacco and 24 percent from wine. Expenses averaged £964 ($4,691), of which £110 ($535) was for European labor, £383 ($1,864) for colored labor, and £147 ($715) for fertilizer. Operator's

earnings increased at least to a certain point in proportion to increase in size of farm, in proportion to increase in capital investment, in proportion to the increase in labor expenses; increased slightly in proportion to the percentage receipts from tobacco, and more noticeably in proportion to the receipts from wine. The very large farms made poor use of their pasturage and did not justify the capitalization placed upon these lands.

The average yield of tobacco per acre was 564 pounds. There was 1 farm with less than 100 pounds per acre and at the other extreme 1 farm with over 850 pounds per acre, but the majority had yields between 475 and 750 pounds per acre. The 10 most profitable farms averaged 728 pounds per acre with an average production cost of 14 cents per pound, including land rent, while the 10 least profitable farms averaged only 292 pounds per acre, the average production cost of which was 42 cents per pound, including land rent.

Turkish-tobacco yields are very low in every producing district. This is more readily understood since Turkish tobacco is grown without irrigation in the winter-rainfall area where there is practically no rain except at the beginning of the growing season. Turkish-tobacco yields were lowest in the Paarl district, where the acreage has been consistently declining, and in the outlying and unimportant district of Ceres. Turkish-tobacco yields are highest in Stellenbosch and Somerset West, where the acreage has been increasing most rapidly.

The price received per pound averaged 40 cents, but varied widely. One farmer received 26 cents per pound, whereas at the other extreme two farmers received more than 57 cents per pound, but the majority received between 36 cents and 42 cents per pound. There was no apparent relation between the yield per acre and the quality of the crop as measured by the price received.

The chief expenses were for wages. The average expenses per farm were as follows:

Wages of Europeans	$536.88
Wages of regular colored labor	1,419.15
Wages of temporary colored labor (chiefly women and children)	444.27
Operating expenses	1,205.75
Livestock	256.28
Equipment repairs	115.19
Depreciation on equipment	181.72
Depreciation on improvements	406.56
Total	4,565.80

The monthly wages of the European foreman averaged £4 ($19.47) cash, and £5 ($24.33) for board and lodging. The average daily wage for adult colored labor was 2 shillings 6 pence (61 cents) in cash, 3 pence (6 cents) in wine (6 tots), and 3 pence (6 cents) for a dwelling house. The daily cost of colored children was 1 shilling 6 pence (36 cents) cash, with nothing additional for wine or extra accommodation. The average annual wage rate of a white foreman was £108 ($525.59), representing continuous supervision, while the average annual wage of adult colored laborers, £39 ($189.80), and of colored youngsters £19½ ($94.90), represents only 5 days of work per week.

The lowest production cost per pound was 11 cents and the highest 67 cents. The lowest price received was 27 cents per pound and the highest 71 cents. The average cost per pound was 23 cents as compared with an average price of 40 cents. The profitableness of the Turkish-tobacco enterprise in 1929–30 is evidenced by the fact that only 5 of the 69 growers received a price lower than cost of production.

METHODS OF MARKETING

Eight cooperative tobacco associations handle tobacco in the Union. Five of these are companies with limited liability, while three are societies with unlimited liability. The total membership in 1929 was 8,374, and the total value of tobacco sold for members was $1,935,257.

The conditions that surround the marketing of tobacco in South Africa are somewhat unique. The Cooperative Societies Act of 1922 was amended in 1925 so that all the tobacco grown in certain designated districts must be delivered to the cooperative associations. The significant clause is the frequently mentioned section 17 of the amended act, which reads in part as follows:

> (1) Whenever the Minister is satisfied that in any district, area, or province, at least seventy-five percent of the producers of any kind of agricultural product are the producers of at least seventy-five per cent of such produce produced in that district, area, or province and are members of a cooperative agricultural society or company registered under the principal Act, or any amendment thereof, and which has as one of its objects the disposal of that kind of agricultural produce, the Minister may, at the request of such society or company, by notice in the Gazette declare that, from a date to be stated in the notice, each producer of that kind of produce, in such district, area, or province as shall be named in the notice, shall sell such produce produced by him through the said society or company whether he be a member thereof or not. . .
>
> (5) For the purpose of this section the term "agricultural produce" means tobacco, and shall also include any other product derived by farming operations whether or not such product has undergone a change of form as the result of some process applied to it, if the Governor General under the authority of a resolution of both Houses of Parliament, has, by proclamation in the Gazette declared such product to be agricultural Produce.

The Western Province Tobacco Growers Co., a cooperative, controls the sale of all the tobacco grown in the six important Turkish-tobacco growing districts near Capetown. Seven other tobacco associations deal with the Virginian type of tobacco and control approximately 92 percent of that type of leaf grown in South Africa. Compulsory cooperation has been applied to the areas in which the Magaliesberg, Pietersburg, Vaal River, Piet Retief, Paulpietersburg, and the Kango associations operate, but not to the Kat River and Barberton areas.

The associations handling Virginian tobacco, with the exception of the Kat River Tobacco Co., are all members of the Sentrale Kooperatiewe Tabakmaatskappy van Suid Afrika, Beperk, which leaves the actual sale of the tobacco to the member association, but attempts to obtain uniformity in price policies. Before the compulsory cooperation legislation came into effect in 1925, there were three cooperative tobacco associations with a combined membership of 3,752, and a general produce association which handled a large quantity of tobacco, with a membership of about 200. These associations, long

established, had done much to improve tobacco-marketing conditions. Since 1925 the local associations have increased to seven in number and their combined membership to nearly 8,800. The Sentrale association is the eighth. The remarkable increase in production between 1925 and 1928 was partly attributable to the confidence inspired by compulsory cooperation, but recent accumulation of stocks, for which greatly reduced prices have more recently been accepted, have served to emphasize the limitations of compulsory cooperation. (*50, p. 32.*)

Farmers in the outlying districts, inaccessible to the cooperative warehouses, sell their tobacco to local storekeepers frequently on the basis of half cash and half trade. The better the customer the better price the storekeeper is inclined to offer, regardless of quality (*17*). Some manufacturers send itinerant buyers to deal directly with farmers. Some farmers buy from their neighbors tobacco that they manufacture into rolls and dispose of on a "tog" or trading expedition (*17, p. 338*).

The effect of a high tax on heavy and dark tobacco is to induce natives to produce at their own kraals tobacco sufficient for their own use and a surplus for sale to their friends.

The Union Department of Agriculture actively promotes cooperative organization by favorable legislation and otherwise. In 1924 loans were granted to two cooperative tobacco societies at Magaliesberg and western Cape Province to enable them to expand their work. The Government also agreed to make loans to farmers at Oudtshoorn, Stockenstroom, and Piet Retief for the erection of a warehouse at each of these places on condition that a cooperative society be formed which would make itself responsible for the loan. The loan was to be without interest for 5 years and repayable thereafter in instalments with interest (*19, p. 211*).

Railage costs are very small. The Government railway rates on South African tobacco railed for export per ton of 2,000 pounds are as follows:

100 miles	$1.89
200 miles	2.94
300 miles	3.04
500 miles	3.28
1,000 miles	4.26

The rail distance from Johannesburg to Capetown is 958 miles; to Port Elizabeth, 713 miles; to East London, 666 miles; and to Durban, 486 miles.

Since 1930 there has been an import duty of 85 cents per pound on unmanufactured tobacco, excepting a quota of 2,000,000 pounds of Virginian and 400,000 pounds of Turkish from Southern Rhodesia, and 400,000 pounds of tobacco from Northern Rhodesia. In addition there is an excise tax levied by the Government on tobacco manufactured into cigarettes in the Union, amounting to 12 cents per pound. Compensating duties apply to manufactured tobacco—$1.22 per pound for manufactured tobacco and $1.95 per pound for cigarettes. Stripped tobacco is classed as manufactured. On manufactured tobacco and cigarettes from the Rhodesias a rebate of 75 percent is allowed.

In addition to the above, a cigarette excise tax and surtax is collected by stamps affixed to each container at the factory or, in the case of imported cigarettes, at or before the time of importation. This amounts to 1½ cents for each half ounce net weight or fraction thereof (48 cents per pound) and is applicable to all cigarettes manufactured in the Union whether they are from tobacco grown or produced in the Union, or from imported tobacco, or from a mixture of the two, and in the same way on all cigarettes imported for consumption in the Union. The cigarette surtax law has remained in its present form since 1922, and the excise tax of 12 cents per pound has prevailed since 1925.

The number of tobacco factories in the Union has varied since 1915 between 58 and 66, the number in 1931 being 62. The 57 factories in the year 1929–30 used 11,698,000 pounds (68 percent) of tobacco grown in the Union of South Africa, 5,412,227 pounds of tobacco imported from Rhodesia, and 129,002 pounds of tobacco imported from other countries. The cost of the Union-grown tobacco was $2,605,777. These quantities reflect a gradual diminution followed by an increase (1927–28 to 1929–30) in the quantities of Rhodesian and other imported tobacco and an increase followed by a decrease in the proportion of Union-produced tobacco. In 1925–26 the ratio between Rhodesian and Union-produced tobacco used in these factories was 41 to 100, in 1927–28 it was 31 to 100, and in 1929–30 it was 46 to 100. This apparently indicates a change in consumer preferences (table 100).

TABLE 100.—*Tobacco: Value per pound entering into manufacture, Union of South Africa, 1925–26 to 1929–30*

Origin	1925–26	1926–27	1927–28	1928–29	1929–30
	Cents	*Cents*	*Cents*	*Cents*	*Cents*
Union of South Africa	19	21	24	23	22
Rhodesia	35	42	42	34	30
Imported	156	146	134	140	38

Other materials used in the manufacture of tobacco by these factories in 1929–30 cost $127,726, not including the cost of packing materials, which was $1,584,683. The products of 57 factories in 1929–30 consisted of 2,650,814,592 cigarettes; 5,228,978 cigars and cheroots; 10,927,872 pounds of smoking tobacco; and 93,286 pounds of snuff; and, in addition, a certain quantity of sheep dip or waste leaf and other articles. The combined value of these manufactured articles was $13,387,245, of which 74 percent was cigarettes, 25 percent smoking tobacco, and 1 percent cigars and cheroots. The average value of cigarettes was $3.72 per thousand; the average value of smoking tobacco was 31 cents per pound, and of snuff 46 cents per pound; while the value of cigars and cheroots averaged only $1.89 per hundred.

Tobacco waste is used for a fertilizer, at an estimated value of 2 cents per pound; as livestock medicine; and as raw material for the manufacture of nicotine, which seems to have a value somewhat higher than that of the waste used as a fertilizer. The preparation

of nicotine almost destroys the value of the residual product as a fertilizer. With tobacco extract containing 7½ percent of nicotine retailing at about 27 shillings ($6.57) per gallon, from 23 to 80 pounds of tobacco costing from $1.95 to $11.81 will be required for the manufacture of 1 gallon of extract (*34, p. 269*). The nicotine contained in heavy types of South African air-cured tobacco, such as that grown in the districts of Barberton, Piet Retief, Potchefstroom, Vredefort, Oudtshoorn, and Piquetburg varies between 2.17 and 5.86 percent. The content in the lighter class of tobacco, such as is grown in the Magaliesberg district, Kat River Valley, part of the Oudtshoorn district, and in Natal, varies from 0.22 to 3.03 percent. Pondo tobacco (*Nicotiana rustica*) sometimes grown by the natives, tested 9.45 percent of nicotine.

Tobacco handled by the cooperative at Rustenburg in 1932–33 was packed in cases 42 by 24 by 26 inches outside measurement or in bales 33 by 25 by 32 inches, weighing 200 to 240 pounds instead of 400 to 450 pounds as formerly. Tobacco for export is packed in boxes. The average moisture content of tobacco packed for sale is 9 percent. Proposed regulations specify 11 to 14 percent for consignments to Great Britain and 13 to 17 percent for tobacco consigned elsewhere.

The tobacco control bill was passed by the Union Government in May 1932. It aims to increase the price of tobacco by requiring the export of a certain quota percentage of designated grades. The bill is patterned in a general way after the Mealie (corn) Control Act, 1931. A similar principle is also applied to butter and cheese. The bill provides that the Minister of Agriculture may declare each year certain percentages of the various types of tobacco which must be exported. Each tobacco buyer or manufacturer must be licensed and must keep and report a full record of all his transactions as proof that he has complied with the act.

It will be much more difficult to carry out these provisions with respect to tobacco than with respect to corn because of the many types and grades of tobacco, some of which are all wanted for manufacture in South Africa, some are wanted primarily for export, while others, although not wanted in South Africa, are not wanted elsewhere. The accurate definition and segregation of these various types and grades, and the application of an export quota to each, will present a rather difficult problem. It would seem to be particularly difficult to prevent evasion of the law. Any material expansion in the exportable surplus will reduce the effectiveness of the law.

To the extent that the proposed law is successful, prices to manufacturers in South Africa will be increased above the export-price level. This will encourage production in the Union and hinder the marketing of cigarettes and other manufactured tobacco outside of the Union of South Africa, thereby limiting South African manufacturers to domestic demand, unless a scheme can be worked out for permitting the exportable portion to be exported in manufactured form. This will be extremely difficult in view of the blending of different grades and types in the process of manufacture.

South African manufacturers may not object to this in view of the fact that the company which controls practically 90 percent of the total manufactures of the Union also has a factory at Salisbury, Southern Rhodesia, which can and will manufacture tobacco for sale in Southern Rhodesia, Northern Rhodesia, Belgian Congo, and adjoining territories unaffected by the handicap of higher cost for raw materials.

The bill represents the fourth attempt to obtain Government aid for the tobacco industry. In the first instance the cooperative attempted to have the compulsory cooperation clause applied to the entire Union of South Africa. It now applies only to certain districts where 75 percent of the producers growing 75 percent of the tobacco have voluntarily agreed to come under its provisions. The Minister for Agriculture would not agree to making it apply to the other districts. In the second instance the cooperative asked that the allowance of 2,000,000 pounds of Virginian tobacco and 400,000 pounds of Turkish tobacco from Southern Rhodesia and 500,000 pounds of tobacco from Northern Rhodesia, all of which were then entering the Union of South Africa duty free, be subject to the same duty paid by all other tobacco imported. The Minister of Agriculture did not agree to this. As a third alternative, the cooperative proposed a levy on all tobacco grown in the Union for the creation of a fund with which to subsidize exports. This plan had previously been applied to other products, such as butter and cheese, but the Minister for Agriculture did not believe this to be a feasible plan when applied to tobacco. Finally, the present plan was proposed.

Although the production of tobacco in the Union in 1931–32 was slightly over 21,000,000 pounds, no export quota was declared; but in 1933, when the crop was estimated at only 10,000,000 pounds, the Union Government fixed the tobacco-export quota percentage for a period of 12 months ended May 31, 1934, at 25 percent of all tobacco (other than Turkish and flue-cured tobacco) purchased by dealers. As the consumption of tobacco by factories in the Union amounts to about 17,000,000 pounds per year, including approximately 2,400,000 pounds imported duty free from Rhodesia, but not including 1,000,000 or 2,000,000 pounds of Union tobacco sold annually by growers to the native trade, it is apparent that a reduction in stocks on hand is inevitable. To give effect to this law, regulations were published in April 1933 requiring that licenses be obtained by tobacco traders and that tobacco traders furnish monthly returns of tobacco purchased and certificates of proof of export.

No tobacco trader's license is required of anyone importing tobacco or buying tobacco from the grower or manufacturing tobacco from any district, provided the tobacco manufactured is rolled tobacco from water-moistened leaf amounting in manufactured form to not more than 600 pounds per year. This exemption applies chiefly to small growers in the Oudtshoorn area who do their own manufacturing of rolled tobacco.

All others must obtain a tobacco trader's license at a cost of 5 shillings for each set of business premises and must keep records in the prescribed forms showing the date when the tobacco was acquired; person from whom acquired; classification of such persons, as tobacco

traders or growers; quantities acquired, classified as Turkish tobacco, flue-cured tobacco, and other tobacco; date of sale or disposal of tobacco; names and addresses of those to whom sold; quantities sold, classified in the same way; and stocks of each class of tobacco on hand at the end of each calendar month. Loss of weight in process of manufacture must be similarly accounted for. The foregoing information must be reported to the Government each month in the prescribed form.

Proof of export of the prescribed quota percentage (25 percent of purchases other than Turkish and flue-cured during the first year) must be submitted to the Government in prescribed form within 14 days after the end of the period prescribed for the export of such tobacco. The tobacco export-quota percentage must be exported within 120 days after the end of the calendar month during which such tobacco was imported, purchased, or acquired. Tobacco acquired from a tobacco trader, having been already subject to the quota percentage, is not subject to a second quota. Any tobacco trader may enter into agreement with a cooperative organization (presumably the Central Cooperative Tobacco Association of South Africa, Ltd.) to export his quota, but such agreement must be entered into within 30 days after the calendar month during which he imported or otherwise acquired such tobacco. Such cooperative organization must export the said tobacco within 90 days after the date of such agreement. Tobacco subject to the quota percentage of tobacco acquired before the publication of the export-quota percentage must be exported within 120 days after the end of the calendar month (April 1933) during which such tobacco export-quota percentage is fixed.

The Union also published, in April 1933, regulations bringing all tobacco under the provisions of the law which requires that it must be inspected as to grade and quality by Government inspectors before being exported. The regulations governing exports are as follows:

It shall consist of whole-leaf tobacco or stripts.

It must be thoroughly and properly fermented in stacks prior to grading and baling thereof.

It must be carefully graded in accordance with the standard grades appearing in the schedule hereunder.

All tobacco, except stripts, must be tied in hands and packed in straight-laid fashion in cases or bales containing 200 to 240 pounds of tobacco, and the contents must be firmly pressed so that the package becomes a compact parcel. Stripts are to be straight-laid but untied and packed as above.

All tobacco must be in sound, good keeping condition, and the moisture content of tobacco consigned to Great Britain and the Irish Free State must be not less than 11 percent or more than 14 percent. Tobacco consigned elsewhere must contain not less than 13 percent or more than 17 percent of moisture.

Each case or bale shall consist only of one and the same grade of any particular type of tobacco.

Each case or bale shall have clearly stenciled on it the place of origin and the grade of its contents, and be numbered consecutively.

Cases containing tobacco for export must be made of new, strong shooks, and the outside measurement of the case shall be 32 inches long, 24 inches wide, and 26 inches deep. The inside of the four sides of the case must be lined with waterproof paper.

Bales of tobacco for export must be approximately 33 inches long, 25 inches wide, and 32 inches deep. The tobacco in each bale must be firmly pressed and the bale protected with 1 baling stick at each of the 4 side corners. Each bale must be tied with four baling wires and completely covered with new hessian tightly sewn on.

All tobacco for export must be inspected by inspectors appointed by the Minister prior to export.

The inspector shall inspect not less than 10 percent of any one consignment. Such inspection shall take place at the following centers: Rustenburg, Brits, Nelspruit, Pietersburg, Piet Retief, Parys, Oudtshoorn, Paarl, Durban, and Port Elizabeth.

Every exporter shall give notice to the Secretary for Agriculture of his intention to export. Such notice shall specify the time, and the place from which the export is to take place, and the quantity of tobacco to be exported, and shall be given at least 21 days before shipment or railing.

An inspection fee of 6 pence (12 cents) per bale or case shall be paid by the consignor for every bale or case proposed to be exported by him. Payment of the inspection fees shall be made within 7 days after inspection.

Should a consignment or part thereof be withdrawn from shipment after having been inspected and necessitate another inspection, a further 6 pence per bale or case will be charged.

The application of the tobacco export-quota law renews South African interest in tobacco-export markets. The South African delegation at the Ottawa Conference asked for a 3-shilling (73 cents) preference on Virginia tobacco and a 4-shilling (97 cents) preference on Turkish tobacco. The guarantee of a continuation for 10 years of the present preference of 2 shillings one-half pence (50 cents) per pound was considerably short of the benefits requested. The failure to receive increased preference hastens the day when the export quota under the scheme recently adopted will sell for so little that further expansion in the Union will be unprofitable.

TOBACCO GRADES

A schedule of grades accompanies these regulations that provides for 19 grades of flue-cured tobacco, and 18 grades of air-cured tobacco classified according to color, length, and quality.

Prior to the inauguration of these official grades a well-defined system of grading had been established by the M. K. T. V. (cooperative). The grade standards have been changed from time to time, and the number has been increased to allow for more accurate grading. From 1912 to 1920 there were 9 grades; in 1928 there were 10 grades of light and red tobacco and 8 grades of dark tobacco. Descriptions are almost useless to designate these grades. The proportion of the 12,622,908 pounds of tobacco handled in 1928 from the five producing districts of the western Transvaal, falling into each of the designated grades, is shown in table 101.

PRICES

Tobacco prices in the Union of South Africa and Southern Rhodesia have not fluctuated in sympathy with tobacco prices in the United States. Prices in the Union are determined primarily by the local supply and demand since exports are only a small part of the Union's production. Compulsory cooperation, import quotas, tariffs, and export quotas have recently accentuated the isolation of tobacco prices in the Union.

In making these comparisons Turkish tobacco has been eliminated from the Union figures since it is not grown in the United States and its prices in the Union is 40 to 55 cents per pound in different years—much higher than the usual 10 to 15 cents for Virginian (non-Turkish) types.

TABLE 101.—*Tobacco: Grade and value per pound in the western Transvaal, 1928*

Grade	Rustenburg	Groot Marico	Nylstroom	Brits	Magaliesberg	Total	Value
Light red:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Cents*
A1	0.01			0.01		0.01	49
A2	.06	0.00	0.01	.06		.05	41
A2s	.04	.04	.01	.08		.05	38
A3	.41	.43	.03	.58	0.01	.39	32
A4	1.59	.82	.37	3.33	.06	1.81	26
A4s	2.30	.96	.31	4.26	.07	2.39	20
DL	5.64	1.88	3.00	10.76	1.09	6.28	18
GL	6.46	2.38	2.77	14.05	1.82	7.71	12
HL	6.39	1.40	2.50	17.38	1.02	8.64	7
A4M	.82	.24	.61	1.45	.01	.88	8
Dark:							
DS	.12		.02	.04	.03	.06	18
D	5.63	7.66	8.39	3.15	2.01	5.11	14
E	13.85	18.41	20.52	7.30	11.52	12.79	12
F	16.07	21.00	18.31	7.54	17.14	14.15	10
G	14.83	19.98	19.55	11.72	23.01	15.51	7
H	20.38	18.77	15.53	13.44	30.43	18.10	4
DKFM	2.46	1.98	3.63	2.28	5.23	2.71	4
DIP	2.94	4.02	4.44	2.76	5.86	3.38	½

Pretorius (28, *pp. 80–81*).

During the years 1912 to 1916 prices to producers fluctuated around 9 cents per pound in the Union and 11 cents in the United States. During the period 1917 to 1925 American prices were generally much higher (31 cents in 1919), while prices in the Union were only 2 or 3 cents higher. During the years 1926 to 1932, with British preferential duties in effect, American prices declined from about 20 to 10 cents per pound, whereas prices in the Union rose to 23½ cents in 1926 and, except in 1929, have not fallen below 12 cents. Compulsory cooperation in the Union since 1925 has also had its effect on local prices.

The cost of Union tobacco bought by tobacco manufacturers gradually rose from 15 cents per pound in 1918 to 24 cents in 1927 and has declined only slightly since that time. In 1918 this price was much lower than the price in the United States, but after 1925 it was higher.

The value per pound of tobacco exported from the Union is a less reliable indicator of the average value of the Union's crop since so small a part is exported, but it is more important as an indicator of competition in Europe with American tobacco. The exports of leaf tobacco and pipe tobacco (cigars and cigarettes excluded) were valued at prices which steadily diminished from 1911 to 1923 (from 39 down to 10 cents per pound) as exports increased from 85,000 to 2,300,000 pounds per year. Since that time exports of this class of tobacco from the Union have been less than 1,000,000 pounds per year (except in 1930) and have been valued at 35 to 55 cents per pound (except in 1929 and 1930). The British preferential tariff of 1925 had a decided influence on these prices except for the surplus of inferior tobacco which had to be sold at bargain prices in 1929–30.

The Rhodesian tobacco cost Union manufacturers twice as much as Union tobacco until 1927. Between 1927 and 1929 the cost of Rhodesian tobacco fell almost to the level of Union tobacco (table 100).

The value of tobacco exported from Southern Rhodesia rose from 24 cents per pound in 1924 to 39 cents in 1927 and then dropped to about 20 cents per pound. This is less than half of the export price of Union tobacco but the Rhodesian tobacco exports represent almost the full production while the Union tobacco exports represent only a small part of the Union's crop.

At the cooperative warehouse at Rustenburg, 15 grades of flue-cured tobacco were made in 1932. The first advance to growers was based on the estimated valuation. The estimated valuation of the top grade in 1932 was 2 shillings 3 pence (55 cents) per pound; 3 pence (6 cents) per pound separated the valuation placed on the grades above 1 shilling (24 cents); 2 pence (4 cents) or 1 penny (2 cents) separated the valuation of the lower grades. The lowest valuation was 4 pence (8 cents) per pound. Valuations placed on bright grades were 2 pence lower than the previous year and valuations placed on red grades were 1 penny lower than the previous year, and on dark grades from par to 1 penny lower. These lower valuations were established to take care of any losses incurred on exporting a portion of the crop.

The cooperative established selling prices to manufacturers in the Union at exactly the same level as the previous year, except that a different method was used for disposing of dark tobacco. Buyers of dark tobacco paid 6 pence (12 cents) per pound for lots composed of proportionate quantities of all grades of dark tobacco. Lower grades could not be bought for less than 6 pence per pound. Higher grades might be bought at 7½ pence (15 cents) per pound. Manufacturers naturally buy all grades of dark tobacco at the flat price (table 102).

SOUTHERN RHODESIA

TREND OF PRODUCTION

The best quality of tobacco and the largest exportable surplus from southern Africa comes from the colony of Southern Rhodesia.

The trend of production in Southern Rhodesia has been fluctuating. Tobacco was grown by the pioneer settlers as early as 1895, and tobacco was grown by natives for many generations before this, dating probably from the introduction of tobacco seed by the early Portuguese explorers. Between 1910 and 1913 the commercial acreage assumed some importance. The crop harvested in 1913 totaled over 3,000,000 pounds, but owing to a disagreement with visiting buyers difficulty was experienced in marketing the crop, and the production did not again reach 3,000,000 pounds until 1920. Between 1925–26 and 1927–28 the production rapidly expanded to 25,000,000 pounds owing to the increase in Imperial preference (from one-sixth to one-fourth of the full import duty) and to the influx of new settlers. Surplus stocks and unfavorable prices caused production to drop below 6,000,000 pounds in 1929–30, but since that date production has again expanded rapidly. The 1932–33 crop was more than 15,000,000 pounds and a further expansion of acreage, 25 percent, occurred in 1933–34 (table 103).

The center of the Rhodesian tobacco industry is just north of Salisbury, but some growers are scattered from Umtali to Bulawayo.

The production of tobacco in Southern Rhodesia has been erratic, reaching peaks in 1914, 1928, and 1934. Marketing difficulties have curtailed production after each boom.

TABLE 102.—*Tobacco: Average price per pound in the United States, Union of South Africa, and Southern Rhodesia, 1910–32* [1]

Year of harvest	United States price to producers [2]	Union of South Africa					Southern Rhodesia	
		Average farm price [3]		Western Transvaal price [4]	Cost per pound to manufacturers [5]	Value of exports [3]	Cost to manufacturers in the Union [5]	Value of exports [6]
		Virginian type	Turkish type					
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	9.3					32.9		
1911	9.4					38.7		
1912	10.8			10.7		34.3		
1913	12.8			8.8		20.8		
1914	9.8			7.2		36.6		
1915	9.1			8.8		28.8		
1916	14.7			9.7		26.2		
1917	24.0			11.8		28.5		
1918	28.0	12	55	10.5	15.0	29.0	31.2	
1919	31.2	11½	50	12.1	16.9	25.2	31.6	
1920	17.3	11	41	13.2	15.1	23.3	31.3	
1921	19.5	14	46	8.2	16.4	28.5	35.8	
1922	22.8	11	50	9.5	17.7	10.5	33.9	
1923	19.0	10	55	10.2	17.0	10.0	31.0	
1924	19.0	11	52	9.4	15.8	21.7	28.9	24.4
1925	10.8	11	56	12.6	19.2	42.2	35.1	29.4
1926	17.9	23½	51	20.5	20.8	54.9	42.5	37.
1927	20.7	18	52	12.5	24.3	45.4	41.6	38.7
1928	20.0	12	45	9.5	23.1	34.9	34.4	28.0
1929	16.6	10	43		22.3	20.7	29.9	19.0
1930	12.9	13½	42			9.2		21.8
1931	8.2					49.5		23.3
1932	10.7					54.0		20.1

[1] Prices 1919 to 1924 (except the United States) were lowered because of calculation at lower exchange rate.
[2] U. S. Department of Agriculture Yearbook 1933 (*3, p. 497*) price received by producers, all types, price Dec. 1, 1910 to 1918, weighted average price for marketing season thereafter.
[3] Union of South Africa official year books. Exports are manufactured and pipe tobacco (cigars and cigarettes excluded).
[4] Average price paid to producers (for Virginian type) by the Magaliesberg Kooperatiewe Tobakplanters Vereniging for each year of harvest; includes second payments and occasional extra bonus payments. Taken from Pretorius (*28, p. 79*).
[5] South Rhodesia official year books (*37, no. 2, p. 657; no. 3, p. 567*) Trade of Southern Rhodesia 1932 (*38, p. 145*); unmanufactured, excluding scrap tobacco.

Value converted at prevailing rates of exchange.

The number of growers increased from 75 in 1915–16 to 987 in 1927–28 and 527 in 1931–32. The total number of tobacco barns on the 527 farms was 2,860, of which 1,908 were used in 1931; 323 new barns were built in 1931 and about as many more for the 1932–33 crop. The total number of tobacco barns in the colony in 1932 was 4,342, of which 1,533 were idle because of geographical realinement of the industry whereby outlying areas have discontinued production and the industry has become centered just north of Salisbury.

An unlimited area of land in Southern Rhodesia might be planted to tobacco, for about 90 percent of the flue-cured tobacco is grown on sand veld and 10 percent on contact soil, that is, the margin between the red-clay loams and the sandy gravelly soils of decomposed granite. About three-fourths of the land settled by Europeans is sand veld, but some red soil occurs on nearly every farm.

Fire-cured tobacco is grown entirely on the red or clay loams. The amount of this land is very large in relation to the tobacco

acreage. The first fire-curing was done in 1920. There was considerable expansion of this type up to 1932, but little further expansion of dark fire-cured tobacco is likely to occur because the demand for this type is not great and the Rhodesian growers are not inclined to enter into competition with the natives of Nyasaland in the production of this type. Expansion will be chiefly in flue-cured tobacco (fig. 69).

TABLE 103.—*Tobacco: Acreage and production by type, Southern Rhodesia, 1917–18 to 1932–33*

ACREAGE

Year beginning July 1	Virginian types					Turkish type	Total all types
	Flue-cured	Fire-cured	Sun and air-cured	Inyorka	Total Virginian types		
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
1925–26					13,160	755	13,915
1926–27					29,172	992	30,164
1927–28	45,199	207	103	202	45,711	911	46,622
1928–29	15,190	1,307	156	108	16,761	1,023	17,784
1929–30	8,602	995	48	36	9,681	787	10,468
1930–31	13,545	1,733	8	31	15,317	828	16,145
1931–32	20,815	3,499	21	59	24,394	1,276	25,670
1932–33	31,402	1,822	187	(1)	33,411	971	34,382
1933–34	39,500	1,750	200	(1)	41,450	1,597	43,047

PRODUCTION, CURED WEIGHT

	1,000 lb.	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*
1917–18							620
1925–26					5,313	347	5,660
1926–27					18,631	633	19,264
1927–28	24,263	102	34	93	24,492	452	24,943
1928–29	6,060	562	49	34	6,705	337	7,042
1929–30	4,887	573	22	12	5,494	350	5,844
1930–31	7,234	1,025	2	8	8,269	375	8,644
1931–32	12,687	2,081	13	14	14,795	573	15,368
1932–33	12,927	788	57	5	13,777	393	14,170
1933–34	23,737	737					

PRODUCTION OF SALABLE TOBACCO, PACKED WEIGHT[2]

1931–32	12,000	1,700	27	(1)	13,727	426	14,153

[1] Included with figure in preceding column.

[2] Percentage of cured weight: Flue-cured, 94.6, fire-cured, 81.6, Turkish, 74.4. Disposed of in recent years about as follows: Local consumption, 720,000 pounds; quota to Union of South Africa (flue-cured), 2,000,000 pounds; (Turkish), 400,000 pounds; exported, including cigarettes, to Northern Rhodesia, 130,000 pounds; to overseas countries, remainder.

SOUTHERN RHODESIA, OFFICIAL TOBACCO ENQUIRY. October 1932. SOUTHERN RHODESIA GOVERNMENT STATISTICAL BUREAU. CROP ESTIMATES, 1932-33. Econ. and Statis. Bull. (n. s.) 1 (3): 11, 1933. [Mimeographed.]

Turkish tobacco is grown on either sand veld or red soils, but the market demand is limited and production is not likely to expand.

METHODS OF PRODUCTION

The principal tobacco-producing areas in Southern Rhodesia lie around and more especially north of Salisbury. During the last 17 years production has shifted from southeast to northwest of Salisbury. In 1933 one-half of the total production, including Turkish, was grown in Lomagundi and Mazoe districts. There is one farm

with about 300 acres of Turkish tobacco near Bulawayo, but the other outlying acreages are small.

The average acreage of tobacco per farm in 1930–31 was 45 acres. Of 429 growers, 118 grew 10 acres and under, 88 between 11 and 20 acres, 66 between 21 and 30 acres, and only 2 more than 300 acres. The farms are large; cattle, corn, cotton, and other enterprises also occupy the farmers' attention. Rainfall around Salisbury averages 30 to 35 inches, and nearly all of it comes between November and March. Seven inches per month is normal during the midsummer months, January and February. Transplanting (excepting Turkish) is done during November and December, earlier if rainfall permits. At the beginning of March harvesting operations are under way, occasionally during February, and by the end of May are prac-

FIGURE 69.—Flue-curing tobacco barns, near Salisbury, Southern Rhodesia. These barns are built of brick and are capable of curing tobacco from several hundred acres.

tically completed. Delivery to the warehouses is at its peak at the beginning of May. The Turkish crop is planted later and approaches harvest in June.

At first white burley tobacco was grown for air-curing, but more recently flue-curing has predominated, with some fire-curing. The bright cigarette tobacco for flue-curing is grown on the lighter and more sandy soils, frequently decomposed granite, while the dark fire-cured tobacco used for smoking mixtures is grown on the heavier and more fertile soils. This is analagous to the situation found in Virginia and the Carolinas. It is, therefore, surprising to note that only about 175 to 200 pounds of blood-meal mixed fertilizer, analyzing 18–6–8[16] and costing, in 1932, £16 15 shillings ($82 at par) per ton, are used per acre. Also popular, is a slightly smaller application of 20–7–10 analysis fertilizer costing, in 1932, £18 ($88 at par) per ton. In Virginia the growers apply 800 to 1,000 pounds per acre of 8–3–5 or 8–3–3 fertilizer.

The dark fire-cured tobacco grown in Southern Rhodesia is fertilized somewhat more heavily. Many Rhodesians use from 400 to 500 pounds of 12–6–8 fertilizer, while the Virginians growing this

[16] Percentages of phosphorus, nitrogen, and potassium, respectively.

type of tobacco usually apply 300 to 500 pounds of 8–3–3 and depend upon a leguminous crop to supply most of the nitrogen.

The average intended applications of fertilizer per acre in 1932 in Southern Rhodesia were: Flue-cured, 219 pounds; fire-cured, 281 pounds; and Turkish, 194 pounds; kraal manure, all types, 95 pounds. These quantities were considerably less than in 1931.

Fertilizer is the most important cash item in the cost of producing tobacco. In Virginia it costs $15 to $20 per acre of flue-cured tobacco; the fertilizer for a field of tobacco yielding 800 pounds per acre would cost 2 cents per pound of tobacco. It is therefore apparent that the economy in the use of fertilizer in Southern Rhodesia is an item of no small importance, especially when used in conjunction with native labor costing only 30 to 50 cents per day. On the other hand, yields per acre are considerably less than in the United States.

The use of chlorides (54 pounds per acre of muriate of potash) is believed to make Rhodesian flue-cured more nearly equal in quality to American flue-cured tobacco.

No tobacco-cost investigations have been conducted in Southern Rhodesia, but several estimates by individual growers of Virginian type have ranged from 12 to 16 cents per pound. These costs are about equal to recent prices, although much below averages of 50 cents per pound, best grades 85 cents, obtained during the 1927–28 boom.

Yields per acre have been increasing during the last 10 years, but the crop, grown without irrigation, is always subject to occasional droughts and wide annual fluctuations. In 1918 the average yield was 191 pounds per acre as contrasted with a record yield of 639 pounds in 1927. In 4 consecutive 5-year periods (1914–33) yields have averaged 398, 351, 470, and 519 pounds. In the United States the yields, excluding cigar types, average about 700 pounds per acre, with flue-cured tobacco only slightly lower.

The grading of tobacco in Southern Rhodesia is performed by native girls who sort according to color, texture, and freedom from blemishes. The three color classifications—lemon, orange, and chocolate—are designated as brights, mediums, and darks. Each of these sorts is subdivided into unblemished, blemished, and green, designated as straights, perished, and green. Only those leaves that are slightly tinged with green are so classified. Leaves showing a preponderance of green are discarded as unsalable. Each sort is then subdivided according to 3 grades of texture, making in all 27 grades. There are, in addition, several extra grades of tobacco that do not conform to the regular classes. The grades are designated by the letters of the key word—Salisbury. By adding the letter P, blemished tobacco is indicated; by adding G, greening tinge is indicated. The main Rhodesian grades are: Brights, BS, BA, BL; mediums, MI, MS, MB; and darks, DU, DR, DY.

At first the tobacco was sold as loose leaf at local warehouses by private treaty, but between 1910 and 1913 the auction system was used. The Rhodesian Tobacco Cooperative Society then undertook to warehouse and sell the tobacco. In 1923 this cooperative was taken over by the Rhodesian Tobacco Warehouse & Export Co., Ltd., also operated on cooperative lines. The proportion of the crop now

handled by this cooperative is not large. The auction-marketing system was again tried in 1928, but it was quickly abandoned. The crop is now sold to local tobacco buyers by private treaty or is consigned to overseas brokers. Overseas consignments have often remained unsold for so long that dissatisfaction has resulted. There are several commercial grading warehouses in Salisbury and similar establishments exist in some of the outlying areas. Most of the tobacco is bought by a leading tobacco company of Great Britain and by visiting representatives of other tobacco firms. Two leading tobacco-manufacturing firms in the Union of South Africa operate two large factories at Salisbury and a few small factories also manufacture low-grade tobacco for native consumption.

In 1930 the quantity of Southern Rhodesian tobacco allowed entrance to the Union duty-free was limited to 2,000,000 pounds of Virginia type and 400,000 pounds of Turkish type. The Southern Rhodesia Tobacco Board was formed to apportion the quantities of leaf sold to manufacturers in the Union at prices agreed under contract, and to control the sale of locally grown tobacco required for manufacture in Southern Rhodesia.

COSTS OF MARKETING

In 1932 the cost of ocean freight to European berth ports was 7.16 pence per pound from Union berth ports in case of unmanufactured tobacco, and 55 shillings 6 pence ($13.50) per shipping ton of 40 cubic feet from Beira. The rate on manufactured tobacco was 92 shillings 6 pence ($22.50) per shipping ton from Union berth ports.

EXPORTS

Most of the exports consist of unmanufactured leaf. In 1929–30 the total value of the crop was estimated to be $2,068,050, of which 9 percent was consumed in Southern Rhodesia, 20 percent exported in the form of cigarettes and manufactured tobacco, and 71 percent exported as unmanufactured leaf (table 104). In 1930 when the quantity of leaf tobacco to be exported was approximately 3,000,000 pounds, a single British tobacco company purchased in Southern Rhodesia about 2,000,000 pounds, while about 1,000,000 pounds was consigned to overseas tobacco brokers.

TABLE 104.—*Tobacco: Exports, Southern Rhodesia, 1929–33*

Form of export	1929	1930	1931	1932	1933
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Unmanufactured	[1] 11,993,693	6,814,135	[2] 7,821,296	[3] 13,281,675	[4] 12,154,742
Cigars	529	572	742	390	.....
Cigarettes	52,814	165,021	180,237	115,168	105,329
Other	34,541	76,623	83,464	73,140	48,285
Total	12,081,577	7,056,351	8,085,739	13,470,311	12,308,356

[1] About 10 percent stripts.
[2] To countries overseas, 5,511,207 pounds; to Union of South Africa, 2,300,721 pounds.
[3] To countries overseas, 10,927,501 pounds; to Union of South Africa, 2,354,121 pounds.
[4] To countries overseas, 10,048,189 pounds; to Union of South Africa, 2,100,553 pounds.

Trade of Southern Rhodesia, quarterly and annual reports, calendar years.

Prior to September 1931 Empire tobacco was admitted to the United Kingdom at a duty rate of 7 shillings 6 pence ($1.82) as compared with 10 shillings ($2.43) per pound for foreign-grown leaf tobacco. This was a preference of 25 percent. Since that time, the duty on both foreign- and Empire-grown tobacco has been increased 8 pence (16 cents) per pound, so that the preference is still the absolute amount of 2 shillings 0½ penny (50 cents), but this is less than 25 percent of the new rate.

In 1928 42 British manufacturers were known to be using Rhodesian leaf, while in 1931 there were 72. In 1928 there were 43 brands of cigarettes containing the Rhodesian leaf, as compared with 50 in 1931. In 1928 there were 131 pipe mixtures containing Rhodesian tobacco, as against 272 in 1931. Approximately 90 percent of the colonial tobacco manufactured in 1930 went into pipe-smoking mixtures. This includes all the Indian tobacco, practically all the Nyasaland tobacco, and the major portion of Canadian and Rhodesian tobaccos. It is claimed that 1 ounce in every pound of smoking tobacco now manufactured in Great Britain represents tobacco from Nyasaland and Northern Rhodesia. Since only 20 or 30 percent of the tobacco manufactured in Great Britain is made into pipe mixtures the maximum market for pipe-smoking tobacco is about 37,000,000 pounds, although it is possible that a vogue for pipe smoking might increase the demand for colonial tobacco, it is generally recognized that the cultivation of the taste of the public for an American-Rhodesian blended cigarette offers the best possibility for expanding the market for Rhodesian tobacco. This requires the production of bright tobacco of good quality and good-burning characteristics (table 105).

The estimated 46,000,000 black people under the British flag north of the Zambesi River are looked upon as a potential market for large quantities of the lower-quality tobacco which is grown in Southern Rhodesia.

PRICES

The average declared value per pound of unmanufactured leaf tobacco exported in 1930 was 10¾ pence (21.79 cents) per pound. Deducting 2 to 2¾ pence (4 to 5.57 cents) for handling, packing, etc., gives 8 to 8.75 pence (16.22 to 17.74 cents) per pound as the gross return to the grower.

The average price paid for flue-cured tobacco in Southern Rhodesia during the 1931–32 season was approximately 7½ pence (15 cents) per pound, as compared with 7 pence (14 cents) during the previous year. On the other hand, prices for dark fire-cured tobacco were slightly above 8 pence (16 cents) per pound during the season, as compared with 10 pence (20 cents) during the previous year, when the large percentage of wrapper leaves gave this tobacco added value.

GOVERNMENT AIDS

Under the terms of article 6 of the draft agreement between Britain and Southern Rhodesia, as arranged by the Imperial Economic Conference in 1932, the United Kingdom invited Parliament to pass legislation securing, for the period of 10 years, to tobacco which

complies with the regulations, the existing margin of preference over foreign tobacco, so long as the duty on foreign unmanufactured tobacco does not fall below 2 shillings ½ penny (50 cents) per pound; in that event the margin of preference should be equal to the full duty. The agreement between the United Kingdom and Southern Rhodesia specifies that Britain will also endeavor to assist in marketing Southern Rhodesian tobacco.

TABLE 105.—*Consumption in the United Kingdom of tobacco grown in the British Empire and in Southern Rhodesia, 1926–33*

Calendar year	Consumption of tobacco grown in—			Calendar year	Consumption of tobacco grown in—		
	British Empire	Southern Rhodesia [1]			British Empire	Southern Rhodesia [1]	
		Total	Percentage of British Empire			Total	Percentage of British Empire
	Pounds	*Pounds*	*Percent*		*Pounds*	*Pounds*	*Percent*
1926	19,850,000	1,098,000	5.53	1930	29,818,000	5,322,000	17.85
1927	22,799,000	2,000,000	8.77	1931	[2] 32,782,000	[3] 6,202,000	19.10
1928	26,634,000	4,095,000	15.38	1932		7,884,000	
1929	28,599,000	5,067,000	17.72	1933		[4] 8,923,135	

[1] Based on deliveries, London, Liverpool, and Glasgow. The total consumption is slightly greater, being 5,600,000 pounds in 1930 (vide returns H. M. Customs and Excise).
[2] Only 10 percent is suitable for cigarettes, although 75 percent of United Kingdom demand is for cigarette manufacture.
[3] Chiefly flue-cured cigarette tobacco—fire-cured tobacco meets severe competition from native-grown tobacco, fire-cured, from Nyasaland and Uganda.
[4] April 1933 to March 1934.

D. D. Brown, chief tobacco expert, Department of Agriculture, Southern Rhodesia, quoting figures from the high commissioner, London. S. Rhodesia Econom. and Statis. Bul., May 7, 1934. [Mimeographed.]

The agreement between the United Kingdom and Southern Rhodesia provides that the former will advise the nonselfgoverning colonies and protectorates to accord to the latter any preferences granted other parts of the Empire and to adjust their customs duties on cigarettes and manufactured tobacco in order to impose a lesser duty on tobacco grown and manufactured in the Empire.

NORTHERN RHODESIA

The Fort Jameson district, near Nyasaland, produces nearly all of the tobacco produced in Northern Rhodesia. The season is similar to that at Salisbury, Southern Rhodesia, and the harvesting is usually completed during May. About 90 percent of the 1931–32 crop was flue-cured and 10 percent sun-cured. There was little, if any, fire-cured or air-cured leaf. The 1930–31 crop of tobacco in the Fort Jameson district was 892,000 pounds of Virginian tobacco, of which 350,000 pounds was exported to the Union of South Africa and 400,000 pounds to the United Kingdom; the remainder was held back for subsequent export. Production has decreased about one-half since 1925–26 owing to marketing difficulties. No major expansion is to be expected in Northern Rhodesia in the near future (table 106).

TABLE 106.—*Tobacco: Acreage, production, and yield per acre, Northern Rhodesia, 1924–25 to 1931–32* [1]

Year beginning July 1	Acreage	Production	Yield per acre	Year beginning July 1	Acreage	Production	Yield per acre
	Acres	*1,000 pounds*	*Pounds*		*Acres*	*1,000 pounds*	*Pounds*
1924–25	4,321	1,397	323	1928–29	3,232	1,447	448
1925–26	4,936	2,070	419	1929–30	3,487	1,318	378
1926–27	6,719	3,006	447	1930–31	(?)	(?) 892	
1927–28	7,339	3,249	443	1931–32	2,472	1,185	479

[1] Chiefly flue-cured. Grown by Europeans only.
[2] Unknown.
[3] Chief agriculturist, Northern Rhodesia Department of Agriculture, correspondence.

Northern Rhodesia Department of Agriculture Annual Report (*ex. Rept. 1930*) and International Institute of Agriculture.

NYASALAND

TREND OF PRODUCTION

Nyasaland ranks with Southern Rhodesia and the Union of South Africa as one of the three important tobacco-producing countries in southern Africa. Nyasaland extends in a narrow strip along the west shore of Lake Nyasa. Its width is more than 100 miles in only a few places, but it extends north and south for about 600 miles. Its total area is 47,949 square miles, of which 37,596 are land area. The total population in 1929 was 1,936 Europeans, 1,117 Asiatics, and 1,456,945 natives. The Europeans are engaged chiefly as government officials, missionaries, and traders. Only a small part of the tobacco is produced by Europeans, and most of this part is produced by native tenants, as the supply of native labor is very unreliable as long as they can satisfy their needs for cash by growing a little tobacco themselves. In 1930 the European-grown crop amounted to only 3,034,000 pounds of flue-cured and 1,208,000 pounds of dark fire-cured tobacco, as against 9,452,000 pounds of native-grown dark fire-cured. The European-grown tobacco acreage in 1929–30 was only 17,481 acres (table 107).

The construction of the Zambesi bridge and an extension of the railway in the north is looked upon as favorable to the extension of tobacco cultivation in Nyasaland. In the northern province tobacco stands well in the field, which makes it possible to harvest it when fairly ripe. Flue-cured tobacco is expected to increase as the more favorable sandy and sandy loam soils of this province are exploited despite the recent decrease in the southern province. It is claimed that 40,000,000 pounds of tobacco could easily be produced annually in the northern areas of Nyasaland. Furthermore, it is proposed to open additional areas in the central province, by the construction of wells, pumps, and windmills. The supply of water at the end of the dry season, tobacco seed-bed time, is one of the limiting factors everywhere in Nyasaland.

Since 1917, Nyasaland has changed from producing bright or semi-bright flue-cured tobacco to the production of heavy-bodied dark fire-cured, for which there is a demand in England, probably for pipe tobacco. In 1917 only 5 percent was dark tobacco, and this was produced mostly by native growers. In 1924 dark tobacco rep-

resented 14 percent; in 1925, 33 percent; in 1927, 43 percent; and in 1930, 73.5 percent of the total tobacco production (table 108). At the same time the area has expanded and moved northward.

TABLE 107.—*Tobacco: Acreage, production, yield per acre, and exports during calendar year of harvest to the United Kingdom, Nyasaland, 1910–11 to 1932–33*

Year beginning July [1]	On land occupied by—					Imported by United Kingdom from Nyasaland	
	Europeans			Natives			
	Acreage	Production	Yield per acre	Registered growers	Production	Quantity	Percent of total imports of Empire-grown tobacco
	Acres	*1,000 pounds*	*Pounds*	*Number*	*1,000 pounds*	*1,000 pounds*	*Percent*
1910–11	7,411	3,391	458				
1911–12	10,496	4,180	398				
1912–13	9,534	3,842	403				
1913–14	9,042	3,371	373				
1914–15	7,484	3,382	452				
1915–16	9,380	4,384	467				
1916–17	9,516	4,777	502				
1917–18	6,027	2,594	430				
1918–19	9,817	3,997	407			5,891	42.2
1919–20	14,218	3,844	270			5,506	30.2
1920–21	21,074	6,737	320			4,777	64.0
1921–22	18,554	6,511	351			6,735	53.0
1922–23	17,306	3,919	226		672	5,891	45.7
1923–24	20,590	7,312	355		1,176	6,882	35.8
1924–25	22,415	5,361	239		2,636	7,300	37.4
1925–26	22,908	6,447	281		4,532	9,158	31.6
1926–27	25,002	10,488	419	66,321	7,804	14,034	33.7
1927–28	22,475	9,112	405	34,761	5,407	13,492	30.4
1928–29	19,269	5,128	266	47,578	8,693	10,739	34.0
1929–30	17,481	6,509	372	48,419	9,482	12,903	35.1
1930–31	13,482	4,168	309	51,903	7,883	11,168	32.6
1931–32	[2] 14,314	[2] 6,252	437	[2] 53,044	13,225	15,006	31.4
1932–33 [3]	8,793	3,000	341		9,250	[4] 10,400	21.1

[1] Includes flue-cured, 8,459 acres; fire-cured, 5,058 acres; and air-cured, 799 acres; production—flue-cured 3,549,168 pounds; fire-cured, 2,317,840 pounds; and air-cured, 385,280 pounds.

[2] Estimated acreage native-grown 34,187, averaging 0.64 acre per grower and 387 pounds per acre, mostly, fire-cured.

[3] Preliminary.

[4] Nyasaland tobacco delivered out of bond for consumption in the United Kingdom and for reexport was 12,072,128 pounds, as compared with 11,141,964 pounds in 1932 and 10,496,088 pounds in 1931.

A. G. Hornby, agricultural chemist, Nyasaland Department of Agriculture, in Empire Production and Export, July 1931, p. 166; and Department of Agriculture, Nyasaland.

METHODS OF PRODUCTION AND MARKETING

The geographical distribution of the tobacco production in Nyasaland is shown in table 109.

Several areas in Nyasaland seem to be suitable for the production of tobacco. They vary in elevation from 1,645 feet, which is the elevation of Lake Nyasa, to 3,000 or 4,000 feet elevation. Small acreages of approximately 5 acres are replacing the large individual acreages formerly encountered. The land is rather mountainous, and much of it requires terracing. The soils have required little fertilizer during the period of clearing and moving on to raw land; but now that the old lands are being brought back into tobacco, it is necessary to use fertilizer. About 400 pounds of 10—5—8 [17] is recommended per acre.

[17] See footnote 16.

TABLE 108.—*Tobacco: Production by type, Nyasaland, selected years 1912–13 to 1930–31*

Type	1912–13	1913–14	1922–23	1923–24	1925–26	1926–27	1927–28	1928–29	1929–30	1930–31[1]
	1,000 lb.	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*	*1,000 lb.*
Flue-cured:										
Bright	1,644	1,673	3,920	4,945	4,479	9,132	6,043	2,893	3,034	2,590
Dark	2,206	1,697	(2)							
Air-cured				49		24	322	63	30	148
Dark fire-cured										[3] 7,953
European-grown				1,200	1,493	1,100	1,279	1,300	1,208	(2)
Native-grown			224	1,170	4,546	7,815	5,390	8,265	9,452	(2)
Total	3,850	3,370	4,144	7,364	10,518	18,071	13,034	12,521	[3] 13,733	10,691

[1] Exports; Nyasaland Department of Agriculture annual report (*24, Rept. 1931, p. 6*).
[2] Included in figure above.
[3] Actual production in 1929–30, European 6,508,768 pounds, native 9,481,732 pounds, total 15,990,500 pounds; in 1930–31, European 4,168,528 pounds, native 7,882,560 (7,883,139, Nyasaland Department of Agriculture annual report (*24, Rept. 1931, p. 7*)) pounds, total 12,051,088 pounds.

Correspondence, Sept. 17, 1931, Department of Agriculture, Nyasaland, derived from customs-export figures including conversion of stripts into leaf. Totals are slightly less than actual production.

TABLE 109.—*Tobacco: Acreage and production by districts, Nyasaland, 1929–30 and 1930–31*

District	1929–30			1930–31			
	On land occupied by—			On land occupied by—			
	Europeans		Natives	Europeans		Natives	
	Acreage	Production	Production[1]	Acreage	Production	Registered growers	Production[1]
	Acres	*Pounds*	*Pounds*	*Acres*	*Pounds*	*Number*	*Pounds*
Lower Shire							
Chikwawa	40	448		20			
Central Shire	338	108,640		207	47,936		
Cholo	4,673	1,804,096	147,840	4,044	1,353,520	296	53,760
Mlanje	1,405	455,280	477,120	967	303,280	3,585	488,320
Blantyre	2,422	885,808	441,280	1,152	399,280	1,137	185,920
Chiradzulu	1,122	351,212	1,023,680	624	163,744	7,245	618,240
Zomba	2,485	874,272	392,000	1,610	334,320	4,439	248,640
Upper Shire	111	46,816	1,120	82	30,688	386	1,120
South Nyasa	1,443	582,288	3,360	1,337	481,600	12	
Ncheu	1,410	556,768	91,840	1,409	433,440	869	116,480
Dedza	240	79,744	340,480	220	83,440	1,478	264,320
Fort Manning	360	103,936	58,240	125	57,120	663	107,120
Lilongwe	1,033	429,184	3,946,880	1,232	447,104	17,726	3,585,120
Dowa	385	181,552	2,154,880	432	130,592	10,852	1,747,200
Kota Kota			403,200			2,652	376,320
Kasungu	10	2,240				503	
Mombera							
West Nyasa							
North Nyasa	104	44,464		12	2,464		
Total	17,481	6,508,768	9,481,920	13,482	4,168,528	[2] 51,903	7,882,560

[1] District where sold, but not necessarily where grown.
[2] Registered growers have increased in the 3 preceding years from 34,761 in 1927–28. In that year 8 percent of the native growers were tenants on private estates, who usually sell to the European landowners. In 1930–31 this percentage had increased to 17 with a corresponding decrease in the percentage on Crown land, especially in Southern Province.

Nyasaland Department of Agriculture (*24, Repts. 1931, pp. 55–57; 1930, pp. 45–47*).

The diseases common to the United States are also common in Nyasaland. Wildfire and angular leaf spot have been moderately serious since 1923.

Rainfall in the principal producing areas varies from 25 to 50 inches per year. The distribution is unequal, and here, as in the

adjoining countries, most of the rain falls during the months of December, January, February, and March, and practically none falls from June to September, inclusive. Temperatures vary from an absolute minimum of around 50° F. to an absolute maximum of nearly 100° F. The mean minimum is 61° in July and August and 74° in December, while the mean maximum is around 90° every month. The quality of the crop depends upon the soil, rainfall, and variety, as well as the method of harvesting and curing. The optimum monthly rainfall in Nyasaland is about 3 inches during the season for planting, about 6 to 7 inches during the growing period, and about 4 to 5 inches during the ripening period. A monthly rainfall of 8 to 9 inches, although frequently encountered, is detrimental to the crop on account of the invasion of diseases. High yields of good-quality tobacco are associated with a monthly rainfall of 2 or 3 inches below normal during the ripening month. Excessive heat and drought at this time are rare in Nyasaland.

Planting time is so regulated that ripening takes place in the drier month of April. The topping stage is reached by February in the south or March in the north. Curing begins in March and ends in June. Deliveries to the warehouses reach a peak early in May. The average time from transplanting to harvesting is 102 days in the northern areas, and topping usually takes place 60 days after transplanting. Thorough ripening after topping promotes better color, texture, aroma, and fire-holding capacity.

Western D. N. variety is now used for producing most of the Nyasaland dark fire-cured tobacco, and has the ability to stand a long time after topping and priming. Gold leaf and Cash and some white burley for air curing are also grown.

The methods of the natives in Nyasaland are as follows (*21*) : The quantity of tobacco grown by each native is very small. The average grower receives between £2 and £3 (about $10 or $15), and only a few receive as much as £20 (about $100) for their crops. This money is used for the payment of taxes, amounting to 6 shillings ($1.46) per year levied on all male adult natives, and for the purchase of hats, shoes, and bicycles. There seems to be no desire for homes better than their primitive grass huts. The meager clothing they wear is hardly sufficient to protect them from temperatures which fall as low as 50° F. during marketing season, from May to July, but the desire for more clothing, obtainable through more tobacco and more money, is lacking. Otherwise production would be enormous. The gradual increases in their wants, together with encouragement by the Government, probably accounts for the steadily increasing production.

At the end of the season growers are persuaded to destroy the unsalable leaf that is left on their hands.

The Nyasaland Government maintains a native tobacco board. In 1926 it consisted of 2 tobacco supervisors, and in 1931 of 4 administrators, 11 European field men, and 215 native field men. Their work is mainly concentrated in the Lilongwe and Dowa districts, where they assist in the education of the native tobacco growers. The white supervisors spend 8 or 9 months of the year traveling from one native village to the next inspecting the growing crops, advising the growers, and giving practical demonstrations. These super-

visors are supported by a fee of 2 shillings 6 pence (61 cents) per 100 pounds of tobacco sold.

At market time all native-grown leaf must be graded and passed by the board's officers before being offered for sale. The grades in use in 1931 were: No. 1, wrapper, over 22 inches; no. 2, short wrapper, 18 to 22 inches; no. 3, filler, 9 to 18 inches; no. 4, nondescript.

In 1932 the native tobacco board maintained 8 central buying stations which opened in the northern province on May 18. The total number of buying booths was 96 and the number of buyers (principals) was 15. The total crop sold in the central buying stations of the native tobacco board was 4,880,915 pounds out of a total of 7,883,139 pounds of native-grown tobacco bought at all points. The average quantity of leaf sold per native grower was 165 pounds, and the average price in 1931 was slightly above 7 cents, so that the average grower received about $11.50 for his crop.

It is said that 1932 was the first year that properly graded tobacco was sold in supervised markets. These market places are enclosed by barbed wire and contain buying and storing sheds and temporary huts for the use of European buyers, all of which are constructed of grass. The markets open promptly at 7 a. m., and the bulk of the buying is finished by noon. A supervisor inspects each basket of tobacco before it is allowed to be offered for sale, and tobacco of inferior quality is not allowed to be sold, even though buyers may be willing to buy it. At some of the larger markets as many as 3,000 natives pass through the gates in a day, with tobacco amounting approximately to 60,000 pounds.

The buying is done under open verandas at the end of the grass sheds where the sellers crowd and jostle each other around the scales. The native sellers are well acquainted with the values of the different grades, and some of them ask to be told the price and weight of tobacco they are selling. Many natives are inclined to haggle and argue concerning the price, except during the rush hours. Accordingly, the buyers, in order to create a favorable impression, usually pay higher prices during the early part of the season and during the early morning hours than when a good flow of tobacco is being sold.

Tenant production by natives on European estates is displacing production by Europeans with wage laborers. The tenants who grow tobacco for white planters usually sell the crop to their landlords, who grade the crop and obtain a profit from its resale. Only a few small areas are reserved for white settlement. These all lack water, and on account of the difficulty of obtaining native labor, it is not likely that European growers will displace native growers.

EXPORTS

Nyasaland tobacco was imported into the United Kingdom in 1932 to the extent of 15,106,218 pounds, including 11,180,512 pounds of leaf tobacco and 3,925,706 pounds of stripts, according to reports issued by a leading British company. This is to be compared with 11,168,288 pounds of tobacco, including 9,055,389 pounds of leaf tobacco and 2,112,899 pounds of stripts during 1931. During 1932 there was delivered from bond for consumption in the United Kingdom and for reexport 11,141,694 pounds of tobacco, leaving stocks on

hand at the end of 1932, 33,906,195 pounds of Nyasaland tobacco. Nyasaland provides about one-third of the total consumption of Empire-grown tobacco in the United Kingdom (table 110).

A well-known tobacco company has erected at Limbe two modern drying plants. The weight of the tobacco exported is less than the production because of the loss of weight in redrying and packing.

TABLE 110.—*Tobacco: Exports by type, Nyasaland, calendar years 1930–32*

Type	1930		1931		1932	
	Quantity	Value [1]	Quantity	Value [1]	Quantity	Value [1]
	Pounds	*Dollars*	*Pounds*	*Dollars*	*Pounds*	*Dollars*
Dark-fired	10,030,016	1,829,770	7,952,873	1,451,351	12,655,092	2,309,523
Flue-cured	2,866,569	522,224	2,590,253	472,703	2,260,509	412,537
Air-cured	38,329	6,983	147,455	26,912	190,443	30,372
Total	12,934,914	2,358,977	[2] 10,690,581	1,950,966	[3] 15,082,035	2,752,432

[1] Converted at par.
[2] Of which 60.7 percent was grown by natives and 39.3 percent grown by European farmers.
[3] Of which 61 percent was grown by natives and 39 percent grown by European farmers.

Nyasaland Department of Agriculture Annual Reports, (*84, Rept. 1931, p. 6*).

MOZAMBIQUE

TREND OF PRODUCTION

Little tobacco is grown in Mozambique except in the higher elevations in the northern part adjoining Nyasaland and Northern Rhodesia. Efforts have been made to extend tobacco production in these areas. Tobacco production in this colony is not altogether new, having been grown to some extent for 20 years, but it is only since the World War that much attention has been given to its cultivation (tables 111 and 112).

TABLE 111.—*Tobacco: Production and exports, Mozambique, 1923–24 to 1930–31*

Year beginning July 1	Production [1]		Exports from— [2]					
			Chartered company [3]		Other colony		Total	
			Leaf	Manufactured	Leaf	Manufactured	Leaf	Manufactured
	Acres	*Pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1923–24	1,050	----------	18	6	8	308	26	314
1924–25	----------	----------	27	3	15	229	42	232
1925–26	----------	----------	3	[4]	129	332	132	332
1926–27	4,984	----------	38	2	126	209	164	211
1927–28	3,558	2,181,078	27	1	50	214	77	215
1928–29	2,557	1,030,541	16	[4]	16	168	32	168
1929–30	1,846	606,100	24	[4]	46	124	70	124
1930–31	----------	----------	68	[4]	45	65	113	65

[1] Excluding native production.
[2] Calendar year of harvest.
[3] A private company has a charter granting jurisdiction over Manica and Sofala districts.
[4] Less than 500 pounds.

Consul Cameron, Lourenco Marques, Mozambique, Department of Agriculture.

TABLE 112.—*Tobacco: Acreage, production and yield per acre, by districts, Mozambique, 1929–30*

District	Growers	Acreage	Production	Yield per acre		Bought from natives
				By all producers	By important producers	
	Number	*Acres*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Niassa	0					
Cabo Delgado	4	15.6	4,148	266	280	47,287
Mocambique	7	221.2	[1] 98,254	444	500	5,492
Quelimane	25	[2] 1,415.9	[3] 421,202	297	317	3,720
Tete	1	56.8	22,040	388		
Inhambane	10	64.2	24,244	378	530	
Lourenco Marques	9	[4] 71.6	36,251	506	734	3,262
Manica and Sofala	4	65.5	26,536	405		(5)
Total	60	1,910.8	632,675	331		59,761

[1] Of which only 57,000 pounds was sold during the year. Production during the preceding year was 450,000 pounds from 813 acres.
[2] Chiefly in Ile, Massingire, and Maganja da Costa districts near southern Nyasaland.
[3] Of which only 42,000 pounds was sold during the year. Production during the preceding year was 580,000 pounds from 1,670 acres.
[4] 247 acres grown in 1927–28.
[5] Not reported.

Colonia de Mocambique Recenseamento Agricola de 1929–1930 (*18*).

METHODS OF PRODUCTION

The principal type of tobacco grown is Virginia flue-cured, analogous to that grown in Southern Rhodesia, including Hickory Pryor, Yellow Pryor, and Warne varieties. More recently Turkish tobacco and burley tobacco have been introduced, and three types of curing (flue-curing, fire-curing, and air-curing) are now in use.

The cultural methods are similar to those in adjoining areas. Seed beds are prepared from September to November, and the plants are set out from October to December. Plants are set in rows 36 to 48 inches apart and plants are spaced 20 to 36 inches in a row. Two or three cultivations are usually given during the season. The plants are topped to leave 12 to 18 leaves per plant, although occasionally 20 to 24 leaves are left. Yields of 350 to 600 pounds of cured tobacco are obtained per acre. Customarily the barns are about 18 feet square and 21 feet high, built of brick, and equipped with two furnaces with U-type flues. The cured tobacco is sorted into not more than six types. From 8 to 15 leaves make a "hand." The officials of the department of agriculture at Lourenco Marques, claim that the quality of tobacco is not inferior to that grown in the adjoining countries of Northern Rhodesia, Southern Rhodesia, and Nyasaland, and that it possesses remarkable combustibility, elasticity, and aroma without having too much nicotine. However, the samples seen in the warehouse in Lourenco Marques, at the time of this study were decidedly inferior in color and other respects.

The tobacco is nearly all grown by Europeans, even most of that consumed by the natives. This is in contrast to conditions in Nyasaland where certain natives hire other natives to grow it. The president of the agricultural development association of the Province of Mozambique estimates that during 1931 producers received 11 cents per pound for dark fire-cured tobacco and 16 cents per pound for mahogany-colored cigarette tobacco.

The production of tobacco in Mozambique is decreasing, probably because of the difficulties of growing the crop and because Portugal has reduced the customs preference from 50 percent to 10 percent.

There are in Mozambique 6 sizable tobacco factories—3 in Lourenco Marques, 1 in Beira, 2 in Mozambique (town), besides 2 small factories—1 in Beira and 1 in Macequeco (table 113).

TABLE 113.—*Tobacco Manufacture in Mozambique*

Calendar year	Mozambique Co.	Other colony	Total	Calendar year	Mozambique Co.	Other colony	Total
	1,000 lb.	*1,000 lb.*	*1,000 lb.*		*1,000 lb.*	*1,000 lb.*	*1,000 lb.*
1921			497	1927	70	570	640
1922		477	477	1928	70	645	715
1923		522	522	1929	76	646	722
1924	5	574	579	1930	86	666	752
1925	25	612	637	1931	103	497	600
1926	39	616	655				

Customs and excise reports, not including tax-free native roll tobacco for native consumption (not produced in factories), possibly 10 percent as much, Consul Cameron, Lourenco Marques.

TANGANYIKA

TREND OF PRODUCTION

Attempts have been made to introduce tobacco production in Tanganyika and initial efforts are proving moderately successful. The production of Turkish tobacco in 1930 amounted to 6,000 pounds and that of fire-cured Virginian tobacco to 16,000 pounds. This tobacco is produced near Iringa in the central portion of the territory, where the elevation ranges from 4,000 feet to 6,000 feet and where rainfall is about 40 inches per year, nearly all of it falling during the summer months, November to April. The tobacco is grown by natives, as in Nyasaland, rather than by Europeans using native laborers as in the Rhodesias and the Union. The Tanganyika Department of Agriculture maintains a European officer in Iringa to experiment and advise on tobacco growing.

Southeast of Iringa, at Mahenge, the Tanganyika Department of Agriculture maintains a white agricultural officer assisted by nine black instructors who are chiefly concerned with establishing a native tobacco industry. The director of agriculture states that heavy Virginian-type tobacco, such as is grown by the natives in Nyasaland, is the most promising native cash crop for this area. The tobacco is suitable for the manufacture of cigarettes and pipe tobacco for the local native trade, and if it is comparable with Nyasaland tobacco it is also suitable for export.

Additional staff members trained in tobacco matters are also employed in the Lindi Province to the east of Iringa. In addition the Department has decided that tobacco may be a more successful cash crop than cotton for the natives on the sandy soils of the Rusubi and Busambiro areas, near Lake Victoria, where cotton has largely failed. Tobacco seed described as "heavy western" of the Virginian type was imported from Nyasaland, and a specially trained native instructor was sent to supervise the trial plantings and the curing of the leaf. Early indications are that tobacco will prove successful in this area.

During 1930, introductions of tobacco seed included the heavy western variety from Nyasaland and Amorillo and Rustenburg selection from the Union of South Africa. In addition, eight varieties of Turkish tobacco were introduced.

An experimental consignment of 5,000 pounds of Turkish tobacco from Iringa Province was sent to London toward the close of 1929. It realized the satisfactory average price of 2s. (49 cents) per pound, which is considered reasonably profitable. A tobacco firm in Dar es Salaam also bought both Turkish and Virginian tobacco grown in the Ifunda area. Cigarettes manufactured from this tobacco have now been on the market for some months and a small local market for both Turkish and Virginian tobacco grown in Tanganyika is now established. But if the industry is to expand on the large areas described as suitable for tobacco growing in the Iringa district, a market must be established overseas.

The director of agriculture calls attention to the formation of native cooperative groups with respect to coffee, and contemplates that the same will be developed in the tobacco area for the south-central districts in connection with the new native tobacco plantings.

KENYA

TREND OF PRODUCTION

Tobacco production in Kenya is of insignificant importance, and little effort is being made to establish the industry. The agricultural supervisor for the coast area reported in 1926 that tobacco grows well all over the coastal area as well as inland. The majority is made into snuff for the native trade. Some tobacco is sold as leaf in bundles weighing 1 to 1½ pounds and selling to the natives for 1s. (24 cents). Exports are of insignificant volume (table 114).

TABLE 114.—*Tobacco: Exports from Kenya, 1920–30*

Year	Exports from Mombasa [1]			Total exports [2]		
	Quantity	Value [3]	Price per pound [3]	Quantity	Value [3]	Price per pound [3]
	Pounds	*Dollars*	*Cents*	*Pounds*	*Dollars*	*Cents*
1914				1,008	49	4.9
1920	20,272	1,977	9.7	10,640	1,446	13.6
1921	11,336	1,611	14.0			
1922	6,496	394	6.1			
1923	5,600	477	8.5			
1924	40,544	652	1.6			
1925	14,580	1,265	8.7			
1926	9,072	662	7.3	20,608	1,333	6.5
1927	15,120	1,095	7.2	17,696	1,630	9.2
1928	15,928	2,015	10.6	14,560	1,849	12.7
1929	17,024	3,995	23.5	13,328	3,377	25.3
1930	5,264	1,129	21.4	12,320	2,725	22.1

[1] Year ended June 1914, 1920–27; year ended July 1928–30.
[2] Year ended December
[3] Converted at par.

Kenya agricultural census reports.

UGANDA

Tobacco production in Uganda is unimportant. The acreage, mostly native grown, amounts to about 3,000 acres and has increased only slightly during the last 10 years (table 115). Production is not

officially estimated but is probably about 1,000,000 pounds per year. The principal district is Bunyora, in the northwest, where the native crop is annually expanding. The crop marketed in September 1931 amounted to 367,041 pounds from 760 acres, an average yield of 483 pounds per acre. In 1932, the Bunyora crop was increased to approximately 600,000 pounds.

TABLE 115.—*Tobacco: Acreage in Uganda, 1923–32*

Calendar year	European	Native	Calendar year	European	Native	Calendar year	European	Native
	Acres	*Acres*		*Acres*	*Acres*		*Acres*	*Acres*
1923		2,980	1927	18	2,108	1930	103	2,233
1924		3,122	1928	227	2,519	1931	209	3,237
1925		2,706	1929	368	3,464	1932	[1] 254	[2] 3,468
1926		2,981						

[1] Distributed as follows among the various districts: Bunyora 84, Mengo 94, Mubende 46, and West Nile 30.
[2] Distributed as follows among the various districts: Bunyora 1800, West Nile 520, Karamoja 500, Ankole 132, Entebbe 400, and others 116.

Correspondence and annual reports, Uganda Department of Agriculture.

The Government is producing seed at the Bulinde Experiment Station and issues to natives only graded and disinfected seed. Three of the fourteen varieties are deemed suitable for the European market. Experiments are being carried out in the West Nile and Mubende Districts with white burley and Hickory Pryor for the production of air-cured leaf.

Two crops per year are sometimes grown, but this is being discouraged because preparation of nursery beds for the second crop conflicts with the curing of the first crop to the detriment of both. The quality of the tobacco crop is sometimes injured by cold, wet weather during July after the leaf has been harvested, especially in late-planted areas (table 116).

TABLE 116.—*Rainfall in principal tobacco areas and seasonal operations, Uganda, normal and 1932*

Month	Hoima [1]		Mbarara [2]		Tobacco operation
	Normal	1932	Normal	1932	
	Inches	*Inches*	*Inches*	*Inches*	
January	0.97	0.38	1.38	1.62	
February	2.95	1.47	2.38	1.46	Planting
March	5.00	7.05	3.69	4.04	
April	6.57	3.84	4.84	3.58	
May	6.03	6.36	2.59	2.95	
June	3.58	3.21	.79	.00	
July	4.36	5.38	.95	.46	
August	5.61	3.52	2.52	.38	
September	6.92	8.71	3.77	7.89	Selling.
October	7.13	9.16	4.22	2.75	
November	6.13	9.39	4.59	4.68	
December	2.47	2.79	2.88	2.52	
Total	58.32	61.26	34.60	32.33	

[1] West-Central, near Lake Albert.
[2] Southwestern.

Source: Uganda Department of Agriculture.

Tobacco growing by natives is mainly for supplying the demands of the local cigarette and tobacco factory at Jinja, but with the impending production of an exportable surplus the Government is contemplating legislation for Government control of local marketing and export in order to maintain the high grade of exportable leaf.

During the year 1931 the Government bought 13,000 pounds of native-grown leaf for shipment to england. This tobacco was regraded, conditioned, and packed at a newly constructed packing factory at Masindi. Out of this Government purchase 5,411 pounds or 42 percent was lost in regrading, redrying, and stripping. The loss consisted of 2,867 pounds of degraded leaf, 1,210 pounds of stems, 306 pounds of sweepings, and 1,028 pounds of water.

The Government's purchase price to the grower in 1931 was 0.3 shilling (7.3 cents at par) for first-grade leaf and 0.2 shilling (4.9 cents) for second grade.

The average price paid to growers was 0.25 shilling (6 cents) per pound. The cost of landing leaf in England averaged 0.73 shilling (18 cents) per pound, exclusive of interest charges and officers' salaries.

The tobacco officer reports:

> Brokers who have handled Uganda leaf have often commented upon the fine spread of the leaf, and every effort is being made by careful selection of seed plants to maintain this feature, a most important point, in view of the fact that it has been stated that African tobaccos are inclined to run narrow after a few years.
>
> There has been some improvement in the grading and handling of the crop during the past season, but brokers report that many consignments of Uganda leaf are still being shipped in too moist a condition.
>
> The leaf generally is reported to be of excellent quality, and in spite of the high percentage of moisture in some of the consignments Uganda wrapper leaf has sold at an average of approximately 1 shilling 3 pence per pound.
>
> Lack of suitable house room for bulking, grading, and packing is one of the greatest drawbacks to the successful handling of the crop on most estates, and it is far too common to see the leaf badly bulked in open sheds more or less exposed to the weather, and grading often being attempted in sheds in which it is almost too dark to see.

During 1931 an ordinance was enacted providing for an excise duty on all cigarettes and tobacco manufactured for sale in the protectorate. The duty is 0.75 shilling (18 cents at par) per pound on cigarettes and 0.5 shilling (12 cents) per pound on other tobacco. These duties are applied from January 1, 1932.

TABLE 117.—*Tobacco: Exports, Uganda, 1927–31*

Calendar year	Unmanufactured tobacco		Cigarettes		Calendar year	Unmanufactured tobacco		Cigarettes	
	Quantity	Value[1]	Quantity	Value[1]		Quantity	Value[1]	Quantity	Value[1]
	Pounds	*Dollars*	*Pounds*	*Dollars*		*Pounds*	*Dollars*	*Pounds*	*Dollars*
1927					1930	125,659	26,980	20,767	26,303
1928	8,539	1,591			1931	[2] 133,597	25,233	46,474	60,078
1929	61,967	14,794	111	127	1932	[3] 160,147	38,787	67,300	88,523

[1] Value converted at par.
[2] Includes 275 pounds of manufactured tobacco other than cigarettes.
[3] Includes 6,353 pounds of manufactured tobacco other than cigarettes.

Uganda, Department of Agriculture, annual report, p. 32.

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EXPORTS

Tobacco exports have increased from nothing in 1927 to 180,071 pounds in 1931, as shown in table 117.

COTTON

PRODUCTION IN SOUTHERN AFRICA

The total production of cotton throughout the world is about 25,000,000 bales of 478 pounds, net weight. The United States produces about half of this total, and most of the remainder is produced in India, Egypt, China, Russia, and Brazil. Production in the 10 cotton-growing countries in south and east (southern) Africa was approximately 200,000 bales in 1931–32 (table 118) and about 275,000 bales in 1932–33. Cotton production in the United States has increased by only a small percentage during the past 25 years, but in southern Africa production has increased from about 5,000 bales to 275,000 bales during this period.

TABLE 118.—*Cotton: Production in south and east African countries, 1929–30 to 1931–32*

Country	Year beginning Aug. 1 [1]			Country	Year beginning Aug. 1 [1]		
	1929–30	1930–31	1931–32		1929–30	1930–31	1931–32
	Bales [2]	*Bales* [2]	*Bales* [2]		*Bales* [2]	*Bales* [2]	*Bales* [2]
Union of South Africa [3]	13,567	6,797	2,344	Angola [4]	3,597	2,004	2,703
South-West Africa [4]	161	100	.....	Tanganyika [5]	23,251	19,360	9,499
Southern Rhodesia	1,201	1,818	485	Kenya [5]	1,270	670	1,152
Northern Rhodesia	14	.....	.....	Uganda [5]	108,052	158,002	173,494
Nyasaland [5]	5,407	8,285	3,737				
Mozambique [6]	7,998	6,841	8,266	Total	164,516	204,057	201,080

[1] Aug. 1 chosen to facilitate international comparisons. Where Aug. 1 occurs in the midst of harvesting, the entire crop is listed for the year in which the major portion of the crop is harvested.
[2] Converted to bales of 478 pounds net, assuming 1,500 pounds of seed cotton equals 478 pounds of lint.
[3] Linters in addition amounted to 575, 1,043, and 432 bales, respectively, in these 3 years. Swaziland, included with Union of South Africa, produced 2,149 bales of lint cotton in 1929–30 (computed from seed cotton at 1,500 pounds per bale), 1,021 bales in 1930–31, and 130 bales in 1931–32.
[4] Weight per bale unknown. Figures from the office of the senior veterinary surgeon, South-West Africa.
[5] Produced chiefly by natives.
[6] Exports in the following calendar year. Production by Europeans in Mozambique in 1929–30 was 6,408 bales and, by natives, about 2,700 bales.

From annual reports and other official sources.

At the beginning of the twentieth century the British Government concluded that because of the advance of the Mexican bollweevil into our Southern States it would be desirable to encourage cotton production within the British Empire. The British Cotton Growing Association was created with financial support from the Government to promote these ends, and much of the cotton now produced in southern Africa is bought by this association. About 1912 a sister organization, the Empire Cotton Growing Corporation, was created to establish and operate experiment stations and, occasionally, to operate gins in British cotton-growing countries. During recent years these two organizations have been partly supported by a small levy per bale of cotton bought by cotton manufacturers in England. The expansion of cotton production in southern Africa is partly due

to the promotional and research activities of these two concerns. That the production thus far has been relatively small is due to inherent difficulties which surround the production of cotton in these countries.

Most of the cotton produced in southern Africa is produced by natives. Production by Europeans employing native labor is important only in the Union of South Africa, Southern Rhodesia, and Mozambique. Formerly it was important in Nyasaland. European farmers are more responsive to price influences. European farmers in these countries increased cotton acreage and production as a result of the high prices and favorable exchange rates which prevailed between 1917 and 1924. Since that time, and especially since 1930, production by European farmers has been greatly curtailed. Production by natives has responded only moderately to price changes. In Uganda production doubled between 1930 and 1933 despite the influence of very low prices. In Tanganyika production declined slightly in those districts where it is predominantly carried on by natives, and declined to a very low level in those districts where European production was important. In Nyasaland production by Europeans practically disappeared between 1926 and 1933, while production by natives continued at approximately the same level.

Generally speaking, cotton cannot be grown as advantageously in these countries as in the United States. Average yields per acre are low (table 119) because of various detrimental influences in different areas, such as excessive rain causing excessive vegetative growth, drought, low temperatures at the higher elevations, and serious infestations of bollworm, jassids, and other insects. A small quantity of cotton is produced under irrigation, but the area susceptible of irrigation is decidedly limited. The ginning equipment is frequently inefficient and cost of transportation from the inland areas is a further handicap. Native labor is cheap but inefficient so that the cost of labor, in terms of output, is little, if any, less than in the United States.

On the other hand, cotton production in these countries is stimulated by certain influences. Cotton is frequently the only cash crop known to the natives, and as their cash wants increase they are more easily induced to increase their production of cotton. Cottonseed is issued exclusively by the Government officials so that improved varieties may be readily introduced and deterioration avoided. Cotton is looked upon as a desirable crop for rotation with corn. Labor is abundant and cheap, though inefficient. Finally, yields are being improved by the introduction of improved varieties, the discovery of feasible methods of insect control, and by improved cultural practices.

With the return to higher price levels a marked expansion may be expected, especially under the stimulus of the British and Portuguese policies of subsidizing colonial cotton production. At present most of the cotton is grown in very small patches by independent natives. With the economic development of these native tribes increased cotton production is probable. Expansion is most likely to occur in Uganda, Kenya, Tanganyika, and Nyasaland, where native population is densest and where moisture and temperature conditions are more favorable.

TABLE 119.—*Cotton, lint: Yield per acre in south and east African countries as compared with that in the United States, average 1920–30, annual 1930–32*

Country	Year beginning Aug. 1				
	Average		1930–31	1931–32	1932–33
	1920–21 to 1924–25	1925–26 to 1929–30			
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
United States	154	171	157	212	173
Union of South Africa	68	90	(1)	(1)	(1)
Southern Rhodesia	[2] 67	61	100	67	(1)
Nyasaland [3]	[4] 60	71	93	79	44
Mozambique	(1)	[5] [6] 62	[5] 58	[5] 62	(1)
Angola	(1)	[6] 40	(1)	(1)	(1)
Tanganyika	(1)	(1)	82	(1)	(1)
Uganda	122	[6] 102	102	93	110

[1] Data lacking.
[2] 2 years only.
[3] European production only; native acreage unknown.
[4] 1929.
[5] Manica and Sofala districts, Europeans and natives.
[6] Low yield (78 pounds) in 1929 because of unusual weather and serious losses in Eastern Province from black-arm disease.

Official sources.

UNION OF SOUTH AFRICA

TREND OF PRODUCTION

Farmers in South Africa have tried for many years to produce cotton, but only about 15 years ago material progress began to be recorded (table 120). The introduction of cotton gins and the acquisition of a more thorough understanding of cultivation methods have contributed to the recent progress. The decline in production following 1925–26 was occasioned by serious infestations of jassid—leaf hoppers (*Empoasca facialis*)—and white fly (*Bemisia gossypiperda*) which transmits the virus disease leaf curl. Resistant varieties and strains have since been developed so that an expansion may be expected when market prices improve.

TABLE 120.—*Cotton, lint: Production in the Union of South Africa and Swaziland, 1910–11 to 1932–33*

Year beginning Aug. 1—	Union and Swaziland	Swaziland	Year beginning Aug. 1—	Union and Swaziland	Swaziland	Year beginning Aug. 1—	Union and Swaziland	Swaziland
	Bales [1]	*Bales* [1]		*Bales* [1]	*Bales* [1]		*Bales* [1]	*Bales* [1]
1910–11	28	.....	1918–19	1,508	.....	1926–27	8,571	580
1911–12	67	.....	1919–20	2,290	.....	1927–28	9,216	875
1912–13	98	.....	1920–21	2,446	.....	1928–29	8,179	1,332
1913–14	160	.....	1921–22	2,293	.....	1929–30	13,567	2,149
1914–15	452	.....	1922–23	5,458	244	1930–31	6,797	1,021
1915–16	478	.....	1923–24	7,308	522	1931–32	2,344	130
1916–17	510	.....	1924–25	14,172	428	1932–33	1,557	138
1917–18	592	.....	1925–26	17,053	829			

[1] Bales of 478 pounds net.

Union of South Africa, Department of Agriculture, Division of Plant Industry.

Several years hence, if the efforts of the Empire Cotton Growing Corporation are completely successful in such matters as variety improvement, disease and pest control, and market demands, the Union and Swaziland may produce 25,000 to 50,000 bales in favorable years when prices are attractive. Some authorities estimate as high as 100,000 bales. The largest previous crop was 17,055 bales of 478 pounds net weight, and the 1932 harvest was only 2,344 bales. The Union of South Africa will never become an important cotton producer, but the demand for specialty types of South African qualities may sustain a modest cotton industry.

The principal producing areas are: Ngotshe district, in northern Natal Province; southern Swaziland; the Barberton area; and the Orange River area, in northern Cape Province. Minor areas include: scattered areas in southern Natal, northern Transvaal, and western Transvaal.

In the Ngotshe area prolonged winter drought sometimes delays and reduces planting. Yields are also reduced, for late cotton is impaired by cold weather during the latter part of its growing season, even though the area is not subject to frosts. One cotton estate until recently represented the bulk of the production in this area, having grown as much as 10,000 acres of cotton in 1 year. Recently this company failed, and cotton acreage disappeared except for certain tracts planted or rattooned (old plants allowed to grow up again) by the block managers who had formerly grown cotton in the various blocks of the estate. The Government has taken back this land and resold it to these former managers and to new settlers at reasonable prices—about $7.50 per acre. In this way production will be maintained at a fraction of its former average quantity. Cotton is grown in this area as much for the seed for cattle feeding as for the lint. The unpressed seed is often fed. Recently on account of short crops, a little cottonseed has actually been shipped into this area.

Southern Swaziland is essentially a continuation of the Ngotshe area. Production here is largely in the hands of 2 or 3 large companies. One, in connection with cattle ranching, has been growing about 2,500 acres of cotton, of which 500 acres have been brought under irrigation. The company is still intact, and the production prospects are similar to or better than those of Ngotshe.

The Barberton area enjoys the stimulating influence of the cotton experiment station located at Barberton. The cotton is produced mainly by independent farmers, of whom perhaps 90 percent belong to a cooperative gin. Acreage and production are often curtailed by dry weather during or after the spring planting season and by delayed planting. Rainfall in eastern Transvaal and Natal averages 30 to 40 inches per year, coming mostly during or near the summer months, December to February.

The Orange River area extends in a narrow strip along the river from Upington for a distance of 100 or 150 miles. The rainfall is only about 7 inches per year, and all the crop land is irrigated. The altitude is about 2,800 feet. Temperatures are accordingly high. Many of these farmers are poor whites established on this irrigation project by the Government and by a prominent church organization. Each farmer grows only a small acreage. The soil is a fertile sedi-

mentary loam along the river and on the river islands, but outside this narrow strip it is a poor white sand or sandy loam almost useless for farming. The supply of irrigation water is usually ample. The principal crop was formerly alfalfa, but cotton and sultana raisins have partly displaced this crop, especially since the railroad does not reach beyond the upper end of this irrigated strip and alfalfa hay will not stand cost of shipment.

In the minor producing sections cotton is grown by scattered farmers, 25 to 50 acres per farm, units much smaller than the above-mentioned estates although larger than in most countries. Production is being curtailed somewhat, but there are no alternative enterprises that offer ready relief from the present low cotton prices. In the middle veld (between the lowlands and the high plateau) early season droughts and late-season frosts are deterring factors.

COTTON YIELD PER ACRE

Low yields are chiefly accountable for the fact that cotton production has not expanded much in South Africa. A comparison between the cotton yields per acre in the United States and in the Union of South Africa is enlightening (table 121).

It was between 1925 and 1929 that the infestations of jassids were so serious in the Union. Data are not available covering cotton yields since 1930, but fragmentary evidence goes to show that the introduction of the jassid-resistant U4 variety of cotton has helped to increase yields.

TABLE 121.—*Cotton, lint: Yield per acre in the Union of South Africa as compared with that in the United States, 1919–20 to 1929–30*

Year beginning August 1	Cape	Natal	Transvaal	Union	United States
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*
1919–20	69	81	72	75	166
1920–21	31	101	50	62	187
1921–22	126	89	54	82	132
1922–23	46	202	70	107	149
1923–24	52	91	41	61	136
1924–25	45	62	39	47	165
1925–26	110	89	70	79	174
1926–27	172	81	32	62	199
1927–28	341	91	58	80	162
1928–29	1 423	77	53	79	163
1929–30	200	87	139	151	164

[1] Irrigated.

Union of South Africa Official Year Book, 1927, *no 13*, p. 295, and official sources, assuming 300 pounds of seed cotton per 100 pounds of lint.

METHODS OF PRODUCTION

In the Union, cotton is grown by European farmers with native labor. The most suitable cotton soils are deep sandy loams with good drainage. Seed of the small-bolled Uganda type is planted in the eastern low-veld areas, and Improved Bancroft is planted in the middle-veld areas and along the Orange River. The planting of only one variety is strived for in order to avoid undesirable hybridization. Heavy fertilization is avoided in order to prevent excessive growth of

branches and leaves at the expense of cotton lint. Phosphorous is most frequently the deficient plant-food element. From 200 to 300 pounds per acre of superphosphate are commonly applied, unless drilled in with fertilizer attachment, in which case half the quantity is used. Nitrogen is commonly applied by plowing under a green-manure crop of velvetbeans, cowpeas, soybeans, or field peas. Excessive nitrogen in the soil is avoided as it causes too luxuriant growth of plants and consequent delay in ripening. Kraal manure is sometimes used in conjunction with superphosphate.

The cotton lands are plowed, if possible, during the dry autumn or early winter months. The lands are plowed again, if necessary, after the first soaking spring rains and are then rolled and harrowed into proper condition. The seed is planted after all danger of frost is past. The seed germinates in 7 to 12 days. The first squares appear in another 40 to 50 days, and 3 weeks later the squares begin to open. Another 50 days or so are required before the bolls are open, depending somewhat on the prevailing temperatures. The seed is planted between October 1 and November 15, although planting may continue until November 30 in the warmest low-veld areas. If rains are delayed, planting may not be completed in the low veld until late in December, but in the middle veld late-planted cotton often encounters frost before it is harvested. The rows are spaced 3 or 4 feet apart. From 20 to 25 pounds of seed are planted per acre, and the plants are thinned to a distance of 10 to 12 inches. Cultivation proceeds throughout the season. The cotton is picked during April and May. Native (black) laborers are employed to pick the cotton. The average quantity picked per day is about 40 pounds of clean seed cotton, although an active woman can pick as much as 75 pounds per day if the plants are full of open bolls. A few skilled natives can pick as much as 100 pounds per day. The fields are usually picked over three times. The smaller quantity of cotton picked per day cancels the advantage of lower wages, as compared with those in the United States.

The cotton is transported in wool bags to the gins. Several large gins have been permanently established in various parts of Natal and Transvaal. The lint is pressed into a bale similar to the American square bale, weighing approximately 500 pounds. The bales are covered in the usual way and fastened with iron bands. The general appearance of the South African bales is neat and attractive.

QUALITY OF SOUTH AFRICAN COTTON

Since 1923, official classing has been required for all cotton destined for export which means practically all the cotton produced. No consignments of cotton lint may be exported unless accompanied by a certificate which must enumerate each bale concerned and show the registered mark of the ginner, and the type mark and color of each bale. The type marks denote only grade and staple, but color is classed separately on the certificate. Each type mark consists of a 4-letter word. The first letter designates staple length and the third letter designates grade.

The principal office of the Government cotton classer is at Durban. A fee of 1 shilling (24 cents at par) is charged for each bale of cotton

lint classed. This fee is paid in conjunction with the special export-levy fee amounting to 1 shilling (24 cents at par) per 100 pounds of cotton lint.

The official reports of the Government cotton classer for the Union of South Africa show that most of the cotton grown in the Union is classed at 1⅛-inch staple length (table 122). This is longer than most of the cotton grown in the United States. Only 8 percent of the bales classed in 1929–30 fell in the group of 1⅛-inch and below, while 2 percent was classed as 1¼-inch and above. This was fairly representative of results obtained during the 5 years, 1927–32.

The same reports show that in 1929–30, 61½ percent was classed as Middling grade or better, and was of good color. The average grade of this crop was higher than the grade during the preceding 4 years, when the proportion thus classed varied between 40 and 50 percent of the crop. Most of the cotton not included in the better grades of good color consisted of lightly spotted cotton.

TABLE 122.—*Cotton, lint: Staple length and quality in the Union of South Africa, 1929–30 and 1930–31*

Item	Designation	Year beginning Aug. 1—			
		1929–30		1930–31	
		Quantity	Percentage of total	Quantity	Percentage of total
Staple length:	*Staple*	*Running bales*	*Percent*	*Running bales*	*Percent*
1¼ inches and above	A	272	2.0	1,309	19.7
1⅛ inches	B	2,035	14.6	698	9.8
Full 1⅛ inches	C	1,561	11.2	103	1.5
Good 1⅛ inches	D	5,441	39.1	682	9.6
1⅛ inches	E	3,499	25.1	3,182	44.9
1⅛ inches and below	F and G	1,114	8.0	1,030	14.5
Total		13,922	100.0	7,094	100.0
Quality, good color	*Grade*[1]				
Middling Fair	F	1,043	14.0	48	.7
Strict Good Middling	A	1,529	11.0	2,009	28.3
Good Middling	B	1,996	14.3	706	9.9
Strict Middling	C	1,859	13.3	430	6.1
Middling and below	G	1,226	8.8	199	2.8
Total		8,553	61.4	3,392	47.8
Off color		5,369	38.6	[2] 3,702	52.2
Total		13,922	100.0	7,094	100.0

[1] Strict Low Middling is C, Low Middling is L, and Good Ordinary is G.
[2] The total includes 2,180 bales of very lightly spotted cotton.

Union of South Africa Crops and Markets, December 1931.

PRICES

South African prices are based upon Liverpool or Manchester quotations. A premium of about 175 pence points was obtainable in December 1932 above American Middling ⅞-inch quotation on account of staple length, which is largely 1⅛ inches. The premium is usually 200 to 300 points and, when cotton was high in price, as much as 500 points. As it costs about 75 points to deliver the cotton to Liverpool, net prices at Durban, including the 10-percent export

bounty, were at that time about 8½ cents per pound. By comparison, the price of Middling 1⅛-inch cotton at New Orleans was slightly below 7 cents.

METHODS OF MARKETING

Cotton in South Africa is railed to the gins in wool packs. Some 13 gins handle this meager production. One or more of these are in liquidation on account of lack of business. Some are owned and operated cooperatively, and five are owned and operated by private buyers. The bales are made to the standard size, weighing 500 pounds (400 pounds at the Germiston gin), and compressed to 30 pounds pressure (17 cubic feet per bale). Occasionally seed cotton is sold to ginners, but usually it is ginned for the account of the grower and then sold to local buyers representing overseas cotton merchants. Sales are usually effected in Durban, where public cotton auctions are held.

The Central Cooperative Cotton Exchange, Ltd., Durban, was registered in 1922. It handles about 30 percent of the crop. Its membership consists of seven local cooperatives which cover every important cotton-growing area in Natal and Transvaal. The combined membership in 1928 was 1,126 growers. The combined sales during 1927–28 were £45,240 ($220,165) exclusive of about half as much business in farming requisites purchased for members. The volume of business is now less than in 1927–28 and much less than during the cotton boom years of 1924–25 and 1925–26. The exchange is financed out of the levy imposed by the Government on all cotton exported. The decreased volume of the last few years has converted operating profits into losses in the case of several cooperatives.

Local buyers representing overseas firms buy some cotton from the cooperative exchange. A little is shipped on consignment to Liverpool, and an increasing quantity is sold c. i. f. on telegraphic order against South African Government standards. Rejection and complaints from c. i. f. sales have been insignificant.

Heretofore practically all the cotton grown in South Africa has been exported overseas for spinning. A few weaving establishments have been established in the Union for the manufacture of cotton blankets for the native trade, but with one or two unimportant exceptions, they have obtained their yarns from overseas. However, as a new departure, a company that has carried on a weaving industry at the coast has decided to establish a large spinning and weaving mill at Johannesburg. The whole process of manufacture will be carried out, from the raw cotton to the finished cotton blankets.

Cottonseed is sometimes pressed for oil and at other times fed to cattle without pressing. The demand for cottonseed cake is greatest in the Transvaal and in Southern Rhodesia.

SOUTHERN RHODESIA

TREND OF PRODUCTION

A few years ago Southern Rhodesia made a large-scale attempt to establish itself in the production of cotton (table 123). These efforts failed because of low yields. A new stimulus to cotton growing in Southern Rhodesia has been given by the recent development of the

U4 variety of jassid-resistant cotton, but it has been temporarily reversed by the disastrous drop in prices and, in 1931–32, by adverse weather.

TABLE 123.—*Cotton: Acreage, production, yields, and exports, Southern Rhodesia, 1923–24 to 1931–32*

Year beginning Aug. 1	Acreage [1]	Production [2]	Yield per acre [3]	Exports [4]	Year beginning Aug. 1	Acreage [1]	Production [2]	Yield per acre [3]	Exports [4]
	Acres	*Bales*	*Lbs.*	*Bales*		*Acres*	*Bales*	*Lbs.*	*Bales*
1923–24	3,947	1,127	143	1,262	1929–30 [5]	6,134	1,291	97	763
1924–25	62,858	3,925	31	3,499	1930–31 [6]	9,028	[7] 1,818	100	-------
1925–26	66,086	5,480	41	5,042	1931–32	[8] 3,488	[9] 485	67	-------
1926–27	8,134	490	30	309	1932–33	1,899	-------	-------	-------
1927–28	1,340	76	28	110	1933–34	4,008	-------	-------	-------
1928–29	1,857	226	62	251					

[1] Including cotton ratooned.
[2] Seed cotton divided by 1,500 to derive bales of 478 pounds. The average ginning percentage at the 4 gins operating in 1931 varied from 33.1 to 34 percent.
[3] Seed cotton divided by 3.
[4] Pounds of lint divided by 478.
[5] Official Year Book (*37, no. 3, p. 256*) gives 6,179 acres averaging 97 pounds of lint per acre.
[6] Government statistician's estimate June 14, 1932, was 8,979 acres, 1,818 bales, 97 pounds of lint per acre.
[7] Seed cotton delivered to gins was only 2,305,770 pounds (1,576 bales). The remainder represents cotton too inferior to be ginned or possibly overestimates by the growers.
[8] Government statistician's estimate Mar. 21, 1934.
[9] Southern Rhodesia Department of Agriculture (*36, Rept. 1932, p. 11*).

Rhodesian Agricultural Journal (*32, p. 621*); Official Year Book (*37, no. 2, p. 546; no. 3, p. 286*).

The cotton specialist for Southern Rhodesia states in his annual report that cotton acreage may be expected to increase materially if there is even a moderate recovery in price. Farmers in Southern Rhodesia have regained confidence in their ability to grow cotton, and the bad impression created during the disastrous years of 1925 and 1926 has been largely eradicated. He believes that cotton growing in Southern Rhodesia will respond vigorously to any general improvement in world economic conditions.

Reports from north of Salisbury indicate that even with the prevailing poor prices cotton is more profitable than growing corn at 6 shillings 6 pence a bag (44 cents a bushel), and it makes a smaller demand on the soil.

The optimists believe that Southern Rhodesia will produce 50,000 bales per year within 10 years, but this seems improbable.

METHODS OF PRODUCTION

The principal cotton-producing areas in Southern Rhodesia are in the Gatooma, Hartley, and north-of-Salisbury districts. Some cotton is also grown in the lowlands, where malarial conditions are bad, though not so bad as in certain cotton areas nearer the coast.

Cotton is planted in Southern Rhodesia during late October or early November even if the summer rains have not begun. In the event of poor germination, replantings are made. The plants are left approximately 6 inches apart in the row and, to insure a good stand, from 25 to 30 pounds of seed are used per acre with machine planting, or 6 or 7 pounds of seed with hand planting.

Experiments indicate that fertilization of cotton is useless, although it may profitably be applied to the preceding crop. In rainy

years the use of green-manure crops may also cause too rank a crop. The crop is cultivated from 4 to 6 times.

Old cotton is recommended for use as traps for cotton stainers, which sometimes cause serious damage. About 15 small piles of wet cottonseed are distributed per acre as bait for the early broods of stainers. This seed is later collected and destroyed.

Cotton picking begins about May, although early cotton may mature during April, even before the end of the summer rainy season. Native laborers can pick from 40 to 60 pounds of seed cotton per day, depending upon the yield per acre. The more exerienced pickers can pick 100 pounds per day. Stained cotton is left in the field to be gathered at the end of the picking season. The labor of cotton picking is done by native women at a cost of 10 pence (20 cents) per 100 pounds of seed cotton. This is much less costly than in the United States.

Ratooning cotton is sometimes practiced successfully. The advantages of ratooning (using the same plants for a second year) are that the costs of plowing and preparing the land (as well as the minor cost of seed) are saved and that returns from the ratooned crop are more certain. It matures much earlier than annual cotton but if it matures too early the bolls open in the rainy season, which usually ends in March or April. This may be prevented by cutting back the plants in September to keep the bolls from opening too early. The chief difficulty is that it attracts insect pests such as bollworm and stainer much earlier than annual cotton so that the latter obtains from the former heavy infestations of these pests. There was a considerable increase in the 1931–32 acreage of ratooned cotton. Ratooning is a practice not likely to persist when prices improve. The discouragement of the growers since the disastrous years of 1924–25 and 1925–26 has changed from discouragement over yields to discouragement over prices. When prices improve, production will doubtless increase.

Cotton growing is desired because cottonseed is used for feeding cattle and because the corn crops following cotton yield better, even though the cotton is grown without fertilizer. Some farmers have adopted the system of planting cotton on successive fourths or fifths of the cornland so that cotton has grown on every cornfield once in every 4 or 5 years. Efforts are being made to improve the cultural practices with respect to closer spacing, heavier seeding, and the nonapplication of fertilizers, except to the crops preceding cotton in the rotation.

The cotton is described as being bright, clean, and of good quality and staple, and usually strong.

The Empire Cotton Growing Corporation is conducting fundamental experiments to firmly establish cotton in Southern Rhodesia. The limiting factors now seem to be the cotton bollworm, drought, and low prices.

Four gins operated during 1931. Sales were effected through the Central Cooperative Cotton Exchange, Ltd., of Durban.

Following the small boom in cotton which occurred in 1924 and 1925 there were established three cooperative gins at Bindura, Hartley, and Sinoia, and several private gins, notably at Salisbury, Gwelo, and Bulawayo. The necessary capital for the three coopera-

tive gins was supplied by the Government of Southern Rhodesia, the British Cotton Growing Association, and the Empire Cotton Growing Corporation in the proportion of 50, 25, and 25 percent. respectively. Neither interest nor principal has been paid on these loans. The number of gins was in excess of the number needed. By 1932 all had been closed down except those at Salisbury and Bindura.

COSTS OF FREIGHT

In 1932 the cost of ocean freight for cotton shipped from Union berth ports to European berth ports was 32 shillings 6 pence ($7.91) per 40 cubic feet. Shipments from Beira were negligible, but the corresponding rate was 42 shillings ($10.22). The rate for cottonseed not over 90 cubic feet per ton shipped from Beira was 38 shillings 3 pence ($9.31) per long ton or 34 shillings 3 pence ($8.34) per 40 cubic feet, at shipper's option, while the rate for cottonseed over 90 cubic feet per ton was 58 shillings 3 pence ($14.17) per long ton.

NORTHERN RHODESIA

In Northern Rhodesia efforts to introduce cotton have not met with success. The incidence of the rains is less favorable and the distance to market is greater than in the other countries discussed. The temperatures are similar to those in Arizona and southern California, and rainfall in the most settled areas is 30 to 40 inches per year. It is 1,650 miles by rail from Capetown to Livingstone, the most southern point in Northern Rhodesia, and 950 miles from the Portuguese port, Beira, on the east coast.

Cotton production passed through a minor boom period when prices were high, but the market collapsed, and jassid infestation brought production down to almost nothing. The only gin is at Mazabuka in the Kafue Valley, where a few bales are ginned and sold for mattress stuffing. A few bales have also been produced in the tobacco area near Fort Jameson. Jassid losses have been solved by introducing the U4 variety, but no appreciable development is expected in the near future. Approximately 9 pence (18 cents) per pound is considered the necessary price for production at a profit under the usual conditions of production.

NYASALAND

TREND OF PRODUCTION

Nyasaland, situated along Lake Nyasa between Northern Rhodesia and Mozambique, rises from almost sea level in the Zambesi Valley to elevations over 8,000 feet along the mountain range. It is populated by about 1,456,945 natives, 1,117 Asiatics, and 1,936 Europeans. Practically all the native-grown cotton is produced in the two districts Lower Shire and Chikwawa, situated in the lowlands between the Zambesi River and the town of Blantyre. About one-third of the small acreage produced by Europeans is also in Lower Shire district. Production by Europeans has gradually given way to production by natives.

Cotton production in Nyasaland during 1932 was 4,293 bales of 478 pounds net, as compared with 3,737 bales in 1931, 8,285 bales in

1930, and 5,407 bales in 1929. The actual number of bales produced in 1930 was approximately 9,000, as compared with 6,000 in 1929, thus indicating an average weight per bale of around 425 pounds (table 124).

TABLE 124.—*Cotton: Acreage, production, and yield per acre, Nyasaland, 1923–32*

Year beginning Aug. 1—	Grown by Europeans			Grown by natives		
	Acreage	Production	Yield per acre	Acreage	Production	Yield per acre
	Acres	*Bales* [1]	*Pounds*	*Acres* [2]	*Bales* [1]	*Pounds*
1923–24	20,948	2,327	53.1	9,456	1,086	54.9
1924–25	26,120	3,613	66.1	13,922	2,044	70.2
1925–26	17,541	2,369	64.6	30,302	4,345	68.5
1926–27	13,355	1,076	38.5	38,314	3,282	40.9
1927–28	2,545	386	72.5	12,862	2,072	77.0
1928–29	1,046	244	111.5	14,950	3,713	118.7
1929–30	1,219	172	67.4	34,735	5,235	72.0
1930–31	761	148	93.0	39,174	8,137	99.3
1931–32	225	37	78.6	30,821	3,760	57.4
1932–33	205	80	144.3	33,575	4,213	66.0
1933–34	246	160	310.5	29,991	4,599	73.3

[1] Bales of 478 pounds, calculated by multiplying hundredweight of seed cotton by 112 pounds and dividing result by 1,500.
[2] Estimated.

Nyasaland Department of Agriculture correspondence, dated May 12, 1932.

Improved varieties, particularly U4, which is jassid-resistant, and earlier and closer planting have resulted in increased yields. Pink bollworm caused the Karonga area at the northern end of Lake Nyasa to be prohibited from cotton growing for the 5 years 1925 to 1929, and on account of low prices production in this area was not encouraged in 1931. With the exception of the cotton produced in the Karonga area, approximately 91 bales of 478 pounds in 1930, the crop was all bought by the British Cotton Growing Association, which exported 7,709 bales of native-grown lint (table 125).

The actual average weight of the bales ginned at the Ngara gin at the northern end of Lake Nyasa was 448 pounds per bale.

TABLE 125.—*Cotton: Quantity and quality purchased by the British Cotton Growing Association, Nyasaland, 1926–30*

Year [1]	Quantity purchased		Quality		
	Seed cotton	Equivalent	First	Second	Third
	Pounds	*Bales* [2]	*Percent*	*Percent*	*Percent*
1926	4,921,260	3,281	67	21	12
1927	3,106,860	2,071	78	20	2
1928	5,568,640	3,712	88	11	1
1929	7,851,200	5,234	87	11	2
1930	12,203,520	8,136	88	11	1

[1] Harvested mostly after Aug. 1.
[2] Seed cotton divided by 1,500 pounds to derive bales of 478 pounds.

Nyasaland Department of Agriculture (*24, Rept. 1930, p. 7*).

Cotton production by natives has maintained itself surprisingly well during recent years. Improvements in transportation and in cultural methods and varieties lead to the belief that cotton production in Nyasaland will extend northward within the next 5 years. The Zambesi River is being bridged and the railway is being extended northward about 150 miles from Blantyre to Domira Bay, which is 40 miles up Lake Nyasa, on the western side.

The principal area at present is that portion of the Rift Valley designated as the Lower River section, including Lower Shire and Chikwawa districts. The elevation is only 200 to 500 feet above sea level, and the cotton is grown either as a winter crop (planted between March and May and harvested between September and December) or as a semisummer crop planted in January or February and harvested between July and October. Further north cotton may be grown as a summer crop, planted in November or December and harvested between May and August.

The remainder of the Rift Valley, having an elevation of 1,000 to 2,500 feet, has been proved suitable for cotton production, as a winter, semisummer, or summer crop. This area includes the districts of Blantyre West, Upper Shire West, South Nyasa West, Ncheu, Dedza East, Dowa East, Kotakota East, and Karonga East.

The eastern plateau area, having an elevation of 2,000 to 3,500 feet, is considered suitable for cotton as a semisummer or summer crop. This area includes the districts of Cholo, Mlanje, Blantyre East, Chiradzulu, Zomba, Upper Shire East, and South Nyasa East.

The western plateau areas (Central Angoniland) will be reached or approached by the railway extension. Elevations vary from 2,500 to 4,000 feet. The area is considered less reliable than the other cotton areas in Nyasaland as to rainfall, and in the Lilongwe Highlands frosts, which occur during June and July, have been found to be a limiting factor. Cotton production will therefore be successful there only as a summer crop. This area includes the districts of Dedza West, Lilongwe, Fort Manning, Dowa West, Kotakota West, and Kasungu.

PRICES

The fall in prices paid to native cotton growers in Nyasaland has greatly discouraged cotton production by natives. In 1929 the native grower received 2 and 1¾ pence (4 and 3½ cents) for his first-grade seed cotton; in 1930, 1¾ pence; and in 1931, five-eighths and one-half penny (1¼ and 1 cent). The higher 1931 price was paid in Lower Shire district and the lower price in Chikwawa and the more northerly areas. The prices paid in Lower Shire and Chikwawa districts were provided entirely by the British Cotton Growing Association, but the one-half penny (1 cent) per pound for first-grade seed cotton in the other areas was made up of one-fourth penny (one-half cent) per pound paid by this one association and one-fourth penny per pound subsidy by the Government. Third-grade cotton sold for as little as one-fourth and one-half penny during 1930, and the total cost to the association (£46,517) averaged 0.91 penny (1.8 cents) per pound of seed cotton. In 1929 the average price paid by the association was 1.87 pence (3.7 cents). In northern Nyasa, where the association does not buy, another large cor-

poration and a private buyer purchased at a flat price of 1 penny (2 cents) per pound.

In the United States prices for seed cotton (on the basis of one-third of the price for lint) were 5.6, 3.2, and 1.9 cents per pound, respectively, during 1929, 1930, and 1931.

The 5-year agreement between the Nyasaland Government and the British Cotton Growing Association terminated in 1931, and the association took the position that it was unable to guarantee prices any longer in view of the losses incurred during the preceding years. The Government decided that it could not pay the subsidy of one-fourth pence (one-half cent) per pound of seed cotton in 1932, and the Government advised growers in the northern area not to plant with the prospect of a price of only one-fourth penny per pound. However, in the Lower Shire and Chikwawa districts, where the association had paid (without the aid of a subsidy) five-eighths and one-half penny (1¼ and 1 cents) per pound in 1931, the growers were advised that, although the 1932 prices were expected to be not less than those of 1931, there was no guarantee that the prices would be maintained. Some seed was also issued in the Central Shire and Blantyre district, where the prospect was for only one-fourth penny per pound for the 1932 crop. As a result of these factors, the quantity of seed issued for the 1932 crop was only 187 long tons, as compared with 2,477 tons in 1931 and 5,448 tons in 1930. The quantity of seed issued for the 1933 crop was about 360 tons.

METHODS OF PRODUCTION

In the two southern districts of Chikwawa and Lower Shire, where most of the Nyasaland cotton is grown, there were 56,878 native taxpayers, including exemptions, in 1929, of whom 27,495 received issues of free seed from the Government, averaging 50 pounds each. There was produced in 1930 an average of 386 pounds of seed cotton per producer, which was sold at an average price of 0.96 penny (1.94 cents) per pound. Each native plants a small garden of a half acre to 1 acre. A few natives frequently plant 70 to 100 seeds per hole and do not thin the plants much if at all. It is common to find 10 to 20 plants growing per hole. For that reason only 4 to 6 pounds of seed cotton are obtained per pound of seed issued. For the 1932 crop it was proposed to substitute U4 variety seed in place of Nyasaland Upland throughout the Lower Shire area and to issue to each grower only 15 pounds of seed. Eventually it is planned to issue only 15 pounds of free seed to each grower and to charge 1 penny (2 cents) for every additional 5 pounds of seed.

The rainy season in the Lower Shire area begins in November and ends in April. There is practically no rainfall during the intervening winter months. The total rainfall in the 4 years 1927 to 1930 ranged from 24 to 36 inches. In southern Nyasaland planting is done preferably with the first good rain after February 15, although some cotton is planted in January and a great deal in March. At Domira Bay, some distance up on the shore of Lake Nyasa, where cotton is less important, it is planted in December and picked during June and July. In order to discourage late planting all seed stores are opened early in January and are closed on March 15. On the lighter, sandier

soils which dry out quickly in the dry season the natives prefer to plant early in January.[18] The blooms that open in July, after the earliest bollworms have appeared, produce the bulk of the crop. A late set of cotton blooms usually appears in August or September.

Picking is general during September and October. A measurement of 70 native plots revealed yields ranging from 78 to 884 pounds of seed cotton per acre. The average yield of native-grown seed cotton was 250 pounds per acre in the lighter soil and 350 pounds on the heavier soil. The average yields obtained at Domira Bay Experiment Station, more than 500 pounds of seed cotton per acre, compare favorably with average yields in the United States.

Red bollworm and Sudan bollworm cause considerable damage particularly during June. Cotton stainers are the principal cause for cotton grading below no. 1. To prevent disease the Government requires all old cotton stalks to be uprooted by December 15, and an earlier date, November 15, is being considered.

Buying began throughout the Lower River area in 1931 on September 14. Only 4 markets operated in 1931, as compared with 11 in the preceding year; while in the northern cotton-growing area the number of markets was reduced from 19 to 8. These changes made it necessary for the grower to carry his cotton longer distances than usual, and only first-grade cotton was bought. From the quantity of seed distributed for the 1931 crop, amounting to 760 long tons, it was estimated that the production in Lower Shire and Chikwawa would be 4,500 long tons of seed cotton (about 7,250 bales of lint), and 450 tons (about 725 bales) from the northern areas. Actually, the quantities bought from the growers were 2,166½ and 310 tons, respectively, about 3,490 and 500 bales, respectively. It is apparent that the growers, influenced by low prices and increased distances to markets, did not carry to market all of their production.

No cotton was grown in the extreme north in 1931 owing to the distance of 700 miles from the coast and the low price of cotton.

In the Lower River area 22,739 pounds of no. 1 seed cotton was found to yield 7,820 pounds of lint, which is a ginning percentage of 34.4. From this slender evidence it would appear that seed cotton should be divided by 1,390 pounds instead of 1,500 pounds when converting seed cotton into bales of lint of 478 pounds net.

MOZAMBIQUE

TREND OF PRODUCTION

Mozambique is divided into seven governmental districts in addition to the vast area chartered to the Mozambique Co. From south to north these districts are Lourenco Marques, Imhambane, chartered territory of the Mozambique Co., Tete (extending westward up the Zambesi River), Quelimane, Mozambique, Cabo Delgado, and Nyasa.

Temperatures in Mozambique are suitable for the production of cotton. Lourenco Marques has a summer temperature similar to that of Raleigh, N. C., but its winter temperature is about 20° higher. Temperatures in the Zambesi Valley and in the northern districts

[18] In the northern Nyasa area cotton was grown in 1930 by 349 natives, who produced 136,990 pounds of seed cotton, an average of only 392 pounds each. The seed was issued by the Government and consisted of the varieties U4, Over the Top, and Cambodia GC 664.

are somewhat higher and more comparable with Texas summer temperatures, but, again, the winter temperatures are much higher. Temperatures are high enough in the northern districts to make it possible to plant cotton in the fall (March) and grow it as a winter crop, thereby reducing losses from disease which are associated with the high temperatures and heavy rainfall of the summer months.

The average annual rainfall at Lourenco Marques is about 32 inches, of which 26 inches falls between October and March. In various years the rainfall between October and March in Lourenco Marques has ranged between 13 and 58 inches. This lack of dependability is a disadvantage, as is the irregularity of the monthly distribution. The annual rainfall near the mouth of the Zambesi River is approximately 51 to 78 inches. In the mountains of the northern districts the rainfall is approximately as high. In the Shire Valley, just south of Lake Nyasa, the average rainfall is only 27 to 32 inches, and this also characterizes a broad belt lying between the Zambesi or coast and the mountainous areas to the northwest. The heavy rainfall, floods in the lowland, and high humidity, combined with high temperatures favorable to the spread of various plant diseases and excessive vegetative growth, operate to limit the possibilities of cotton growing in a large part of Mozambique.

Attempts to grow cotton have been made since 1900 (*8*). Egyptian, sea-island, and upland varieties have been tried in turn. The principal effort was made between 1922–23 and 1925–26 with Government assistance. In 1921 the Government distributed seed to individual farmers and to selected natives in Quelimane, and about 22,000 acres were planted in 1922–23. Results did not justify continued efforts except in the Shire and lower Zambesi Valleys, where in 1924–25 there were 9,600 acres and 2,700 acres, respectively, as compared with 2,600 acres in the rest of Quelimane district. Exports from the district of Quelimane dating from 1907 reached about 1,500 bales of 500 pounds in 1925. In Mozambique District, north of Quelimane, small-scale attempts have been made repeatedly since before 1916, but in 1926 only a few small farms had grown cotton regularly over a period of 5 years. In the southern districts of Lourenço Marques and Inhambane cotton production on a commercial scale was first attempted about 1920–21. Fair yields, good quality, and high prices stimulated a boom beginning in 1923–24 when 82 registrants for cotton growing listed 4,500 acres for cotton planting, and this number increased to 195 in 1924–25 who listed about 33,000 acres for cotton planting. Several cotton-growing corporations entered the field between 1924 and 1926, and three modern cotton gins were built in Lourenço Marques. Disastrous results from excessive rainfall, drought, insects, and disease greatly discouraged producers, and acreages were reduced. Low prices have subsequently had the same effect.

Two large rivers, the Zambesi and Limpopo, and several smaller rivers, including Inkomati and Sabi, offer fertile alluvial valleys and deltas which are, from a soil point of view, suitable for cotton except when subject to frequent overflow. The upland soils are black clay or red loam, and these often are good cotton lands. The rainfall is ample and well distributed, but depth of soil is lacking, and the fertility declines rapidly under cultivation. Most of the suitable soils are found in the districts of Quelimane and Lourenço Marques.

Two common cotton pests of the United States, the Mexican cotton bollweevil and pink bollworm, are not found in Mozambique. The principal pests are American bollworm, spiny bollworm, Sudan bollworm, cotton stainers, jassids, and stalk borers. The cotton stainers puncture the bolls and cause rot to set in, or they attack the seed in the opening bolls and cause discolored and immature fibers. The jassid is a leaf hopper that attacks the cotton leaves and causes great loss. This pest is being overcome by developing hairy-leafed types of cotton which are jassid-resistant. The boll rots are carried by insects and are more serious because of the prevailing climatic conditions. Bacterial blight and anthracnose also cause serious damage. Damage from insects and disease is reduced by growing cotton in the winter season, but this is only possible in the northern areas of the lower Zambesi Valley and the coast of Quelimane or under irrigation in the Lourenço Marques District.

The principal varieties are Nyasaland Upland, Improved Bancroft, and Zululand Hybrid. The jassid-resistant U4 variety is of more recent introduction.

Many yields have been too low for profit (*8*). The highest yield in the Shire Valley in the three harvests of 1923 to 1925 was 61 pounds of lint per acre, and the highest average in the lower Zambesi and coastal belts was 140 pounds per acre; in the Quelimane district it was 257 pounds per acre. If yields of 100 to 125 pounds of lint cotton per acre were not profitable when the price was 20 cents per pound, there is little possibility of expanding cotton production profitably at present prices, even if the yields could be miraculously increased.

The market value of the crop is reduced by lack of uniformity in staple length caused by irregular rainfall. The length of fiber produced in Mozambique is reported to be about 1 to $1\frac{1}{16}$ inches for Nyasaland Upland and $1\frac{1}{8}$ to $1\frac{3}{16}$ inches for Improved Bancroft. The Government has fostered cotton production by distributing seed and in other ways, but it undertakes little research for the improvement of the industry, and, furthermore, imposes an export duty on cotton.

Labor supplies are cheap and abundant except in the district of Lourenço Marques, which supplies labor for the Rand mines. But the labor is not dependable, and because of its shifting nature it is impossible to retain skilled labor. As a result farming operations are inefficiently performed. A system whereby share cropper or the volunteer labor of squatters would be substituted for the system of paying cash wages is a suggested improvement.

The tsetse fly spreads sleeping sickness among people and nagana among cattle. The occurrence of these flies in most of Mozambique often makes the use of oxen impossible. Donkeys are substituted since they are not subject to the fatal "horse sickness." Wild eland, the largest of the African antelopes, which are almost immune to these diseases, are being domesticated in a few instances to be used as work animals.

No material expansion of cotton production may be expected under prevailing conditions of low prices and low yields. When cotton prices have improved it may be possible to produce profitable yields on the better soils by introducing scientific farming methods, involving the more efficient use of native labor, the more effective control of

insects and diseases, and the investment of capital in providing drainage and irrigation systems. Malaria and other tropical diseases are prevalent and inhibit settlement by Europeans.

There is the possibility that more cotton will be produced as a native-grown crop without European supervision, but under present conditions cotton production by Europeans is declining. In 1929–30 the acreage in Manica and Sofala was 21,864 (1,423 European and 20,441 native), and in the remainder of the colony 47,813 European and an insignificant acreage native (table 126). In 1931–32 the acreage was 19,160 acres in Manica and Sofala (including only 736 acres grown by Europeans), and about 35,000 acres in the remainder of the colony (table 127). Severe droughts during the summer of 1931–32 reduced the crop in the Lourenço Marques and Inhambane districts to less than half of normal. The largest single producing company, located at Moamba, Lourenço Marques district, had reduced its acreage by four-fifths and has now transferred most of its European personnel to another estate under the same ownership in Swaziland.

TABLE 126.—*Cotton: Acreage, production, and yield per acre, Mozambique, 1929–30*

District	On land occupied by Europeans				Quantity purchased from natives
	Growers	Acreage	Production	Yield per acre	
	Number	*Acres*	*Bales* [1]	*Pounds*	*Bales* [1]
Niassa	0				
Cabo Delgado [2]	27	12,000	685	27.3	
Moçambique [3]	14	1,948	257	63.1	16
Quelimane [4]	20	11,350	1,859	78.3	71
Tete [5]	2	1,237	36	13.9	
Manica and Sofala [6]	22	1,423	[7] 228	[7] 75.9	(8)
Inhambane [9]	7	1,591	136	40.9	46
Lourenço Marques	64	19,681	3,209	77.9	
Total	156	49,236	6,408	62.2	133

[1] Computed bales of 478 pounds.
[2] Chiefly in Montepuez and Pemba subdistricts.
[3] Chiefly in Ribaue and Maleme subdistricts.
[4] Chiefly in Massingire subdistrict.
[5] Chiefly in Barue subdistrict.
[6] Chiefly in Chimoio, Chemba, and Sena subdistricts.
[7] Also reported to have been 686 bales averaging 230.4 pounds per acre, but apparently seed cotton was reported as cotton lint.
[8] Not reported but, judging by exports, represented a large part of the total crop.
[9] Chiefly in Inharrime subdistrict.
[10] Chiefly in Sabie and Maputo subdistricts.

Colonia de Moçambique Recenseamento Agricola (*18*).

GOVERNMENT AIDS

The Government committee appointed from Lisbon in 1931 to examine the economic situation in Mozambique reported that substantial concessions should be made in favor of products coming from this colony and imported into Portugal. The proposals included the abolition of the tariffs on cotton, a 50-percent reduction in the tariff on tobacco, and certain aid for the colony's surplus sugar. It was recommended that the maximum discount rate chargeable by the banks should be 2 percent and that ocean freight and shipping charges should be reduced.

TABLE 127.—*Cotton: Acreage and production, Manica and Sofala districts, 1927–28 to 1931–32*

Year beginning Aug. 1	On land occupied by—						Total		
	Europeans			Natives					
	Acreage	Production	Yield per acre	Acreage	Production	Yield per acre	Acreage	Production	Yield per acre
	Acres	*Bales* [1]	*Pounds*	*Acres*	*Bales* [1]	*Pounds*	*Acres*	*Bales* [1]	*Pounds*
1927–28	823	109	63	19,772	2,803	68	20,595	2,912	68
1928–29	1,045	134	61	23,082	2,180	45	24,127	[2] 2,272	45
1929–30	1,423	226	76	20,441	2,569	60	21,864	2,795	61
1930–31	1,704	121	31	22,309	2,774	59	24,013	2,895	58
1931–32	736	205	133	18,424	2,289	59	19,160	2,494	62

[1] Converted to bales of 478 pounds net weight.
[2] Slight error in original data.

Data supplied by the Governor, Companhia de Moçambique, and Vice Consul Toch, Lourenço Marques.

In 1932 Portugal began paying an export bounty on colonial cotton at a rate equal to the difference between the fixed price of 8 escudos per kilogram and the average market price for the month. The following figures published in 1932 in the newspaper Provincia de Angola, give the average market price for cotton as 5.6 escudos (27 cents) in July, 6.45 escudos (31 cents) in August, and 6.45 (31 cents) in September. These are the basic prices that are to be compared with 8 escudos (38 cents). The unofficial local prices quoted by the same newspaper were as follows:

July 24	6.30 escudos (30 cents)
September 21	7.00 escudos (34 cents)
September 26	6.00 escudos (29 cents)

From this it will appear that a shipment made on July 24 would have been subsidized at the rate of 2.4 escudos (12 cents) per kilogram, making a total return to the exporter of 8.7 (42 cents), while on September 26 a shipper would have received a subsidy of 1.55 escudos (7 cents) plus the price of 6 escudos (29 cents), making a total of 7.55 escudos (36 cents) or 16 cents per pound. These figures, although not official, illustrate how the cotton decree will be applied in Mozambique on shipments of raw cotton sent to Portugal.

The premium paid by the Portuguese Government is equal to the difference between the average quotation for lint on the Lisbon exchange or the average New York price of Good Middling and the fixed price of 8 escudos per kilogram, the comparison being for the month of shipment. In 1932 this worked out somewhat as follows:

Average price October, New York	7.45 cents gold.
Premium for Good Middling	.25 cents.
Total	7.70 cents.
Equivalent	3.35 pence.
28 percent exchange	1.30 pence.
Sterling price	4.65 pence.
8 escudos equals	7.77 pence sterling.
Price difference	3.12 pence sterling.
Equivalent difference	1¾ pence gold.

The cotton decree which grants a premium on colonial cotton, is being extended to apply to cotton grown in the territory of the Mozambique Co., which, for certain purposes, is separately administered. This is said to be having a stimulating effect on cotton growers and exporters in this territory (table 128).

TABLE 128.—*Cotton: Exports of lint produced in Mozambique, average 1912–20, annual 1921–32*

Calendar year	Manica and Sofala [1]	Other districts [1]	Total [1]	Calendar year	Manica and Sofala [1]	Other districts [1]	Total [1]
	Bales [2]	*Bales* [2]	*Bales* [2]		*Bales* [2]	*Bales* [2]	*Bales* [2]
Average:				Average—Contd.			
1912–15	(3)	544	(3)	1927	(3)	4,404	(3)
1916–20	(3)	779	(3)	1928	(3)	2,500	(3)
1921	(3)	1,005	(3)	1929	2,009	5,185	7,194
1922	(3)	1,042	(3)	1930	2,613	5,383	7,996
1923	(3)	1,508	(3)	1931	2,223	4,621	6,844
1924	(3)	1,760	(3)	1932	3,081	5,184	8,265
1925	(3)	3,192	(3)				
1926	(3)	5,322	(3)				

[1] Not including small quantities of linters and seed cotton.
[2] Converted to bales of 478 pounds net weight.
[3] Data unavailable.

Official sources.

During the year ended June 30, 1933, payments by the Portuguese Government to cotton exporters of Mozambique under the bounty scheme of 1932 amounted to 1,577,000 escudos (20 percent Lisbon escudos at 110 per pound sterling and 80 percent Mozambique escudos at 113 per pound sterling), the equivalent of $68,000 (about $8.50 per bale) less the depreciation of the pound in relation to the dollar.

ANGOLA

Cotton has been grown by natives in Angola for perhaps a century or more. Cotton growing has been encouraged by the Government at various times. In 1845 all natives gathering 331 pounds of cotton annually were exempted from military service. In 1906 the Government established an experiment station about 60 miles inland from Luanda, where most of the cotton was grown. In 1870, as a consequence of the American Civil War, exports reached about 4,600 bales of 478 pounds but declined thereafter to 157 bales in 1903. They increased with increasing prices after 1917 to a recent maximum of 4,239 bales in 1933. Production varies considerably from year to year according to rainfall (table 129).

Cotton is grown in the northwestern part of Angola in the low country near Luanda and on the Malange Plateau. It is also grown to some extent in the vicinity of rivers southward along the coast. The crop is ginned and exported by Europeans.

During the 5 years 1923–24 to 1927–28 the average yield per acre was 120 pounds of lint. The crops planted in 1927, 1928, and 1929 averaged 80, 80, and 40 pounds per acre. These low yields indicate that the competitive position of Angola is weak.

About 1885 a settlement of South African Dutch people was established in Angola. Conditions were found unsatisfactory and in 1928 nearly all of them, about 1,600 persons, moved to South-West Africa. The Portuguese export bounty on colonial cotton may stimulate further production, but past experience does not indicate that production will reach significant proportions in the near future.

TABLE 129.—*Cotton: Acreage, production and exports, Angola, average 1910–14, annual 1912, 1913, and 1919–33*

Calendar year	Crops planted late in previous year			Exports	Calendar year	Crops planted late in previous year			Exports
	Acreage	Production	Yield per acre			Acreage	Production	Yield per acre	
	Acres	*Bales* [1]	*Pounds*	*Bales* [1]		*Acres*	*Bales* [1]	*Pounds*	*Bales* [1]
Average, 1910–14				630	1925		2,758		2,956
1912				447	1926	22,479	3,776	80	3,842
1913				709	1927	11,974	2,012	80	2,011
1919				1,304	1928	11,858	1,992	80	[2] 1,992
1920				900	1929	39,551	3,328	40	3,670
1921				1,889	1930				3,397
1922				3,456	1931				2,091
1923				1,720	1932				2,703
1924		3,067		3,132	1933				4,239

[1] Calculated bales of 478 pounds net weight.
[2] Of which 93 percent was exported to Portugal, 4 percent to Germany, and 3 percent to Belgium.

Economic Conditions in Angola, by British Consul General, Luanda, 1923, 1925, 1929, and 1932, and reports of the International Institute of Agriculture.

TANGANYIKA

TREND OF PRODUCTION

Cotton production was introduced into Tanganyika more than 30 years ago, when it was under German control (*15*). Originally each native hut owner in the coastal area was influenced to plant one-half hectare (about 1¼ acres) of cotton, but after the native rebellion of 1905–6 it was necessary to recommence the work. Cotton was permitted to be grown among the corn, bonuses were given for good cultivation and sorting, and prizes were given to official chiefs for encouraging cotton growing. Eventually the Germans changed to a policy of declaring a guaranteed price of 0.17 to 0.21 shilling (4.1 to 5.1 cents) per pound of seed cottton. Under this policy some private buyers overbid for the cotton, while others paid lower prices because they were allowed to distribute free seed to natives on condition that the cotton be sold exclusively to them. After the native rebellion, production recovered in 1908 to 1,486 bales of 400 pounds (1,244 bales of 478 pounds), coming chiefly from northern Tabora, Bagamoyo, Rufiji, and Kilwa, with irregular quantities from Mwanza and Tanga. At that time both Egyptian and upland varieties were grown, although Egyptian varieties have since been abandoned. The quantity of seed distributed to natives increased from 177 long tons in 1910 to 406 tons in 1912, and 542 tons in 1913. The production of lint in 1913 amounted to 10,349 bales of 400 pounds (8,660 bales of 478 pounds) and was exceeded in value only by rubber, sisal, and

hides and skins. Official regulation to ensure payment of fair prices proved to be the most effective stimulant to native cotton growing.

During this period Europeans, including 17 companies, also attempted to establish cotton plantations; but although acreage grown by Europeans increased from 11,000 acres in 1909 to 21,795 acres in 1910 (165 plantations) besides 13,306 acres interplanted with rubber or sisal, two-thirds of the production was from native sources. The production by Europeans was centered in the districts of Mohoro, Kilwa, Lindi, Morogoro, and Mwanza. The efforts of these European planters were unsuccessful because of the unsuitable climatic conditions in the northern districts and unsuitable soils and inferior methods of production elsewhere.

Cotton raising by paid labor was quickly abandoned except in the Kilosa and Morogoro districts, although in 1908 there had been 112,000 acres of plantation cotton in Sadani and two large plantations of 52,000 and 25,000 acres in the Rufiji district. Irrigation was costly, and destruction by insect pests was severe, so that in 1912 the total production of cotton, both by Europeans and natives, was only 10,000 bales of 400 pounds (8,368 bales of 478 pounds).

Experience has proved that production by small holders is more hopeful than that by large estate operators and that only those natives who are more energetic shall be entrusted with growing cotton. It is noteworthy that in the Morogoro-Kilosa area native capitalists may be found who raise cotton with paid labor recruited from their own kind. Elsewhere in the eastern districts the natives are concerned chiefly with the production of food crops while working for Europeans on sisal or coconut plantations. Lack of transportation facilities and the long distances to the gins have also handicapped the extension of cotton growing. Considerable areas above 3,500 feet altitude and areas with deficient rainfall are unsuitable for cotton growing, but other important areas await only the coming of gins, improved transportation, and better prices.

Production for export was almost stopped between 1914 and 1918 but cotton was one of the first crops to be encouraged by the department of agriculture which was formed in 1921. Free distribution of seed to native growers increased from 120 long tons in 1921 to 1,568 in 1926. Since that time recognition by the ginners of the export value of cottonseed has led to more economical distribution of seed to natives.

In 1923 there were 19 licensed gins in Tanganyika, and in 1928 there were 40 public gins, of which 35 were licensed for operation in that year. At that time cotton had become the third most valuable export in the territory (*15*).

The acreage of cotton is approximately the same as that of the coffee crop, the rice crop, and the peanut crop. The sisal acreage is 40 to 50 percent greater, and much greater acreages are devoted to millets and corn for native consumption. Acreages of coconuts, sesame, and wheat are much smaller. Cotton acreage has declined since 1928 because of low prices which have caused native growers to lose interest in the crop, even to the extent of leaving the crop unharvested and unmarketed; and among European growers, who interplant young sisal with cotton, the decline in sisal planting has carried cotton production down with it. In the Biharamulo area,

southwest of Lake Victoria, cotton production has proved unsuccessful. But in Tanga Province, along the northeastern coast, natives have turned from coffee to cotton for a cash crop, and the cotton production there has declined less than elsewhere.

The greatest production of cotton is on the lowlands along the east coast in the vicinity of Dar es Salaam and in the Mwanza Province on the south shore of Lake Victoria. In the former district the estate-grown cotton appeared, until recently, to be overtaking the native production, while in the latter district the production is almost entirely by natives (table 130).

TABLE 130.—*Cotton: Production and exports, Tanganyika, 1921–33*

Year [1]	Production [1]									Exports [1]
	Province						Total	Grown by—		
	Tanga	Eastern	Lindi	Mwanza	Tabora	Northern, Iringa, Mahenge, Bukoba		Natives [3]	Europeans	
	Bales	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*	*Bales*
1921	----	3,595	1,803	674	----	----	6,132	----	----	5,136
1922	[4] 218	2,786	540	[5] 2,428	(6)	[7] 32	6,004	2,571	3,433	7,236
1923	326	4,620	808	[5] 3,781	(6)	133	9,568	6,152	3,416	6,884
1924	683	8,110	1,157	4,456	308	951	15,727	9,863	5,864	11,908
1925	1,262	6,389	1,789	7,345	764	630	18,179	13,508	4,671	21,097
1926	293	11,380	1,171	5,622	1,257	560	20,319	14,014	6,305	22,897
1927	110	5,041	713	5,541	859	197	[8] 13,361	9,557	3,804	18,464
1928	223	15,705	1,100	9,252	1,002	295	27,577	20,429	7,148	25,680
1929	266	14,808	1,642	6,303	295	227	23,251	15,149	[9] 8,102	23,183
1930	144	11,069	777	6,957	234	179	[3] 19,360	12,747	[9] 6,613	17,202
1931	142	[10] 3,278	132	[11] 5,759	108	80	[12] 9,499	7,979	[13] 1,520	11,370
1932	674	7,125	35	6,483	----	779	15,096	14,068	1,028	15,039
1933 [14]	267	10,751	777	11,898	----	148	23,891	21,121	2,720	23,782

[1] Bales of 478 pounds. Exports for 12 years exceed reported production by 2,022 bales.
[2] Harvesting and marketing occur from August to December.
[3] Actual proportion somewhat higher. European growers sometimes illegally buy native cotton to help meet commitments on their own crop. Average price over 9 years estimated at 0.15 shilling (3.7 American cents per pound of seed cotton).
[4] Northern Province included under Tanga.
[5] Tabora included under Mwanza.
[6] Reduction attributed to low prices preceding year.
[7] 73 percent graded first quality.
[8] Low yields due to insect damage and field mice. Acreage estimated to be 112,240 averaging only 82 pounds of lint per acre.
[9] 83 percent graded first quality.
[10] Reduction attributed to decline in sisal planting by Europeans (cotton interplanted).
[11] Production, chiefly by natives, declined less than elsewhere.
[12] Low production due to low prices and low yields (locusts).
[13] 80 percent graded first quality.
[14] Preliminary.

Tanganyika Territory, Department of Agriculture, annual reports and Cotton Growing Review, July 1930

Of the (nonnative) production on estates in 1930, 42 percent was produced in Kilosa district, 33 percent in Morogoro district, and 20 percent in Dar es Salaam district, all in Eastern Province. Most of the remaining production on estates was also from districts in the general vicinity of Dar es Salaam.

METHODS OF PRODUCTION

The best time for planting cotton in Tanganyika according to Government experiments is usually in January or early February. The cotton plants thus bloom in April or May, immediately after

the long rains. This is conducive both to high yields and high quality. In the Shinyanga district, just south of Lake Victoria, the optimum time for planting cotton is during December, at the beginning of the principal rainy season. In all cases, cotton planted late gave poor yields in these experiments. In the Shingyanga district cotton suffered extensive damage from Egyptian bollworm during the early bolling period.

> * * * In spite of active propaganda, it is almost invariably planted too late to give maximum returns. The recent deterioration in the average quality of the total cotton lint exported is due to the relatively increased amount of plantation-grown cotton which is crop-picked and not sorted. Some natives in the Dar es Salaam district are planting acreages so large that they say it is an impossible task to pick in qualities, thus we have, strangely enough, large-scale enterprise affecting the export quality of a crop. Unless the first month's pickings are made on quality and the seed from the first quality reserved for next year's planting deterioration will rapidly take place and our cotton will lose practically all its premium, which would possibly result in the elimination of the crop, on account of the relatively poor prices which it will fetch in competition on the overseas market (*13*, *p.* 7).

Cotton yields are conspicuously low—about 82 pounds of lint per acre in 1930 or about 250 pounds of seed cotton—but at experiment stations, on small plots, under more favorable growing conditions, yields of 733 and 820 pounds of seed cotton per acre were obtained. Cottonseed of the U4 jassid-resistant variety was introduced from the Union of South Africa a few years ago as an improvement over the Uganda upland type commonly grown.

The cotton crop is marketed during August to December, immediately after harvest. Cotton-marketing supervisors were employed by the Government at three important markets to see that the natives were paid fair prices for their seed cotton and to enforce the observance of certain rules relating to the marketing of cotton (table 131). The cotton-market supervisors were paid out of a levy on native-grown cotton. As a result, considerable native-grown cotton was marketed under the guise of European-estate production, especially in Eastern Province.

GOVERNMENT AIDS

The Tanganyika Government imposed a tax in 1928 of 6.66 shillings ($1.62 at par) on each running bale of cotton. The tax was evaded and in 1933 was reduced to 2 shillings (49 cents at par) per running bale on all lint cotton exported. This fund is used for supplying free seed to the growers. In 1933 the department of agriculture distributed 1,800 long tons of cottonseed. The Government prohibits the establishment of new gins until existing capacity is exceeded. In 1932, 16 gins were idle, and 26 gins were being operated—14 of them by Indians, 11 by Europeans, and 1 by a Japanese firm. The Government, in cooperation with the Empire Cotton Growing Corporation, maintains several cotton-experiment stations and opens up new roads into cotton-growing areas. To safeguard seed purity and check the spread of disease no unginned cotton is permitted to be moved from one district to another without approval from the director of agriculture. In 1933 the regulation compelling natives to sell only graded seed cotton was amended to apply to nonnatives also.

TABLE 131.—*Cotton: Prices paid for native-grown seed cotton, Tanganyika, 1929–31*

District	1929	1930			1931		
	First quality	First quality	Second quality	Third quality	First quality	Second quality	Third quality
	Cents [1]	Cents [1]	Cents [1]	Cents [1]	Cents [1]	Cents [1]	Cents [1]
Ngrengere	4.4–5.2	2.5–3.3	1.3–2.4	0.7–1.7	2.0–2.4	1.1–1.5	0.6–1.1
Kilosa	4.4–5.3	2.3–3.5	.9–2.4	.4–1.3	1.6–2.8	.6–2.0	.2– .7
Mikese	4.6–5.1	2.5–3.5	.9–2.4	.4–1.8	1.5–2.2	.6–1.5	.2– .4
Kimamba	4.4–5.7	2.2–3.9	.9–2.8	.4–1.1	1.8–3.1	.6–1.6	.2– .8
Mohoro	4.9–5.6	2.2–2.3	1.3–1.4	1.1–1.1	1.6–2.0	1.0–1.3	.3– .7
Lindi	4.0–4.4	2.0–2.8	1.2–1.9	1.0–1.3	1.3–1.3	.9– .9	.7– .7
Mikindanu	3.6–4.4	2.0–2.5	1.0–1.7	.9–1.2	1.1–1.3	.8– .9	.6– .7
Mwanza Province	3.9–4.5	1.9–3.4	----------	.4–1.2	.9–1.8	.2– .4	----------
Tabora Province	----------	----------	----------	----------	.9–1.8	.2– .9	----------
Biharamulo	1.7–3.3	1.2–1.4	----------	.4– .6	.6– .9	.2– .2	----------

[1] United States cents per pound converted at par from East African cents per kilogram.

Tanganyika Department of Agriculture (*18, p. 8; 40, Repts. 1929–30 (pt. 1), p. 24; 1931, p. 15*).

KENYA

TREND OF PRODUCTION

Kenya is one of the least important cotton-producing countries in south and east Africa. Cotton is grown almost entirely by natives independent of supervision. The total crop amounts to only about 1,000 to 5,600 bales per year. Production is erratic; there is no convincing evidence of any pronounced tendency to increase production in the colony greatly. It is rather remarkable that while natives of Uganda have increased cotton production within the last 25 years from almost nothing to 246,718 bales of 478 pounds net weight in 1932–33, no corresponding expansion has occurred in Kenya. Much of the colony is too high and too cold for successful production even though located on the Equator, but in the east-coast area and the lake-shore area there is reason to expect that, with the economic development of native tribes, cotton production will be somewhat expanded.

All of the cotton produced in Kenya is ginned and exported as lint cotton. Ginning statistics and cotton exports are reliable measures of cotton production in the colony (table 132).

PRICES

At the end of 1931 the general price throughout the native areas adjacent to Lake Victoria was 10 shillings ($2.43 at par) per 100 pounds of seed cotton. This is to be compared with prices of 11 shillings to 22 shillings ($2.68 to $5.35) paid in Uganda in 1929 and 17 shillings to 24 shillings ($4.14 to $5.84) in 1928.

METHODS OF PRODUCTION AND MARKETING

Kenya, on the Equator, has no distinct winter and summer seasons. The seasons are designated as the long rainy season, March to June, and the short rainy season, October to December. The hot season is from December to March. From 20 to 40 inches of rain

may be expected to fall during the long rains. Between May and October there is a cool period of cloudy and overcast days with occasional mists in the early morning, but seldom with any rain. The nights during June, July, and August are distinctly cold and unfavorable for cotton in the higher altitudes populated by Europeans, but in September, just preceding the short rains, warm weather again prevails.

TABLE 132.—*Cotton: Production, quality, and price per pound, Kenya, 1925–26 to 1932–33*

Year beginning Aug. 1	Gins	Seed cotton purchased [1]	Percentage A quality	Average buying prices [2]			Lint ginned [3]
				A quality	B quality	C quality	
	Number	*Pounds*	*Percent*	*Cents*	*Cents*	*Cents*	*Bales*
1925–26	9	2,594,491	94	4.2	2.4	1.9	1,749
1926–27	8	1,174,145	92	3.0	1.8	1.2	778
1927–28	8	1,580,718	97	4.9	2.3	1.0	1,039
1928–29	6	2,529,071	94	4.2	1.9	1.5	1,660
1929–30	4	1,500,050	87	3.3	1.4	1.2	1,270
1930–31 [4]	3	992,006	97	2.4	1.0	.....	670
1931–32 [4]	4	2,747,309	84	2.3	.9	.....	1,452
1932–33 [4]	5	5,584,111	89	2.0	.8	.....	3,579
1933–34	.....	8,305,601	88	2.4	1.0	.....	5,649

[1] Some seed cotton, in addition, is sold to gins in Uganda.
[2] Converted at par.
[3] Weight converted to bales of 478 pounds. Cotton lint ginned was 31.4 to 32.3 percent of seed cotton purchased until 1931–32, when it was only 25.3 percent and, in 1932–33, 24.3 percent.
[4] Year ended Feb. 28. Change of fiscal year does not alter the crop considered.

Kenya Agricultural Census Reports, (*14, Rept. 11, p. 27; 18, p. 25; 16, p. 22*).

Cotton in Kenya is grown by natives at the lower altitudes, chiefly in the vicinity of Lake Victoria, but also in the eastern coastal areas. It is rarely grown at the higher elevations where Europeans are settled. Cotton is planted in the long rainy season, May and June, but continues in the lake area until September.

Selected Uganda seed is issued to natives by the gins, but natives require urging to take the seed. They are prone to neglect planting a crop, especially when prices are low. The indifference of the natives results in low yields. The plants are often spaced 3 by 3 feet or 4 by 4 feet, instead of 30 to 36 by 15 inches as recommended. The natives do not cultivate the soil properly. Pink bollworm and stainers are the most serious pests. The old plants are removed in March to reduce infestation of the following crop. It is the general practice to grow cotton on the same land continuously, instead of growing leguminous crops during the rains and simsim during the short rains of every second year, as is recommended.

Picking begins in September near the coast and in November near the lake. Buying begins in November near the coast and in December or January near the lake. By the end of December 1931, 516,721 pounds out of a total of 627,786 pounds of seed cotton in the eastern coastal area had been bought from natives. Cotton received after January 1 is usually of lower quality. In the lake area buying is done chiefly by three companies at various buying posts which they establish.

UGANDA

TREND OF PRODUCTION

Uganda is located on the Equator at the northwestern extremity of the region here designated as south and east Africa. Uganda is bordered on the north by the Anglo-Egyptian Sudan, an important cotton-producing country. Uganda is the principal cotton-producing country in south and east Africa. It is unique in that practically all of the cotton is produced by natives without European supervision.

Cotton was first introduced into Bunyoro Province of Uganda as early as 1872, but it was not until 1903 that cotton production became established commercially. In that year 45 bales of 478 pounds net weight were produced and exported (*25*). In 1910 this quantity had increased to 17,099 bales, in 1920, to 68,089 bales, and in 1930 to 158,092 bales. By 1932 a record total of 246,718 bales was produced (table 133). Between 1930 and 1932 the acreage of cotton planted by natives increased from 739,690 to 1,071,410 acres. A substantial increase in acreage occurred in every important cotton-growing district between 1930 and 1932 (*41 Rept. 1932*) (table 134). This recent increase in acreage and production occurred despite the serious drop in prices that caused a sharp curtailment of production in those countries of southern Africa in which cotton is produced chiefly by Europeans.

TABLE 133.—*Cotton: Quantity ginned, Uganda, 1901–33*

Crop year [1]	Year of export	Quantity ginned	Crop year [1]	Year of export	Quantity ginned
	Beginning Apr. 1—	*Bales* [2]		Beginning Jan. 1—	*Bales* [2]
1901	1902	1	1919	1920	[3] 43,671
1902	1903	2	1920	1921	68,089
1903	1904	45	1921	1922	40,410
1904	1905	201	1922	1923	73,679
1905	1906	818	1923	1924	107,018
1906	1907	3,325	1924	1925	164,048
1907	1908	3,300	1925	1926	151,340
1908	1909	5,200	1926	1927	110,233
1909	1910	11,195	1927	1928	115,888
1910	1911	17,099	1928	1929	170,759
1911	1912	21,624	1929	1930	158,052
1912	1913	23,069	1930	1931	158,092
1913	1914	27,226	1931	1932	173,494
1914	1915	21,946	1932	1933	246,718
1915	1916	15,269	1933	1934 [4]	230,000
1916	1917	23,309			
1917	1918	23,006			
1918	1919	30,569			

[1] Cotton harvested after August for comparison with other countries.
[2] Bales of 478 pounds converted from bales of 400 pounds.
[3] Including 3,760 bales reported in previous figure.
[4] Preliminary.

Uganda Protectorate, Department of Agriculture, correspondence Feb. 21, 1933. These figures agree exactly with cotton exports as officially reported since 1923.

There is no evidence to indicate that a limit has been reached in the expansion of cotton acreage and production. The native population is more dense than in any of the other countries here considered. With the economic development of the country their cash wants are increasing, and, simultaneously, their willingness to produce cotton as a cash crop. In 1932, despite the marked increase in

cotton acreage, only 1¾ percent of the land was used for growing cotton. This is small even considering that a large part of the country is unsuitable for cotton growing. The average yield per acre is about 100 pounds, which is higher than in any other country in south and east Africa. In 1932 the average yield was 110 pounds, indicating that the 45 percent increase in acreage between 1930 and 1932 did not lower the average yield per acre.

The highest yields per acre, according to numerous quarter-acre comparisons made by the Government in 1929 and 1931, are obtained in south Busoga district near Lake Victoria and in the southern and western part of Lango district near Lakes Kyoga and Kwania and adjoining swamps. The high-yielding area in southern and central Busoga is fertile elephant-grass country which is favored by adequate but not excessive rainfall. Low yields were obtained in the north and eastern part of Lango district, the northern part of Teso district, the eastern part of Bugwere district, and the southern part of Budama district. This crescent-shaped area of low yields borders the dryer area where rainfall is less than 50 inches per year. The 2-year average yields of these quarter-acre plots in south Busoga was 207 pounds of lint per acre, as compared with 151 pounds in west and south Lango, 136 pounds in west Bugwere, 124 pounds in north Busoga, 109 pounds in north Budama, 100 pounds in south Teso, 76 pounds in east Lango and south Budama, 67 pounds in Bugwere, 57 pounds in north Lango, and 37 pounds in north Teso. The average yield per acre of all cotton planted in Eastern Province in 1930 (assuming 1 pound of lint from 3 pounds of seed cotton) in the various districts, was Busoga 115, Lango 120, Teso 110, Bugwere 74, Budama 81, and Bugishu 59 pounds.

Bugishu district is mountainous, and the normal rainfall ranges from 50 to 70 inches. Throughout most of the cotton area rainfall is 50 to 55 inches per year. West and southwest of Mengo district annual precipitation is as low as 35 or 40 inches, except on the mountainous areas on the western border, and cotton acreage there is very small. The northern part of Uganda, including the northern part of Mengo district, normally has less than 50 inches of rain, except in a crescent-shaped area which includes southern Lango, southern Bunyoro, southeastern Teso, and Bugwere districts.

In comparison, normal precipitation at Charlotte, N. C., is 46 inches, at Greenville, S. C., 53 inches, at Atlanta, Ga., 48 inches, at Vicksburg, Miss., 52 inches, at New Orleans, 57 inches, and at Fort Worth, Tex., 33 inches. The similarity between rainfall in the cotton-producing areas of the United States and in those of Uganda is apparent. The expansion of cotton acreage in Texas into areas of less than 40 inches of rainfall suggests the possibility of similar expansion in Uganda. At least three-fourths of the area of Uganda has a normal annual rainfall of 40 inches or more. The area having more than 60 inches annual rainfall is negligible, except in the mountains, which are not extensive.

The extension of railway facilities will hasten the expansion of cotton production. At the beginning of 1931 the extension of the railroad from Jinja, in Busoga district, to Kampala, in Mengo district, was opened for traffic. This made it possible to transport most of the cotton crop from Uganda to Mombasa by rail, thus avoiding

the double handling which occurred when the crop from Buganda Province was shipped by boat across Lake Victoria. The acreage of cotton in Buganda Province had been 199,035 in 1929 and 194,629 in 1930. It increased to 291,665 acres in 1931 and 318,311 acres in 1932. The increase between 1930 and 1932 was 64 percent, as compared with 39 percent in Eastern Province, including Lango district, already served by rail. The difference is chiefly attributed to improved transportation facilities.

There are three general types of soil: (1) Red loam, (2) lake-basin soil, and (3) intermediate. This classification does not include the small areas of black volcanic soils near the mountains. The red-loam soil consists typically of 40 percent of clay, 17 percent of silt, 18 percent of fine sand, and 20 percent of coarse sand. Its loss on ignition is 14 percent. This type of soil produces good cotton. The lake-basin soil was laid down under water and is sandy. It contains typically 19 percent of clay, 15 percent of silt, 27 percent of fine sand, and 39 percent of coarse sand. Its loss on ignition is only 4 percent. This type of soil is found in the broad belt around Lake Kioga, in the Lake George plain, to the east of the Masaka and Bukoba road, and to some extent in the Entebbe district. This soil is usually covered with short grass and scrub. It usually has a thin layer of black sticky organic matter on a sandy yellow subsoil which is frequently cemented into an impervious layer. Cotton will not grow on this soil except in seasons of well-distributed rainfall. The intermediate type of soil is a silty loam usually located between the other two types. Typically it contains 30 percent of clay, 10 percent of silt, 19 percent of fine sand, and 34 percent of coarse sand. Its loss on ignition is 11½ percent. Cotton is grown on this type of soil. Generally speaking, the quality of the soil in Uganda is not a factor limiting the cotton acreage.

METHODS OF PRODUCTION

Cotton is grown in 16 districts extending over a large part of Uganda, but the principal producing areas are in Eastern Province and Buganda Province, just north of Lake Victoria (table 134). With the exception of 286 acres (1931) all of the cotton is grown by natives. The average acreage per native grower is greater than elsewhere in the countries under discussion, as evidenced by the fact that with a native population of 3,149,000 (1927) cotton acreage was 1,071,410 acres (1932), and a considerable part of the native population does not grow cotton.

Total rainfall in the principal cotton districts averages about 50 inches per year. There are two rainy seasons instead of one, as in the countries south of Kenya, and cotton can be planted at two different seasons. In practice, however, the bulk of the cotton in Uganda is planted between June and August, the months separating the two rainy seasons. Picking is done during the dry months of the year, November to February (tables 135 and 136).

A number of varieties have been tried. The original introduction in 1872 was Gallini cotton. In 1905 the Black Rattler variety was grown with considerable success. In 1911 the Sunflower variety was obtained. In 1915–16 Nyasaland Upland was introduced. Origi-

nally the cultivation of Egyptian cotton was attempted, but in 1907 the Government decided to proceed with American upland types only.

TABLE 134.—*Cotton acreage: Distribution of native owned in Uganda, 1929–32*

Province and district	1929	1930	1931 [1]	1932
Eastern Province:	*Acres*	*Acres*	*Acres*	*Acres*
Busoga	111,324	132,890	137,887	221,271
Budama	33,814	31,810	36,827	64,300
Bugwere	77,038	107,484	112,101	123,530
Bugishu	33,041	26,793	47,592	48,856
Teso	107,670	118,813	115,626	134,481
Lango	57,015	66,757	52,453	(2)
Total	419,902	484,553	502,516	592,438
Buganda Province:				
Mengo	96,093	99,506	145,285	157,668
Entebbe	47,299	41,023	70,340	96,924
Masaka	28,000	25,600	39,090	33,828
Mubende	27,643	28,500	36,941	30,891
Total	199,035	194,629	291,665	318,311
Northern Province:				
Lango				83,183
Bunyoro	15,600	15,000	16,550	25,000
Gulu	17,000	19,915	26,200	22,300
Chua	6,800	12,000	12,245	18,000
West Nile		6,580	5,050	4,200
Total	39,400	53,495	60,048	152,683
Western Province:				
Toro	3,100	6,000	4,847	5,505
Ankole	1,720	1,013	6,183	2,473
Total	4,820	7,013	11,030	7,978
Grand total	663,157	739,690	865,259	1,071,410

[1] Acreage grown by Europeans in addition: Mengo district, 179; Entebbe district, 47; and Mubende district, 60 acres; total 286 acres, compared with 111 acres in 1932.
[2] Transferred to Northern Province.

Uganda, Department of Agriculture (41).

TABLE 135.—*Cotton: Percentage of monthly plantings, Eastern Province, Uganda, 1928–31*

Month	1928	1929	1930	1931	Month	1928	1929	1930	1931
	Percent	*Percent*	*Percent*	*Percent*		*Percent*	*Percent*	*Percent*	*Percent*
May	3.5	2	1.7	2.1	August	29.0	33	46.9	26.3
June	21.0	13	13.5	18.1	September	4.5	15	9.5	4.3
July	42.0	37	28.4	49.2					

Uganda Department of Agriculture Annual Report, 1931 (41).

In 1908 the Government took full control of importation and distribution of seed, and in 1911 it started a seed station at Kadunguru. By 1916 all of the seed planted consisted of selections made locally. In 1919 the Serere Experimental Station was opened, and in 1925 an improved strain, N–17, was put into general distribution. Since 1929 the Government has systematically introduced a new and improved strain, SG–29, and in 1931 there were 55,499 acres of this strain planted. During 1931 the Uganda Government amended the cotton ordinance of 1926, giving the governor power to proclaim any

TABLE 136.—*Rainfall at two stations and seasonal cotton operations, Uganda, normal and 1932*

Month	Kampala, south central		Serere, east central		Seasonal cotton operations
	Normal	1932	Normal	1932	
	Inches	*Inches*	*Inches*	*Inches*	
January	2.13	0.61	0.57	0	Picking and selling.
February	2.76	.82	1.98	1.81	Selling.
March	6.32	10.03	4.23	8.32	Do.
April	6.86	6.03	7.90	3.83	Do.
May	5.31	5.04	6.45	9.41	Do.
June	3.38	.70	4.49	2.68	Planting.[1]
July	2.60	1.35	4.91	4.83	Do.
August	4.01	2.41	6.35	5.86	Do.
September	4.42	8.49	6.34	13.24	
October	4.46	2.91	4.96	3.26	
November	4.41	4.50	3.73	2.51	Picking.
December	3.53	3.70	1.89	5.19	Do.
Total	50.18	46.59	53.80	60.94	

[1] Best yields from early plantings.

Uganda Department of Agriculture correspondence dated Feb. 23, 1933.

area to be a segregated area for the purpose of increasing the seed supply of any variety of cotton. In any such area control of planting, marketing, and ginning of the cotton is vested in the director of agriculture. In this way variety improvement is facilitated.

The best yields are obtained from early plantings during May and June, although considerable cotton is planted as late as September. The later cotton is planted on the old bulo (millet) plots after the grain is harvested. The destruction of many bulo plots by locusts during May, June, and July 1931 caused planting of cotton on these plots to be unusually early in that year. By September most of the crop is about a foot high, and the picking of early planted cotton begins in November. September, October, and November are critical months, when excessive rains cause heavy shedding of squares and bolls and increase the damage caused by insects and blackarm disease (*Pseudomonas malvacearum*). Sometimes deficient rainfall at this time induces shedding of squares and bolls and reduces yields. Pink bollworm appeared in Uganda for the first time during 1931, and the Government imposed stringent regulations against the export of seed cotton and cottonseed from the infested districts. Most of the cotton is picked during November, December, and January, but sometimes heavy blooming produces a large, late top crop in February and March.

METHODS OF MARKETING

Prior to 1906 Uganda cotton was ginned at Kisumu in Kenya. The first cotton gin in Uganda was erected at Kampala in 1906. During the early years cotton was bought by wandering native buyers who arranged "head transport" to the gins at Kampala. East Indian traders, settled in the outlying districts, took some part in the purchase and collection of cotton. Later cotton came to be bought and collected mainly by Indian traders, who stored it in their shops. Beginning in 1913 open markets were held in Teso and

Lango, and the system was extended throughout the Eastern Province in 1914. In 1919 these were superseded by permanent centers for the daily purchase of cotton throughout the season. In Buganda Province open markets were instituted in 1917, but by 1932 permanent centers had not yet been introduced. East Indian ginners handle over 80 percent of the Uganda cotton crop. Large profits were made by Indian cotton dealers during the years of high and rising prices following 1917.

Gins were first established at Jinja in 1911 and 1912. In 1914 there were 20 gins in Uganda. In 1915, 6 gins existed in Kampala and 1 nearby at Entebbe, on the north shore of Lake Victoria. In 1930 there were 193 gins—148 owned by Indians, 39 by Europeans, and 6 by Japanese. In 1931 there were 127 gins licensed to gin and bale cotton, but 2 of these, in addition to 67 other gins not licensed for 1931, were not in operation during that year.

Since 1927 motor transport has been increasingly used for delivering seed cotton to the gins, and it has become common for cotton to be bought as much as 60 miles distant from the gin. This has had the effect of mixing good and ordinary cotton and tends toward greater congestion at the markets as a result of more rapid marketing.

In 1932 the buying season in practically all districts was opened by official decree on January 25, but in a few other districts the season opened on February 8, 15, or 29. The marketing season ended in July.

Nearly all of the cotton is at present shipped to India, although Great Britain and Japan formerly took significant quantities (table 137). Until 1917 Liverpool was practically the only market for Uganda cotton. The cotton trade with India is controlled by a cotton merchants' association of Bombay, the members of which own over 80 percent of the gins in Uganda and Tanganyika. As a result of the establishment of about twice as many gins as were needed for efficient operation, competition increased, and ginners' profits were forced down, until in 1928 a cotton-buying association was formed by the ginners of Uganda. This development was opposed, and in 1931 there were no big combinations of ginners in buying associations, although certain European firms in that year came to agreements as to price and competition.

TABLE 137.—*Cotton: Exports from Uganda, 1928–31*

Destination	1928		1929		1930		1931	
	Quantity	Percentage of total	Quantity	Percentage of total	Quantity	Percentage of total	Quantity	Percentage of total
	Bales [1]	*Percent*	*Bales* [1]	*Percent*	*Bales* [1]	*Percent*	*Bales* [1]	*Percent*
Great Britain	49,304	36	44,726	22	9,197	7	16,065	9
India	76,304	55	118,529	60	112,573	88	171,502	91
Japan	12,728	9	35,139	18	6,814	5	236	
Total	138,336	100	198,394	100	128,584	100	188,403	100

[1] Running bales of about 400 pounds

Uganda, Department of Agriculture (*21, Repts. 1930–31*).

PRICES

Most Uganda cotton is 1⅛ inches in staple length and brings a premium over ⅞-inch quotations. Extremely high prices were obtained for cotton in 1919 and 1920, but in 1921 the price f. o. b. Mombasa fell from 3.96 shillings (96 cents at par) per pound for lint to 7.8 shillings (19 cents at par). Prices subsequently recovered somewhat. In 1927 growers were paid prices varying from 0.12 shilling (2.9 cents) to 0.17 shilling 4.1 cents) per pound of seed cotton in the various Provinces. In 1928 these prices averaged, in the various Provinces, from 0.17 shilling to 0.24 shilling (4.1 cents to 5.8 cents). In 1929 average prices again fell and ranged in various Provinces from 0.11 to 0.22 shilling (2.7 to 5.4 cents) per pound of seed cotton. These prices in some cases were somewhat lower than it is calculated might have been paid considering the American Middling ⅞-inch price on the Liverpool market and the prevailing premiums of 300 pence points per pound of lint in 1927, 400 points in 1928, and 175 to 200 points in 1929, and assuming an operating margin of 0.31 to 0.59 shilling (7.54 to 14.4 cents) per pound of lint to cover buying expenses, ginning, pressing, baling, overhead expenses, transport of lint to railroad, cotton tax, ship freight, and overseas selling charges. During January, February, and March 1931 prices rose from 0.07 shilling to 0.2 shilling (1.7 to 4.9 cents) per pound of seed cotton.

GOVERNMENT AIDS

The Government of Uganda, in collaboration with the British Cotton Growing Association and, later, the Empire Cotton Growing Corporation, has contributed largely to the expansion of the cotton industry since its inception in 1903. Since 1908 the Government has exercised exclusive control over the importation and distribution of seed. It has developed improved strains and has evolved improved cultural practices. When the price of cotton dropped precipitously in 1921, the Government purchased part of the crop which was subsequently sold at a profit. A cotton tax of 0.04 rupee (1.6 cents) per pound of lint was imposed in 1919 for the advancement of the cotton industry. This was reduced to 0.03 rupee during the following 3 years and then changed to 0.06 shilling (0.05 shilling in 1930) during the subsequent period, with the exception of 1927, when the cotton tax was only 0.02 shilling (one-half cent). The cotton-tax ordinance was replaced in 1931 by the cotton export-duty ordinance. The scale of taxation was amended, making the lowest price at which the tax becomes operative 5.01 pence (10 cents), as against 6.01 pence (12 cents) in the previous ordinance. The price basis of the tax continued, as in the past, to be the price of American Middling cotton, but July futures in December were substituted for those of June. Legal transactions in baled cotton must be registered. In 1931 the particulars of 1,861 contracts covering 251,167 bales of cotton were recorded.

The Government commissioner recently laid down several recommendations for the regulation and control of cotton buyers in order to protect the interest of the native growers and to encourage still further the cultivation of cotton. Recommended regulations included control of price, limitation of the number of gins, and the extension

of educational work among native growers. It is claimed considerable cheating is practiced by cotton buyers at the expense of native growers. This is done by giving short weight, or short change, or by bribing chiefs to induce their natives to deliver the cotton and receive payment at a much lower price than the chiefs receive. Official native weighers are recommended as a corrective measure, together with a prominent exhibition of prices being paid at each buying place.

In 1931 the Government of India proposed to levy a duty of one-half anna (1.05 cents) per pound on raw cotton imported into India. In opposing this proposal the Indian traders in Uganda claimed that the duty was unjustified because Uganda cotton was of superior spinning value to cotton produced in India and was not competitive with the various qualities of Indian cotton.

SUGAR

INTERNATIONAL SIGNIFICANCE OF SOUTH AND EAST AFRICAN COUNTRIES

The present and future production of sugar in Africa deserves the consideration of those who are engaged in sugar production in the United States. In 1932–33 the African countries Egypt, Union of South Africa, Mozambique, and islands of Reunion, Madagascar, and Mauritius produced 943,000 short tons of sugar, all from sugarcane. This was 5 percent of the estimated total world production of cane sugar. The Union of South Africa and Mozambique produced one-half of the 943,000 tons. The Union alone produced more cane sugar and one-fourth as much total sugar as continental United States. The Union's share of the total world production of both cane and beet sugar has increased from 0.60 percent in 1924–25 to 1.34 percent in 1932–33 (table 138). The percentage produced by Mozambique is about one-third as large. Other south and east African countries not enumerated separately have entered recently upon the production of cane sugar on a modest scale. Production in the Union may be doubled or trebled within a few years by the adoption of recent technical improvements, but this expansion may be checked by low price levels.

The increasing shipments of sugar from Mozambique to Portugal and from the Union to England and Canada will make it somewhat more difficult for the principal producing countries, like Cuba and Netherland India, to dispose of their sugar in these countries. However, there is no immediate prospect of a serious glutting of world markets by the south and east African countries.

UNION OF SOUTH AFRICA

TREND OF PRODUCTION

Sugar is one of the important export products of the Union. Its production has expanded from 120,000 to 391,173 short tons between 1918 and 1933. The coastal belt in the vicinity of Durban is well suited to the production of sugarcane. The industry dates from 1849. Expansion followed the increase in consumption resulting from the opening of the mines on the Rand and elsewhere between

1880 and 1889. The Anglo-Boer War also led to greater local demand, and the opening up of native lands in Zululand in 1905 was a stimulating influence. Since that time, governmental policies have contributed largely to the subsequent expansion. In 1903, tariff preferences were established against Mauritius and overseas sugar, and in 1922 a duty was imposed on sugar from Mozambique. Successive increases in the sugar duty were made in 1926, 1930, and 1932, with a result that the production of sugar has doubled during the last 10 years. Land formerly used for the production of other crops, such as tea, has been diverted into sugarcane production, particularly since 1910. The price of sugar for consumption in the Union has been limited since 1926, but it is possible to obtain for the domestically consumed production considerably more than the price obtained for exports. Exports reached a peak of 210,000 tons in 1931. Further expansion has been checked temporarily by the severe drought of 1931 and perhaps permanently by the increasing proportion of the production that must be sold at low export price levels (fig. 70). The quota for export in 1932–33 was established at 52 percent of the total crop, and the price paid for cane was less than the estimated cost of production.

TABLE 138.—*Sugar: Production in the world and in the Union of South Africa, 1924–25 to 1933–34*

Year of harvest	World production [1]	Union of South Africa [2]	
		Production	Percentage of world total
	Short tons	*Short tons*	*Percent*
1924–25	26,670,000	161,250	0.60
1925–26	27,989,000	239,851	.86
1926–27	26,624,000	242,662	.91
1927–28	28,515,000	247,273	.87
1928–29	30,055,000	295,034	.97
1929–30	30,607,000	298,036	.98
1930–31	31,530,000	[3] 393,205	1.25
1931–32	29,500,000	[3] 325,933	1.10
1932–33	27,088,000	[3] 358,905	1.33
1933–34	[4] 28,383,000	[3] 391,173	1.20

[1] Foreign Crops and Markets 26 (*23*): p. 654; includes cane and beet sugar.
[2] Union of South Africa Official Year Book (*47, no. 13, p. 393*); cane sugar only
[3] Reported by Consul Miller and South African Sugar Association.
[4] Preliminary.

In 1918 an investigation was made to discover how far the production of sugar within the Empire was capable of development, and the estimate for Natal was a total of 900,000 tons. Production has more than doubled since 1918, but the estimate of 900,000 tons will not be reached for many years, if at all. The secretary of the South African Sugar Association estimates that the production during the 5 years 1933 to 1937 will increase to around 500,000 tons per year and in rainy years when growing conditions are unusually favorable, to 700,000 tons. Higher yielding varieties, slightly larger acreage, and irrigation are mentioned as reasons for this relief. It is not expected that the area will be materially expanded.

It is limited on the north by the occurence of tsetse flies that bring nagana to the cattle and mosquitoes that spread malaria to the people. In the south the lands are all too rough to permit further acreage expansion. Throughout the length of the cane belt the cane lands are hedged in by native reserves and locations. A few areas otherwise suitable for expansion are handicapped by the absence of railway transportation and at the extreme northern end of the cane belt the high cost of transport is a distinct handicap. It costs 30 shillings per ton to move sugar from Umfolosi, at the northern limit of the cane belt, to Durban as compared with 5 shillings from Mount Edgecombe, just north of Durban.

The rapid expansion of sugar production in South Africa has been checked. Production during 1932 was 358,905 short tons, against 325,933 tons in 1931 and 393,205 tons in 1930. The reduc-

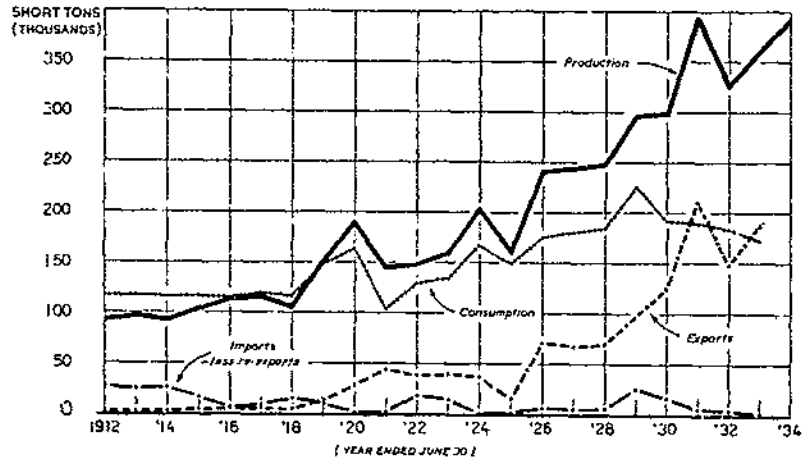

FIGURE 70.—PRODUCTION, CONSUMPTION, AND TRADE OF SUGAR, UNION OF SOUTH AFRICA, 1912–34.

Sugar production has steadily increased, and, since 1925, has greatly exceeded domestic consumption.

tion in 1931 was caused by drought in northern Natal, including Zululand, combined with most unusual September frosts in certain areas.

The 1934 crop is estimated to be 350,000 tons. Low prices have discouraged planting. Prices per ton paid to planters for sugarcane of 13 percent sucrose delivered at the mill have declined during the past 4 years (table 144).

The time for planting new cane is from September to December. The cane that has passed its third ratooning usually yields too little to save and is plowed up. Twenty tons per acre biennially is usually considered the minimum yield for profit. When prices are high, additional ratooning is profitable even at lower yields per acre, but when prices are low, the older cane lands are more likely to be plowed and replanted. However, in 1932–33, under adverse financial conditions, less old cane was plowed out and less new cane was planted. The number of profitable ratoon crops depends upon the quality of

TE 466 (1935) USDA TECHNICAL BULLETINS UPDATA
AGRICULTURE IN SOUTHERN AFRICA
TAYLOR, C.C. 4 OF 4

the soil, and other factors. Furthermore, irrigated cane is often cut annually, and there may be 5 or 6 ratoon crops. The irrigated acreage now amounts to only about 5,000 acres out of almost 350,000 acres, but the irrigation projects now under development or consideration may increase the irrigated acreage to 50,000 or 100,000 acres. It is estimated that by irrigation it will be possible to double the annual sugar production of South Africa, but at present prices it would not be profitable, in view of the heavy costs of pumping water from the rivers, and the expansion from this source is not likely to affect the mentioned tendencies toward a diminution of production.

Another influence against marked reduction in acreage is the fact that the lands now in cultivation represent much invested capital and will not be quickly abandoned. Practically no other crops are grown in the sugar belt, although the local industry is over 50 years old, and substitution of other crops does not seem generally practicable.

About one-third of the crop is produced by the milling companies, whose invested capital is great and whose necessity for maintaining production will be equally great, even though mergers eliminate some of the weaker mills. The other two-thirds of the crop (over 200,000 acres) is in the hands of about 600 independent planters with acreages averaging between 300 and 400 acres, although some have more than 1,600 acres. These planters will abandon production reluctantly. A recovery of prices will prevent reduction in their numbers except as they may sell out to the mills.

Another factor against marked curtailment of production is the introduction of improved strains of cane, which yield much more than the present Uba variety and give a factory recovery of 80 to 85 percent, as compared with the present 75 percent. Among the best of the new cane varieties is Co. 290 from India, suitable for dry land, and P. O. J. 2878 from Java, suitable for irrigated land. The Natal Sugar Experiment Station is testing over 100 promising varieties of improved cane from various parts of the world. The first canes have been released by the station for commercial planting. Several hundred tons have been distributed for planting, and it is expected that in 2 or 3 years, if not sooner, half of the new plantings will be of one or more of these new improved varieties, particularly since the canes are ready for use as plant cane at the end of 1 year instead of 2. The average yield of sugar per acre per year in the Union is only 1 ton, as compared with 6 tons in Hawaii and Java. Limiting factors in the Union include low and irregular rainfall, low temperatures during winter months, soil deficient in phosphorous and organic matter, and the existence of one or two minor diseases of sugarcane. A material increase in the yield of sugar per acre would reduce the cost of production and enable the growers to compete more successfully in overseas markets.

Drought has demonstrated the value of the Uba variety, which is both disease resistant and drought resistant. These advantages are sufficient to offset its small-sized canes and high fiber content. It is not likely that the improved varieties of Java cane now being distributed for the first time by the Natal Sugar Experiment Station will ever completely displace the Uba variety from the areas that are most susceptible to drought and disease.

A yield of 20 tons of cane, which brings 12 shillings ($2.92) per ton is still profitable on some lands where the production costs are estimated to average £10 ($48.67) per acre, but if 2 shillings (49 cents) is allowed for costs of transporting cane to the mill there is no profit, and for many producers there is a loss. With the low yields of 1931 losses were common.

The highest yield of cane per acre was obtained in 1925, and there is no obvious tendency toward an increase in average yield (table 139). It is significant, however, that yields in Zululand have decreased during the 5 years 1926 to 1930, while yields excluding those in Zululand have increased. This is probably because Zululand cane in 1926 was more largely grown on new lands, where yields were above average and where less attention has been given to maintaining the soil.

TABLE 139.—*Sugar: Yield of cane and of sugar, Union of South Africa, 1924–31*

Year of harvest	Acreage harvested	Cane harvested (May to December)			Sugar produced			Rainfall at Mount Edgecombe
		Total	Per acre	Per ton of sugar	Total	Per acre	Per acre per year	
	Acres	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Inches*
1924	92,965	1,720,344	18.60	10.72	161,250	1.73	0.87	29.93
1925	109,362	2,638,000	24.12	11.00	239,851	2.19	1.10	43.80
1926	114,279	2,335,406	20.44	9.62	242,662	2.12	1.06	25.42
1927	128,734	2,482,000	19.28	10.04	247,273	1.92	.96	42.46
1928	141,224	2,878,149	20.38	9.73	295,934	2.10	1.05	27.56
1929	135,807	2,818,000	20.75	9.44	298,635	2.20	1.10	43.83
1930	169,503	3,801,886	22.39	9.67	[1] 393,205	2.32	1.16	30.03
1931	(2)	3,123,792	(2)	9.58	[1] 325,933	(2)	(2)	28.01

[1] Revised to agree with Consul Miller's report.
[2] Data lacking.

South African Sugar Technologists' Association (*6, p. 29*).

The drought in 1931 and 1932 greatly stimulated interest in the development of irrigation for sugarcane. Several of the large sugar estates are installing new pumping plants for raising water from the rivers, or are enlarging the pumping plants and storage reservoirs already in operation.

The sugarcane area of the Union extends in a narrow strip along the coast of Natal Province from Port Shepstone on the south to Illabisa district on the north. This coastal strip is about 235 miles long and, with minor exceptions, extends only 10 or 15 miles inland (table 140).

The sugarcane acreage at the beginning of the 1932 season was 300,860, which is an increase of 43 percent in the 8 years since 1923, and an increase of 4 percent from 1931. This was the second time in 10 years that the area of plant cane showed a material decrease. The recent slump of sugar prices is doubtless the cause. The area reaped in 1931 declined for the first time. The reduced planting in 1930 will be further reflected in the statistics for the area harvested in 1932. The acreage of virgin cane land prepared for planting grew from 10,536 acres in 1922 to 20,050 acres in 1928, but decreased again to 9,058 acres in 1931. The area in sugarcane at the beginning of the 1932 season was only 48 percent of the area of the 583 farms

growing cane. At that time cane growers reported that there was an additional 15 percent of the farm area (90,971 acres) suitable for cane but not yet planted or prepared. It is significant that between 1925 and 1929 the farmers' estimates of land suitable for cane but not yet planted or prepared rose from 98,000 acres to 139,000 acres despite the fact that 65,000 acres of virgin land were prepared between these two dates. Since 1929 there have been 38,000 acres of virgin land prepared, and the estimate of remaining land suitable for cane has decreased by 48,000 acres. This indicates that the growing optimism as to the suitability of land for cane has been checked since 1929. Tables 141 and 142 reflect the details of these tendencies. The oldest districts of Pinetown and Camperdown, near Durban, have increased in acreage only 5 percent in the 8 years since 1923, while the greatest percentage increases occurred in the new areas in Eshowe and Hlabisa districts. In the latter area no cane was grown in 1923. Most of the acreage described as suitable for cane and not yet planted is found north of Durban, especially in the important districts of Lower Umfolosi and Lower Tugela.

TABLE 140.—*Sugarcane: Acreage in the Union of South Africa*

District [1]	Acreage, Apr. 30, 1933	Percentage increase, 1923–33	Acres suitable for cane [2]	District [1]	Acreage, Apr. 30, 1933	Percentage increase, 1923–33	Acres suitable for cane [2]
	Acres	*Percent*	*Acres*		*Acres*	*Percent*	*Acres*
Port Shepstone	7,743	39	4,132	Eshowe	14,437	603	8,950
Umzinto	59,082	119	12,371	Lower Umfolozi	59,207	48	32,093
Pinetown	13,257	6	4,487	Hlabisa	8,540	[3]	8,535
Inanda	45,251	8	4,414				
Lower Tugela	87,051	64	28,820	Total	336,500	60	117,710
Mtunzini	41,602	50	13,899				

[1] Arranged geographically from south to north.
[2] Not yet planted or prepared, 1933.
[3] Not enumerated in 1923.

Union of South Africa: Monthly Bulletin of Union Statistics, April 1934. [Mimeographed]

TABLE 141.—*Sugarcane: Acreage owned by Europeans in the Union of South Africa, 1923 to 1933*

Year beginning May 1—	Plant cane	Ratoons					Total [1]
		First	Second	Third	Fourth	Other	
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
1923	69,710	36,098	32,745	34,044	22,877	15,522	210,996
1924	69,141	43,823	26,362	27,536	19,166	14,921	200,951
1925	72,986	54,273	32,956	25,459	17,398	13,698	216,800
1926	76,086	59,098	41,081	26,030	15,791	13,272	231,967
1927	73,537	64,256	49,012	28,418	14,071	16,023	245,247
1928	86,246	64,172	53,227	31,701	15,073	13,916	264,335
1929	90,293	68,647	59,930	29,348	16,549	16,127	299,894
1930	98,814	73,087	62,322	39,640	17,142	18,913	309,918
1931	84,814	75,219	56,944	40,522	16,309	15,245	289,053
1932	81,195	74,972	64,075	41,941	18,736	19,041	300,860
1933 (Uba variety)	85,046	78,525	71,252	52,557	22,464	23,007	332,851
1933 (Other varieties.)	3,489	143	17				3,649

[1] Not including insignificant acreage of varieties other than Uba.

Compiled from Agricultural Census Reports; Monthly Bulletin of Union Statistics, March 1932; and correspondence, Union of South Africa, Office of Census and Statistics.

TABLE 142.—*Sugar: Farms, acreage and probable expansion, Union of South Africa, 1922–23 to 1932–33*

Year beginning May 1—	Farms	Total area of farms	Cane land		Cane plowed out	Average age of cane plowed out	Land prepared for cane		Land suitable for cane not yet planted or prepared
			Area reaped	Cane reaped			Old cultivated land	Virgin land	
	Number	*Acres*	*Acres*	*Sh. tons*	*Acres*	*Years*	*Acres*	*Acres*	*Acres*
1922	501	484,253	79,759	1,578,801	[1] 22,893	[1] 8.32	[1] 17,791	[1] 10,536	[1] 101,346
1923	565	487,454	99,467	1,918,560	21,323	8.43	16,368	13,715	92,091
1924	600	512,112	86,631	1,616,210	19,799	8.28	18,306	12,477	98,237
1925	665	589,173	102,113	2,311,293	18,498	8.17	16,418	12,690	134,973
1926	678	603,907	106,811	2,182,691	18,331	8.15	17,645	10,618	129,723
1927	674	641,209	111,921	2,157,583	22,752	8.10	20,351	16,004	122,009
1928	693	714,555	129,760	2,644,900	24,355	(2)	21,078	20,050	139,184
1929	694	713,105	134,857	2,707,883	26,540	(2)	22,233	16,504	127,345
1930	675	705,429	144,874	3,243,107	23,557	7.88	19,612	12,780	114,189
1931	583	625,236	139,774	2,635,728	29,240	7.80	20,052	9,058	90,971
1932 (Uba)	619	700,601	163,584	3,165,105	40,229	7.80		11,869	117,710
1932 (Other)			41	1,140					

[1] Includes a small acreage grown by non-Europeans (approximately 7,000 acres at present).
[2] Data not available.

Compiled from Agricultural Census Reports; Monthly Bulletin of Union Statistics, March 1932; and correspondence, Union of South Africa, Office of Census and Statistics, excludes Indian and native cane, 6 or 8 percent of total cane.

The Government decided to proceed with the Pongola River irrigation scheme, which is to water 60,000 acres of good land near Gollel on the southern border of Swaziland. Official tests have shown sugarcane to yield 80 tons per acre per year as compared with a good average of 25 tons per acre biennially in Natal Province. Even 60 tons per acre worth the present low price of 12 shillings per ton would return £36 ($175 at par) gross per acre per year, as against £7½ ($36.50 at par) per acre per year in Natal Province. This development may be expected within a few years to increase the Union's sugar production and displace the crop now grown on some of Natal's less productive soils.

The South African Cane Growers Association is undertaking to induce the Government to control production. The present unprofitable price is caused by the necessity of exporting overseas at least 50 percent of the sugar manufactured. Indians and natives produce a considerable quantity of cane. About 30 to 50 percent of the cane is produced by miller planters, whose milling profit offsets the loss from low cane prices. Therefore, voluntary action is impossible. The association claims that by various manipulations planters are receiving 6⅓ percent below the basis of the Fahey conference agreement. Under this agreement planters received in 1930 a benefit of 1 penny (2 cents) per ton instead of the expected 1 shilling 10 pence (45 cents) per ton.

METHODS AND COSTS OF PRODUCTION

About 28 percent of the cane is grown by the manufacturing companies who own the sugar factories. There are 21 sugar factories, some of which produce raw sugar for refining, while some make carbonation white sugar, and others make mill white sugar. One of the raw-sugar mills refines its own product by the Suchar process. Two

of the most northern factories handle a large proportion of cane grown on alluvial flats together with the hill canes, whereas the rest work hill canes only, of widely varying quality, according to locality and conditions of growth. The remaining 72 percent of the cane is grown by about 600 individual planters.

Most of the estates are on gently rolling hills. Many contain a considerable proportion of flat land, and a few, especially near the mouths of the larger Zululand rivers, are entirely on the flats. The soil is fairly deep and fertile, and the belt is practically free from frost. Sandy loams predominate but are heavier in the older parts of Natal near Durban. In the southern part of the belt, clay and medium loams predominate. The rainfall, averaging about 40 inches, is deficient for optimum growth of sugarcane. Thirty-three rivers flow through the sugar belt into the Indian Ocean, but as yet only six estates practice any irrigation; one of these irrigates 2,000 acres, and another, 500 acres. The standard number of irrigations is 12, of 3 inches each, and the cane is usually harvested after the normal 2 years' growth.

One of the estates ordinarily gives 15 or 20 applications of 2 or 3 inches and finds that in this way a crop can be grown in one season such as would ordinarily take 2 years to grow without irrigation.

For several years (since 1926) the commercial cultivation of varieties other than Uba (a drought-resistant, mosaic-resistant hard cane) has been prohibited, but recently improved varieties have been selected and released for commercial cultivation. The most promising varieties are P. O. J. 2725, P. O. J. 2878, and Co290.

The cane shoots are planted in furrows 4½ to 6 feet apart. The sticks are usually laid in a single continuous line, sometimes with an overlap, or occasionally a double line. Blank spaces in the row are usually replanted as soon as possible. The fields are cultivated and weeded mechanically and by hand.

The use of commercial fertilizer is general, consisting usually of superphosphate and occasionally of complete fertilizer. Applications usually range from 400 to 800 pounds, averaging about 600 pounds per acre. The subsequent ratoon crops are usually fertilized, chiefly or solely with superphosphate. Filter cake is largely used in quantities of about 10 tons per acre. Stable manure is applied when available, but supplies are scanty.

The first crop is harvested after 2 years, and 3 or 4 ratoon crops are subsequently harvested at biennial intervals before the field is plowed, rested for a year, and replanted. The lighter soils produce only 2 ratoon crops, while up to 9 or 10 ratoon crops are obtained from alluvial flats.

The standing cane is customarily burned before the cutting except where the soils are sandy and deficient in organic matter. Most of the labor is performed by natives (blacks) drawn from neighboring estates and native locations, or recruited from tribes living at a distance. East Indians, the descendants of laborers formerly brought into the country under indenture, are also commonly used except in Zululand to the north. Natives are usually paid for every 30 days of actual work and the Indians at a fixed rate per calendar month. During the harvesting season the number of laborers is 1 to every 5

to 12 acres under cane, and during the rest of the year 1 for every 9 to 12 acres. Much of the work, especially the cutting and loading of cane, is paid for on the task system. The usual daily task is 2 to 3 tons of cane per day, cut and loaded on the truck or wagon, or if the cane has not previously been burned, 1 to 1½ tons per day. The task for plowing varies from 1,000 to 3,000 yards and for weeding it varies from 500 to 2,000 yards per day.

In Zululand, where there is still sufficient grazing land, oxen are generally used for draft and transport, although mules are preferred for cultivation, and motors are often used for plowing and for hoeing cane. Further south, where grazing land is scarce, very few oxen are used. The oxen are generally fed exclusively on cane tops during the harvesting season and grazed during the remainder of the year. Mules are usually fed 4 to 10 pounds of crushed corn per day together with cane tops or grass. Molasses is only occasionally fed.

Since the customary wage for natives and Indians is only 1 shilling 4 pence (32 cents) per day or about £1 to £2 ($4.87 to $9.74) per month, plus rations and housing costing about £1 per month, and since very little food must be purchased for oxen or mules, the cost of man and animal labor is very low.

Over a moderate-sized holding an average yield of 20 to 25 tons per acre may be expected every second year.

A recent inquiry among certain cane growers has disclosed that their average cost of producing cane was 13 shillings 2 pence ($3.20 at par) per ton. As their average production was 4,563 tons, as compared with 2,940 tons—the average for all members of the Cane Growers' Association—and as lower output was associated with higher costs, it is probable that the average cost was more than 13 shillings 2 pence ($3.20) per ton. It was definitely higher than the average price of 11 shillings 9.8 pence ($2.88) for 1932.

METHODS OF MARKETING

In 1929–30 there were 6 mills in operation in Zululand and 24 in the remainder of Natal. The number has since been reduced to 21. There are two refineries. One of these, using the bone-char process, takes raw sugar from the mills and is equipped to produce 120,000 tons of refined sugar; the other, using Suchar process, produces about 10,000 tons. Several mills produce mill white sugar, and one mill produced about 30,000 tons of refined sugar by the double carbonation process. These manufacturers are organized to form the South African Sugar Association.

Three cooperative sugar associations were registered in the Union of South Africa at the end of June 1930. Two of these were limited liability companies; the third was a cooperative society with unlimited liability. The total membership of these three organizations was 116, and the produce sold for members during the year 1929–30 amounted to £186,954 ($909,000). The Eshowe Cooperative Sugar Co., Ltd., was organized and registered in February 1924. In 1928 it had 26 members, paid-up capital £310, and the profit for the year was £18. The total turn-over of business for 1926–27 was only £16,777. The Eshowe Cooperative sells its members' cane under con-

tract to a proprietary mill. It has constructed a small railway, 6¾ miles long for transporting its cane to the mills. The Umfolosi Cooperative Sugar Planters, Ltd., was registered in November 1923. In 1928 it had 21 members, paid up capital £6,648, reserves £4,577, and a profit for the year of £4,153 on total business amounting to £122,518 ($596,000). Prior to 1923 the cane now handled by the Umfolosi Cooperative was crushed and processed by a commercial company operating at Umfolosi under contract with the Government. When this company suspended operations in 1923 the growers established a cooperative company to acquire and operate the mills. This deal was financed with the aid of loans from the Government Land Bank, guaranteed by the department of lands. During its first season, 1924–25, the cooperative operated successfully, but in 1925 its machinery was so damaged by flood that operations had to be suspended for two seasons. During this period cane was transported by rail for pressing in other mills.

The milling season usually extends from May to December. The exporting season coincides with the milling season, although smaller quantities are exported from January to June.

In 1910, when sugar consumption in the Union was about 112,000 short tons, production was only 82,000 tons, thus making necessary the importation of a considerable proportion of the supply. Since 1918 consumption has ranged upward from about 150,000 tons, while the production, increasing even more rapidly, has resulted in insignificant imports and rapidly increasing exports. The export quota for the 1932 crop was 52 percent of the production (table 143).

TABLE 143.—*Sugar: Production, imports, exports, and consumption, Union of South Africa, 1910–11 to 1933–34*

Year ended June 30—	Production [1]	Imports less reexports	Exports of South African produce	Retained or available for consumption	Sugar used in manufacturing
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*
1911	82,000	32,321	2,790	111,531	(2)
1912	92,000	27,055	2,036	117,019	(2)
1913	96,000	23,617	2,303	117,314	(2)
1914	92,153	25,039	2,073	116,019	(2)
1915	102,653	15,774	2,859	115,568	(2)
1916	113,358	5,920	3,893	115,385	(2)
1917	114,709	7,978	4,047	118,640	14,085
1918	104,921	15,389	4,039	116,271	16,152
1919	150,214	10,498	12,898	147,814	17,848
1920	159,183	1,359	27,495	163,047	19,059
1921	143,680	2,050	42,725	103,005	16,898
1922	148,275	17,667	36,652	129,290	13,735
1923	159,362	13,506	39,181	133,687	15,330
1924	203,360	583	36,452	167,491	18,016
1925	161,250	791	13,558	148,483	19,693
1926	239,851	6,075	70,602	175,324	20,710
1927	242,662	4,091	66,910	179,843	22,351
1928	247,273	5,292	68,078	183,587	23,919
1929	295,034	25,201	96,081	224,514	24,842
1930	298,635	15,746	123,590	190,791	24,217
1931	393,205	6,004	210,632	188,577	22,664
1932	325,933	4,154	140,977	183,110	22,475
1933	353,905	820	185,451	174,274	23,028
1934	391,173	.....	.....	.....	.....

[1] Figures up to 1921–22 represent sugar that went into direct consumption and from 1922–23 gross output at mills.

[2] Not available.

Union of South Africa Official Year Book (*47, no. 15*).

Most of the sugar exported from the Union goes to the United Kingdom, although during recent years substantial and increasing quantities have gone to Canada. Exports to the United Kingdom were 68,487 short tons in 1932, as against 122,293 tons in 1931 and similar quantities in each of the 2 preceding years, while exports to Canada were greatly increased. Exports to Canada have shown progressive increases during the last 3 years, because Canada gives greater preference to sugar from the British Dominions than from the British Colonies, whereas the reverse is true of the United Kingdom. Small quantities are exported to nearby countries, chiefly Mozambique, Belgian Congo, Nyasaland, Tanganyika, Kenya, and Mauritius.

PRICES

The average price obtained for sugarcane by South African growers between 1919 and 1929 was usually slightly below £1 ($4.87 at par) per ton, although in 1921 it was 33 shillings ($8.03 at par). During the last 3 years, however, these prices have slumped below 12 shillings ($2.92 at par) (table 144).

TABLE 144.—*Sugarcane: Price per short ton to growers, Union of South Africa, 1918–32*

Year	Shillings-pence	Dollars at par	Year	Shillings-pence	Dollars at par	Year	Shillings-pence	Dollars at par
1918	18–4	4.46	1923	17–3	4.20	1928	19–9	4.81
1919	16–7	4.03	1924	21–0	5.11	1929	18–10	4.58
1920	19–10	4.83	1925	17–8	4.26	1930	15–2	3.69
1921	33–0	8.03	1926	16–0	3.89	1931	12–0	2.92
1922	19–4	4.70	1927	16–8	4.05	1932	11–10	2.88

Union of South Africa Official Yearbooks (47).

Approximately one-half of the sugar production of the Union is retained for consumption in the country. Under prevailing arrangements sugar manufacturers sell sugar in the Union at much higher prices than they obtain for the portion exported. The price of sugar in South Africa is closely controlled by legislation. The Sugar Price Act of 1926 established a maximum price at retail for refined sugar at South African ports for consumption in the Union at 3¾ pence (7½ cents) per pound and of mill white sugar 3½ pence (7 cents) per pound. These were reduced one-fourth penny in 1932. By way of comparison, the price of no. 1 grade Natal sugar during the 1932 season was 22 shillings 9 pence ($5.54) per 100 pounds f. o. b. Durban or c. i. f. Cape ports, but this amounts to only 18 shillings ($4.38) after deductions for excise tax and loss on exports. This price of 18 shillings is equivalent to 2.16 pence (4.38 cents) per pound. In September 1926 the Government made effective a suspended duty of 3 shillings 6 pence (85 cents) per 100 pounds. This is in addition to the substantive duty which was increased in 1930 from 4 shillings 6 pence ($1.10) to 9 shillings ($2.19) per 100 pounds. The local candy manufacturers and fruit canners are protected by the ruling that the Natal Sugar Association must supply manufacturers at prices equal to the world's price

c. i. f., plus 4 shillings 6 pence ($1.10) per 100 pounds duty. The determination of the world's price is left to the sugar association, and manufacturers have requested that the Government permit sugar for manufacturing purposes to enter at 4 shillings 6 pence ($1.10) per 100 pounds duty in order to guarantee that South African sugar shall be quoted at prices based on true current value in the world's markets. Table 145 gives the average price (including £1 ($4.87) excise duty) of first refined Natal sugar per short ton at Durban from 1910–11 to 1929–30.

TABLE 145.—*Sugar: Price of Natal sugar at Durban, 1910–11 to 1932–33*

Year	Price per ton	Price per pound	Year	Price per ton	Price per pound
	Dollars	*Cents*		*Dollars*	*Cents*
1910–11	83.70	4.2	1922–23	111.13	5.6
1911–12	87.95	4.4	1923–24	144.19	7.2
1912–13	79.16	4.0	1924–25	118.35	5.9
1913–14	78.28	3.9	1925–26	105.48	5.3
1914–15	88.76	4.4	1926–27	107.33	5.4
1915–16	94.53	4.7	1927–28	109.82	5.5
1916–17	90.13	5.0	1928–29	107.61	5.4
1917–18	123.86	6.2	1929–30	97.96	4.9
1918–19	113.33	5.7	1930–31	94.09	4.7
1919–20	128.07	6.4	1931–32	88.18	4.4
1920–21	226.65	11.3	1932–33	95.57	4.8
1921–22	141.95	7.1			

From official sources.

The excise tax of 1 shilling per 100 pounds on Union sugar has been in force since 1915. The net return that the sugar industry gets from best refined sugar used in products manufactured in South Africa and exported overseas is about the same as the return it gets for centrifugal sugar exported from Durban to be refined in England and Canada, and considerably less than it would get for refined sugar if exported to those countries.

The diminishing value of exported sugar is reflected in table 146.

GOVERNMENT AID

Until 1925–26 the customs duty on sugar imported into the Union of South Africa was 4 shillings 6 pence ($1.10) per 100 pounds. The net protection was only 3 shillings 6 pence (85 cents) above the excise tax of 1 shilling (24 cents), and since this proved insufficient to prevent importations of sugar a suspended duty of 3 shillings 6 pence (85 cents) per 100 pounds was imposed on condition that the consumers' interest be safeguarded and that attention be given to inefficiencies in mechanical equipment and the system of distribution. The industry assumed an obligation to supply manufacturers with sugar at special rates and to pay freight charges on sugar shipped from Durban to Cape ports. Under the Sugar Price Act the Government stipulated the maximum retail prices at which sugar could be sold in the five largest coastal towns—Durban, East London, Port Elizabeth, Mossel Bay, and Capetown. In 1928 sugar prices slumped, and sugar imports into the Union again assumed alarming proportions. In 1930 the customs duty on import sugar was further increased by 4 shillings 6 pence ($1.10) per 100 pounds, making a total duty of 12

shillings 6 pence ($3.04) or an effective duty of 11 shillings 6 pence ($2.80) after deducting 1 shilling (24 cents) excise tax. Imports were at once checked (table 147).

TABLE 146.—*Sugar and cane: Values per short ton, Union of South Africa, 1927–28 to 1932–33*

Year milled (May–January)	Sugar price					
	Refined sugar	Refinery cargo sugar			Export cargoes	Export quota
		Basic	Bonus	Final		
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Percent*
1927–28	109.53	82.37	2.06	84.41	62.91	25
1928–29	107.60	80.70	2.13	82.33	60.31	29
1929–30	97.97	73.45	.30	73.78	47.45	42.6
1930–31	94.99	71.25	.02	71.25	37.10	49
1931–32	88.18	66.14	.05	66.18	34.61	50
1932–33 [1]	95.57	70.94	(2)	(2)	28.11	51

Year milled (May–January)	Sugar price, general average	Cane sucrose content	Cane price per ton			
			Actual sucrose content			13-per-cent cane
			Base	Bonus	Total	
	Dollars	*Percent*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1927–28	78.85	13.93	4.59	0.09	4.68	4.38
1928–29	76.12	14.11	4.51	.09	4.59	4.20
1929–30	62.57	13.24	3.61	.01	3.61	3.56
1930–31	54.52	13.98	3.38	.01	3.38	3.14
1931–32	50.38	14.07	3.18	.02	3.18	2.94
1932–33 [1]	49.08	13.65	(2)	(2)	3.02	2.88

[1] Preliminary.
[2] Data not available.

South African Sugar Journal (5, p. 105). Values converted at par.

TABLE 147.—*Sugar: Customs duty and imports, Union of South Africa, 1927–32*

Calendar year	Customs duty per 100 pounds		Imports		Calendar year	Customs duty per 100 pounds		Imports	
			Quantity	Value per ton f. o. b.				Quantity	Value per ton f. o. b.
	Shillings	*Dollars* [1]	*Short tons*	*Dollars* [1]		*Shillings*	*Dollars* [1]	*Short tons*	*Dollars* [1]
1927	8	1.95	3,001	78.99	1930	12½	3.04	10,113	48.65
1928	8	1.95	17,958	57.83	1931	12½	3.04	2,954	49.67
1929	8	1.95	19,821	58.46	1932	12½	3.04	2,824	76.29

[1] Converted at par.

South African Sugar Journal (5, p. 215).

Early in 1932 prices of Cuban sugar fell so low that substantial shipments were again sent to South Africa. Cuban-American no. 1 refined could be landed in the Union at £21 ($102.20) per ton (7 shillings 6 pence—$1.82—per 100 pounds c. i. f. plus duty, primage, and landing charges) as compared with the prevailing wholesale price of £22 15 shillings 0 pence ($110.71) for local sugar of the same quality at coast ports. Therefore, in July 1932 the Government

granted a further increase in customs duty of 3 shillings 6 pence (85 cents) per 100 pounds. To prevent any increase in local prices the Sugar Price Act of 1926 was amended by lowering the maximum prices of no. 1 and no. 2 sugar by one-fourth penny (one-half cent) per pound to 3½ pence (7 cents) for refined and 3½ pence (6½ cents) for mill white sugar. In 1931 the coastal towns in the Union averaged in various months from 3.36 to 3.55 pence (6.81 to 7.20 cents) per pound for no. 1 sugar, the average for the year being 3.42 pence (6.93 cents), while for no. 2 sugar the monthly averages during 1931 ranged from 3 to 3.06 pence (6.08 to 6.20 cents), an average of 3.04 pence (6.16 cents). The probable outcome will be that retail prices will rise to and remain fixed at the newly legal maxima. If prices rise unwarrantably the suspended duty of 3 shillings 6 pence (85 cents) per 100 pounds will be withdrawn.

With respect to the half of the crop for export there are also significant developments. Early in 1932 additional sugar preference was granted to colonial sugar by Great Britain. The duties on foreign and Dominion sugars were left as they were, while colonial sugar obtained an extra 1 shilling (24 cents) preference plus a further 1 shilling on a quantity of 275,000 tons, which is the quantity the colonies normally send to England and about 50 percent of what they were expected to turn out in 1932. This 275,000 tons is known as certified sugar, and it was divided among the colonies in certain fixed proportions. The net result was that the duty on 96° sugar per 112 pounds was:

	s.	*d.*	*dollars*
Foreign	8	1.6	(1.98)
Dominion	4	4.8	(1.07)
Colonial ordinary	3	4.8	(.83)
Colonial certified	2	4.8	(.58)

Dominion sugar from South Africa was given a preference of about 3 shillings 9 pence (91 cents), while colonial sugar has a preference of 5 shillings 9 pence ($1.40) for its normal export. The certificate scheme was designed to discourage diversion of colonial sugar from the Canadian market to the United Kingdom. If, in 1933, the price of foreign sugar had exceeded 7 shillings 6 pence ($1.82) c. i. f. the budget of 1934 would have reduced the colonies' extra preference of 2 shillings (49 cents) in 6-penny stages, so that if the price had exceeded 9 shillings ($2.19) c. i. f. the whole of the 2 shillings would have been taken off, and only the basic (Dominion) preference of 3 shillings 9 pence (91 cents) would have remained.

Under the terms of article 4 of the agreement between Great Britain and South Africa, as arranged at the Imperial Economic Conference in 1932, the United Kingdom undertakes that the existing preferential margin on sugar shall not be reduced without the consent of the Government of South Africa.

South African sugar producers are hoping that the imperial preference on Empire-grown sugar will be still further increased in the near future. The United Kingdom has appointed a royal commission to investigate the whole question of sugar production in the Empire and the producers believe that the findings of the commission will be favorable to sugar producers in the Union and in other portions of the British Empire.

MOZAMBIQUE (PORTUGUESE EAST AFRICA)

TREND OF PRODUCTION

The sugar-producing belt of Mozambique extends along the coast from the vicinity of Lourenco Marques to the mouth of the Zambesi River. Sugar is one of the principal products produced in the colony, ranking in importance with coconuts, copra, sisal, cotton, and corn. The industry dates back to 1893. The production of sugar and of other crops is small in comparison with the size and population of the colony. The land area is approximately 274,000 square miles, which is larger than the State of Texas. Its population is scarcely 3,000,000, of which only 18,000 are whites, including 9,000 in the city of Lourenco Marques, 2,000 in Beira, and 7,000 scattered throughout the colony. Of the remainder, a few are East Indians and over 2,500,000 are natives.

The climate and soil are favorable to the production of sugar, particularly near the mouth of the Zambesi River, where the alluvial soil is very fertile. The average rainfall is 43 inches and the average temperature 73° F., although temperatures as high as 115° are occasionally recorded. Temperatures lower than 60° are rare. The most favorable areas for the production of sugarcane are in the valleys of the Zambesi, Limpopo, and Incomati. The chief difficulty lies in the fact that the rainfall is irregular and comes almost entirely during the summer months, so that irrigation must often be used.

Three large companies and one small company produce practically all the sugar grown in the colony. Small patches grown by natives for chewing and for alcohol may be disregarded. The area devoted to the crop in 1929–30 was 69,741 acres (including Manica and Sofala districts) and the production was 87,937 short tons of which 76,686 tons were exported (calendar year 1930). This is to be compared with an average export movement of only 8,400 tons during 1910–15 (table 148).

TABLE 148.—*Sugar: Area and production, Mozambique, 1929–30*

District	Area of cane			Production			
	Total	Cut	Not cut	Cane cut	Sugar produced		
					White	Yellow	Total
	Acres	*Acres*	*Acres*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Manica and Sofala	30,121	20,176	9,945	388,203	23,617	11,390	35,007
Quelimane	30,635	20,774	9,861	372,892	4,336	35,469	39,805
Inhambane	1,539	991	548	7,485	348	205	553
Lourenco Marques	7,443	5,310	2,133	117,143	3,253	9,319	12,572
Total	69,741	47,251	22,490	885,783	31,554	56,383	87,937

Colônia de Moçambique, Recenseamento Agricola (*18, p. 27*).

A company has been granted charter rights over the two districts Manica and Sofala, representing a large area extending from the Zambesi River southward to 22° south latitude, embracing an area with a coast line 300 miles long extending west to Southern Rhodesia

and with a land area of approximately 65,000 square miles. Beira is the principal port of this chartered company, and the exports from this port and the production of the company's lands are recorded separately from the statistics of the other seven districts which comprise the colony administered by the colonial government. This is the northern sugar area of the colony.

Reports issued by the chartered company indicate that in 1929 there were 331 proprietors established on their land as compared with a maximum of 378 in 1926 and 298 in 1919. Agricultural developments date back as far as 1897, but most of the development has taken place since 1910. The cultivated area in the territory of the chartered company and its distribution are shown in table 149.

TABLE 149.—*Sugar: Acreage of sugarcane and other crops, Manica and Sofala districts, Mozambique, 1919–29*

Year	Crop area	Sugarcane	Supplementary crops			
			Corn	Cotton	Peanuts	Beans
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
1919	43,000					
1920	50,000					
1921	107,000					
1922	158,000					
1923	156,000					
1924	178,000					
1925	193,000	16,000	60,000	46,000	900	3,100
1926	187,000	21,000	65,000	27,000	2,700	2,000
1927	171,000	24,000	70,000	19,000	3,300	2,100
1928	171,000	25,000	70,000	20,000	3,600	3,100
1929	103,000	20,000	64,000	24,000	2,700	3,500

From official sources.

The average yields of sugar per acre on the land of the chartered company from 1925 to 1929, inclusive, were: 1.49, 1.32, 1.72, 1.69, and 1.72 short tons.

METHODS AND COSTS OF PRODUCTION

The cultivation methods applying to sugarcane are similar to those previously described for Natal Province in the Union of South Africa. The variety cultivated is the Uba, because of its disease resistance. The cane joints are usually planted at the beginning of the rainy season (December to March) or a little later if it is possible to irrigate. The cane joints are placed in furrows about 5 feet apart. The irrigation water which is pumped for the purpose is applied in varying quantities depending upon the occurrence of rains.

In 1928 the sugar industry employed an average of 15,000 native women per day. In the Zambesi Valley the natives are generally less efficient and cut only 2.8 tons of cane per day as compared with 4.4 tons in the southern areas of the colony, from which it follows that in the north they are paid less but more are employed. Native wages in the south of the colony are about $3.65 per month plus food, housing, medicine, and blankets, but less than this is paid in the northern part. The use of about 180 miles of railroads on various plantations saves considerable labor. Horses cannot be used because of various diseases to which they are susceptible. Most of

the animal labor is performed by oxen and mules, although in regions afflicted with the tsetse fly cattle cannot be kept and donkeys are substituted.

The cane matures in 18 to 20 months in the southern areas near Lourenco Marques, but in less time in the northern area at the mouth of the Zambesi. The cane is cut twice in each 3-year period except in the north, where it is cut at 12- to 16-month intervals. The crop is usually harvested from May to October during the dry season. In the Zambesi Valley 4 or 5 ratoon crops are cut but with diminishing yields. In the more fertile fields of the south, as in the valley of Incomati, as many as eight crops are harvested. Yields as high as 40 to 45 tons per acre are sometimes obtained, especially under liberal irrigation. Yields in the Zambesi Valley are somewhat smaller than in the south; but as they decrease with age, many yields of only 18 tons are obtained. An average of 24 tons is estimated by a leading representative of the trade.

The sugar content is relatively low for Uba variety, decreasing from 13 percent in September or October to 9 percent when the temperature rises in the following months. In the southern areas the average ratio is 12 tons of cane to obtain 1 ton of sugar of 96° purity. In the Zambesi Valley only 10.5 tons are necessary to yield a ton of sugar. Under adverse conditions less favorable results are obtained. The cost of producing 2,000 pounds of sugar on one of the largest estates averaged about $48 in 1916. Land is cheap. It can be rented from the Government for 22 cents per acre. In addition, the tax is about as much if the land is cultivated, but more if uncultivated.

The wages of native employees of plantation companies in the area of the chartered territory were reduced in 1932 from £1 ($4.87) to 10 shillings ($2.43) per month.

METHODS OF MARKETING

As there are no sugar refineries in the colony, sugar for domestic consumption is not pure white. Most of the sugar is sent to Portugal for refining and for consumption (table 150). The annual consumption of sugar in Portugal is approximately 100,000 short tons, of which a considerable portion is obtained from this colony under preferential customs treatment; it shares preference with Angola and Cape Verde. The production will probably expand slightly until Portugal's needs are met.

In the colony the customs duty for exports varies from 4 percent when the value of the sugar does not exceed 250 gold francs per metric ton to 10 percent when the value exceeds 750 gold francs. Sugar importation is taxed 0.55 gold francs per kilogram.

SOUTHERN RHODESIA

Southern Rhodesia is not a sugar-producing country. A small beginning has recently been made by an estate located near the Zambesi River, about 15 miles southwest of Victoria Falls, where a small acreage is being grown and a sugar mill has been established. During 1932 the plant manufactured brown treacle sugar, but it was planned to produce white sugar in 1933.

In 1932 Southern Rhodesia imported 8,000 short tons, as compared with 8,000 in 1931 and 7,000 in 1930. Most of this sugar comes from

Mozambique, although a considerable quantity comes from the United Kingdom. In 1931, 500 tons were imported from the United States, which was several times as much as from the Union of South Africa.

TABLE 150.—*Sugar: Exports from Mozambique, average 1912–16, 1917–21; annual 1922–32*

Calendar year	Colony (excluding Manica and Sofala)			Manica and Sofala			Total		
	White	Yellow	Total	White	Yellow	Total	White	Yellow	Total
Average:	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
1912-16	(1)	(1)	8,597	(2)	(2)	(2)	(2)	(2)	(2)
1917-21			13,151						
1922	14,985	344	15,329						
1923	2,223	13,788	16,011						
1924	2,233	17,752	19,985						
1925	4,111	18,439	22,550						
1926	2,917	31,265	34,182						
1927	2,202	35,146	37,438						
1928	11,954	28,098	40,052						
1929	7,349	48,051	55,300		39,989	39,989	7,249	88,040	95,289
1930	2,469	43,309	45,778	11,315	19,593	30,908	13,784	62,902	76,686
1931	19,111	34,262	53,373	6,242	23,695	29,937	25,353	57,957	83,310
1932	21,274	32,597	53,871	7,218	9,114	16,332	28,492	41,711	70,203

[1] Data not available prior to 1922.
[2] Data not available prior to 1920.

Colonia de Moçambique, Estatistica Comércio e Navegação.

Southern Rhodesia exports no sugar of its own production, although it forwards considerable quantities to Northern Rhodesia. Southern Rhodesia, owing to its inland situation, is not likely to produce an exportable surplus of sugar, but it may come to supply a large portion of its domestic requirements.

TANGANYIKA

Sugar production in Tanganyika is of no commercial importance. The production is centered in Pangani district, on the northeastern coast. In 1930, the colony exported only 24 short tons as compared with 28 tons in 1929 and 50 tons in 1928. Molasses exports in those 3 years amounted to 24, 26, and 64 short tons, respectively. Sorghum is grown for grain in the drier inland areas, but there is no evidence of the development of a sugar industry.

The small quantity of the sugar produced is jaggery, or brown cake sugar. The price of white sugar in Tanganyika is high in relation to world prices. The colony is supplied with sugar from Kenya and Uganda (3,546 short tons in 1931), but the establishment of a large sugar plantation and factory in Tanganyika is recommended by the director of agriculture, who believes that there is ample scope for the development of sugar production in the future should it be found necessary to support other industries. There were five small factories in the Territory in 1933.

KENYA

TREND OF PRODUCTION

Five sugar mills are operating in Kenya, 1 at sea level, 1 at an elevation of 5,600 feet (these 2 established in 1929), and 2 others previously established at 4,000 feet elevation. Three of the largest

factories are capable of producing between 9,000 and 10,000 tons each and the others about 2,000 tons each. This is far in excess of actual production. There is no sugar refinery in the country, but one of the largest factories has been considering the introduction of a refinery process. There were only 12,363 acres of sugarcane on farms of Europeans in the colony in February 1932, against 13,493 acres in the previous year (table 151). The 1932 European-owned acreage was distributed as follows:

	Acres
Kisumu-Londiani (Lake Victoria)	7,456
Klambu (central)	3,327
Digo (near Mombasa)	1,200
Other	380

In addition, East Indians grew 4,470 acres in the Lake Victoria area, making a total of 16,833 acres. This does not include production by natives for their own use (chewing and drinking) estimated in 1930 to be 21,870 acres (chiefly near Nairobi) producing 178,000 short tons of cane or 8.14 tons per acre. The production of sugar per acre of cane from European and Indian acreage is less than half of the average obtained in the Union of South Africa. A small part of the Indian-grown cane is retained locally for making jaggery.

TABLE 151.—*Sugar and sugarcane: Acreage and production in Kenya, 1925 to 1934*

Census date	Cane acreage owned by—			Cane harvested by Indians		Total sugar production	
	Europeans	Indians [1]		Total	Per acre	Raw	Crystallized
		Planted	Cut				
	Acres	*Acres*	*Acres*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
1925 (June)	6,556	----------	----------	----------	----------	206	3,238
1926 (July)	6,747	----------	----------	----------	----------	56	4,577
1927 (July)	6,811	----------	----------	----------	----------	113	9,953
1928 (July)	9,403	[2] 3,693	----------	[2] 32,256	----------	107	7,114
1929 (July)	11,161	[2] 8,820	[2] 3,325	[2] 44,688	[2] 13.4	142	6,890
1930 (July)	11,870	8,395	1,436	27,665	19.3	9	7,455
1931 (February)	13,493	[2] 9,120	[2] 4,200	[2] 47,025	[2] 11.2	38	10,182
1932 (February)	[3] 12,363	[2] 4,470	[2] 1,913	[2] 15,299	[2] 8.0	30	[4] 5,863
1933 (February)	12,068	[2] 4,274	[2] 725	[2] 6,915	[2] 9.5	30	5,953
1934 (February)	12,704	[2] 4,884	[2] 1,260	[2] 15,002	[2] 11.9	77	6,377

[1] Kibos-Miwani area, near Lake Victoria.
[2] Incomplete, principal area only.
[3] Of which 6,054 acres were cut, yielding 98,911 tons of cane, an average of only 16.34 tons per acre.
[4] Reduction mainly the result of locust depredation.

Kenya Colony census reports. Statistics are for 12 months preceding census date.

Locusts on the highlands of Kenya have constituted one of the most serious obstacles: they eat off leaves so continuously that the young ratoon crops die. Liberal appropriations by the Government for eradication have proved insufficient to make an impression.

The production of crystallized sugar was only 5,863 short tons in 1931–32, against 10,182 short tons in the previous year. However, the quantity of crystallized sugar exported from the colony in 1931 was 1,197 short tons, against 842 tons in 1930. Imports into the colony were only 350 short tons in 1931, against 1,940 tons in 1930. The apparent decrease in domestic consumption is accounted for by increased supplies obtained from Uganda. Production, aided by the high protective tariff and its price-fixing association, may be ex-

pected to displace imports, but the distance from the coast of all but the small acreages near Mombasa will operate against extensive expansion, especially in the areas that are now most important.

METHODS AND COSTS OF PRODUCTION

The crushing season in Kenya is unusually long. It begins in July and ends in March or April.

There is no sugar experiment station in Kenya, the nearest being at Imani in Tanganyika, but the division of plant industry issues improved cane varieties from its quarantine station.

The growing of any variety of sugarcane other than Uba was prohibited in 1928 in the vicinity of Kisumu, near Lake Victoria, on account of the presence of mosaic disease, but this prohibition was annulled in 1931. Since then, improved varieties of Java cane such as P. O. J. 2725, 2727, 2878, 2714, and 2722 have been issued to growers.

Millers grow most of their own cane, but in some cases they buy as much as 50 percent of their cane, usually from Indian growers. Cane is bought at a flat rate of 10 shillings ($2.43 at par) per ton with free transport. Most of the Indian growers have from 50 to 100 acres or less, although 1 or 2 have 700 or 800 acres. The Indian farming community in the Kibos-Miwani area, near Lake Victoria, grew 4,470 acres of sugarcane in 1931, as compared with 9,120 acres in 1930.

The 10 shillings ($2.43) price in Kenya compares favorably with the 12 shillings ($2.92) price in the Union of South Africa when consideration is given to the fact that a bonus of 6 pence (12 cents) per ton is paid for every pound sterling which sugar realizes over £20. Thus, when sugar is £24 ($116.80) per ton, the price for cane is 12 shillings ($2.92). In addition, railage is paid in all cases, and labor is much cheaper.

Ordinary cane cutters receive 12 shillings ($2.92) per month plus rations for allotted tasks but receive a bonus of 6 pence (12 cents) per day for cutting and loading 30 hundredweight of cane and 1 shilling (24 cents) bonus per day for cutting and loading 3 tons. Very few of them cut and load 3 tons per day. Rations cost approximately 8 shillings ($1.95) per month, making the total cost of native labor average £1 ($4.87) per month. Natives are usually steady workers and some have been cutting cane for 7 or 8 years. Malaria is prevalent among Europeans but not among the natives.

Not a great deal of suitable land is available for growing cane, and good cane land is relatively high in price. The average price of virgin land suitable for cane is about £3 ($14.60) per acre. A well-established farm of 364 acres with about 300 acres under cane was recently sold for £4,000 ($19,466). Very little sugar land is irrigated, but irrigation is successful where tried.

METHODS OF MARKETING

Control of the sale of sugar is vested in the East African Sugar Manufacturers' Association. The secretary is also the manager of one of the large companies which is an amalgamation of all of the larger manufacturers, with one exception, in Kenya and Uganda.

Local consumption is small, and a small quantity was exported overseas for the first time in 1932. Considerable quantities are supplied to Tanganyika (table 152).

TABLE 152.—*Sugar, raw and crystallized: Imports and exports, Kenya, 1925–33*

Calendar year	Imports		Exports			
			Total		To Uganda [1]	
	Quantity	Value	Quantity	Value	Quantity	Value
	Short tons	*Dollars*	*Short tons*	*Dollars*	*Short tons*	*Dollars*
1924 [2]			[3] 51	[3] 9,003		
1925	1,521	153,173				
1925 [2]			[4] 525	[4] 65,810		
1926	1,096	98,620	1,249	143,820		
1927	536	51,473	1,418	180,314	795	107,822
1928	4,389	326,172	669	93,719	620	74,701
1929	2,695	188,037	870	124,110	1,061	130,831
1930	1,940	114,411	878	96,838	435	46,100
1931	356	29,919	1,216	121,321	128	11,976
1932	218	20,352	898	87,008	2	175
1933	143	11,626	4,628	325,875	149	6,701

[1] Exports of Uganda produce via Kenya are reported only on final exportation from Mombasa; consequently no details are available in respect to goods consumed in Kenya, but the value of such produce is small.
[2] Exported from Mombasa, year beginning July 1.
[3] Including 10 tons of raw sugar, value $608.
[4] Including 19 tons of raw sugar, value $1,290.

Kenya Colony census reports. Converted at par of exchange.

As in the Union, the Kenya sugar industry is given protection by the Government on condition that the price of sugar for direct consumption shall not exceed a certain figure.

UGANDA

TREND OF PRODUCTION

There are two sugar estates producing and manufacturing sugar in Uganda north of Lake Victoria, one at Lugazi in Mengo district and one at Kakira in Busoga district. The total acreage under cane at these two estates in 1931 was 8,440 acres, as against 6,700 acres in 1930. Production estimates are not given. The entire production of sugar is consumed in Uganda and other east African territories.

There were, in addition, 4,681 acres of sugarcane grown by natives and 8,565 acres grown by Asiatics during 1931, distributed geographically as shown in table 153.

METHODS OF PRODUCTION AND MARKETING

The sugar industry in Uganda is closely related to that of Kenya, and the mills are amalgamated with those of Kenya into one association. Exports are small but increasing (table 154). Most of the exports go to Tanganyika.

New varieties of sugarcane must be introduced through the Government quarantine station and must be resistant to mosaic disease.

East Africa experiences the unusual difficulty of loss of cane by locusts. Very young cane that has been eaten off more than three times must be plowed and replanted. Cane frequently attacked by locusts loses up to half of its sucrose condition on maturing.

TABLE 153.—*Sugar: Distribution of cane acreage in Uganda, 1931*

District	Native grown	Grown by Asiatics	District	Native grown	Grown by Asiatics
Buganda Province:	*Acres*	*Acres*	Northern Province:	*Acres*	*Acres*
Mengo	1,500	5,590	Bunyoro	75	----
Entebbe	1,600	----	West Nile	100	----
Masaka	100	125			
Mybende	300	----	Total	175	----
Total	3,700	5,715	Western Province:		
Eastern Province:			Toro	120	----
Busoga	230	2,850	Ankole	6	----
Budama	50	----	Kigeze	25	----
Bugwere	40	----			
Bugishu	325	----	Total	151	----
Teso	10	----			
			Grand total	4,081	8,565
Total	655	2,850			

Uganda Department of Agriculture (*31, Rept. 1931, p. 29*).

TABLE 154.—*Sugar: Exports from Uganda, 1926–31*

Year	Jaggery unrefined sugar		Refined sugar		Year	Jaggery unrefined sugar		Refined sugar	
	Quantity	Value	Quantity	Value		Quantity	Value	Quantity	Value
	Short tons	*Dollars*[1]	*Short tons*	*Dollars*[1]		*Short tons*	*Dollars*[1]	*Short tons*	*Dollars*[1]
1926	15	1,046	71	7,782	1929	6	501	240	34,411
1927	25	2,068	509	79,669	1930	11	818	373	42,426
1928	7	633	154	21,578	1931	5	258	2,510	226,662

[1] Converted at par of exchange.

Uganda Department of Agriculture (*31, Rept. 1931, p. 82*).

An excise duty of 1 shilling (24 cents at par) per 112 pounds is levied on sugar, excluding jaggery (unrefined sugar) as from January 1, 1932.

CORN

INTERNATIONAL SIGNIFICANCE

The production of corn in the 13 south and east African countries extending from the Union of South Africa north to the Equator, is about 125,000,000 bushels per year (table 155). This is only about 3 percent of the total world corn production, but it is a fairly high proportion of the corn produced outside of the United States, and is exceeded only by production in Argentina, Brazil, the Danube Basin, and Russia. A relatively high proportion of the south African production is exported.

Corn production is centered chiefly on the high plateau in those areas in which rainfall is 25 to 40 inches per year, most of it falling during the summer months, October to April (fig. 71). In the drier areas kafir is more important. Corn is grown to some extent in each of the south and east African countries. It is grown by the natives primarily for their own consumption. Corn is grown for export

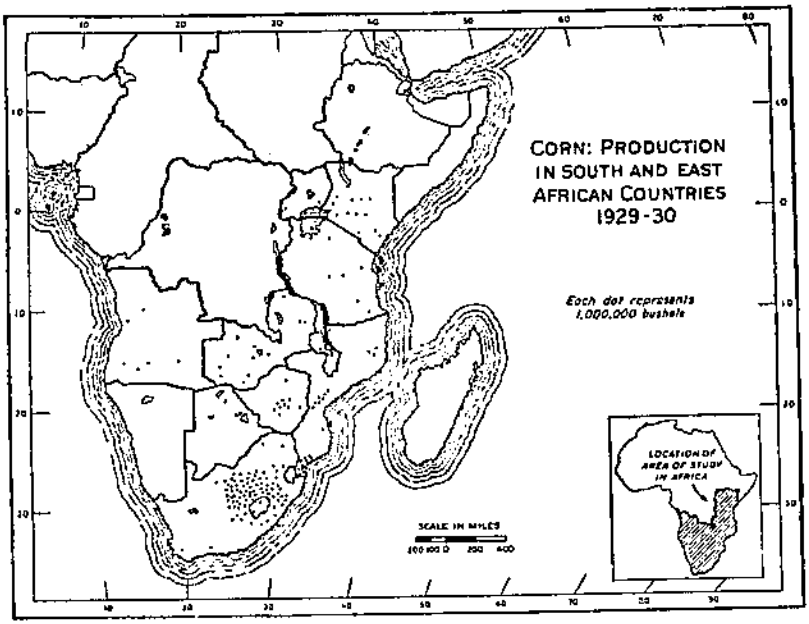

FIGURE 71.—Corn is widely grown for local consumption as food. Corn exports from the Union of South Africa and Southern Rhodesia are important.

TABLE 155.—*Corn: Production and trade in south and east Africa, 1929–30 and 1930*

Country	Production 1929–30			Trade, 1930 [1]	
	By Europeans	By natives	Total	Exports	Imports
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Union of South Africa	51,021	18,296	[2] 79,917	[2] 25,368	
Southern Rhodesia	6,845	2,708	9,553	3,308	60
Basutoland		1,910	1,910	22	219
Swaziland	132	98	230	(3)	(3)
Bechuanaland		[4] 400	400	3	81
South-West Africa	56	[4] 1,300	1,356		288
Northern Rhodesia	720	[4] 11,000	11,720		693
Nyasaland	50	[4] 3,000	3,050	6	1
Mozambique [5]	1,612	[4] 18,000	19,612	[6] 1,400	34
Angola [7] (approximate)	500	[4] 5,000	5,500	2,850	
Tanganyika	(3)	6,276	6,276	0	[8] 115
Kenya	6,635	4,952	11,587	4,609	
Uganda		700	700	4	94
Total	78,150	73,640	151,820	37,579	1,583

[1] Calendar year. Corn, 56 pounds per bushel, plus corn meal, 49 pounds per bushel; but omitted are hominy chop, crushed corn, corn grits, corn germ meal, and corn feed.
[2] An unusually good year; average production during 5 years 1926–30 was 63,000,000 bushels, and average exports 16,500,000 bushels; production in 1932–33 was only 29,789,285 bushels, and exports were very small.
[3] Not reported but insignificant.
[4] Estimates based upon native population and diet.
[5] Portuguese East Africa.
[6] Approximate.
[7] Portuguese West Africa.
[8] 1931.

From official sources.

chiefly by European growers in areas in which yields are reasonably high and the cost of shipment to the seacoast is relatively low. Various limitations such as drought, poor soil, locusts, and low market returns will prevent a major expansion of corn production in these countries.

About 20 to 30 percent of the corn production of the Union is produced by natives. This is to be compared with 50 percent in Southern Rhodesia and Swaziland, 40 percent in Kenya, and nearly 100 percent in other south and east African producing countries.

Exports of corn from south and east African countries amount to about 25,000,000 bushels per year, of which the Union of South Africa exports about 15,000,000 bushels, Southern Rhodesia and Kenya 3,000,000 to 4,000,000 bushels each, and the two Portuguese

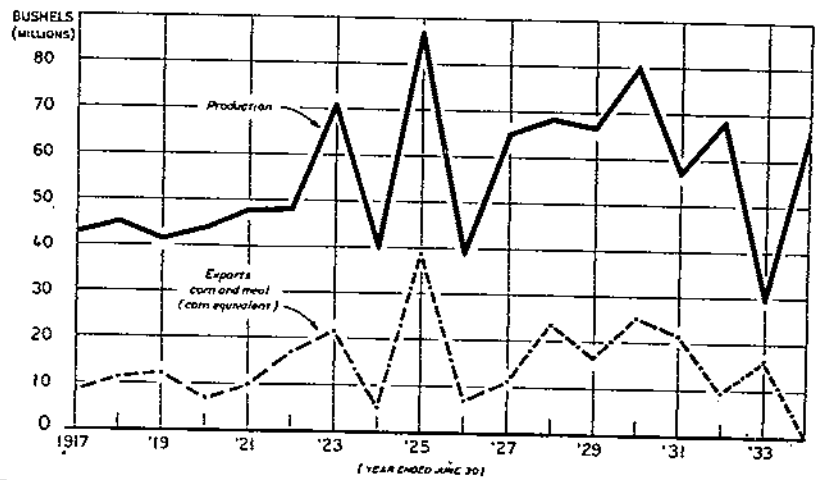

FIGURE 72.—PRODUCTION AND EXPORTS OF CORN, UNION OF SOUTH AFRICA 1917-34.

Corn production and exports fluctuate violently because of the unreliability of rainfall.

territories about 4,000,000. Northern Rhodesia and South-West Africa import from 500,000 to 1,000,000 bushels for consumption at the mines.

UNION OF SOUTH AFRICA

TREND OF PRODUCTION

More than half the corn produced in these 13 countries is produced in the Union of South Africa. Production there increased materially during the first quarter of the century, but no subsequent increase has occurred. Between 1911 and 1922 production increased irregularly from 30,000,000 to 50,000,000 bushels; since that time it has ranged between 30,000,000 and 87,000,000 bushels (fig. 72). The harvest of 1933 was only 30,000,000 bushels from almost the same acreage which produced 80,000,000 bushels in 1930. Yields are especially erratic because of drought and insects, but in none of the last 12 years have yields averaged more than 12.8 bushels per acre on farms owned by Europeans and in 1933 the yield was only 3.5 bushels.

Only about 5 percent of the land in the Union is used for growing crops, chiefly corn. The total acreage of corn in the Union is approximately 9,250,000 acres, of which slightly more than 6,000,000 acres are grown by Europeans and the remainder by natives (table 156).

TABLE 156.—*Corn: Acreage and production in the Union of South Africa, average 1910–15 and 1915–20, annual 1921–34*

Year ended June 30	Total production	Produced by—			
		Europeans			Natives
		Acreage [1]	Production [2]	Yield per acre	Production [3]
Average:	*Bushels*	*Acres*	*Bushels*	*Bushels*	*Bushels*
1910–11 to 1914–15	34, 838, 404				
1915–16 to 1919–20	42, 385, 693				
1920–21	47, 868, 606	3, 814, 737			
1921–22	47, 958, 071	4, 588, 583	31, 127, 418	6.8	16, 830, 653
1922–23	70, 556, 734	4, 908, 626	50, 604, 734	11.0	19, 952, 000
1923–24	40, 122, 666	3, 604, 264	26, 207, 666	7.1	13, 915, 000
1924–25	86, 735, 224	5, 332, 821	68, 153, 224	12.8	18, 582, 000
1925–26	38, 984, 103	4, 044, 124	27, 444, 382	6.8	11, 539, 724
1926–27	65, 177, 125	5, 191, 502	49, 895, 637	9.6	15, 281, 488
1927–28	68, 495, 204	4, 735, 718	53, 818, 340	11.4	14, 676, 948
1928–29	68, 726, 056	5, 370, 079	49, 537, 995	9.2	17, 188, 061
1929–30	79, 916, 667	6, 198, 110	61, 020, 667	9.9	18, 296, 000
1930–31	57, 148, 650	5, 309, 662	45, 178, 350	8.4	11, 970, 210
1931–32	67, 951, 380	6, 025, 780	54, 692, 400	9.1	13, 258, 980
1932–33	29, 789, 285	6, 074, 470	21, 357, 142	3.5	8, 432, 143
1933–34	69, 471, 000	----------	52, 200, 000	----------	17, 271, 000

[1] Harvested acreage.

[2] Production on European-occupied farms, including natives living on such farms, was, in 1903–4, 12,898,554 bushels; in 1918–19, 30,954,000 bushels; in 1919–20, 33,447,616 bushels.

[3] Includes production by natives on European-occupied farms as well as production by natives living on reserves. The former has averaged about 5,000,000 bushels per year between 1921–22 and 1929–30. The latter was, in 1917–18, 10,455,000 bushels, and in 1920–21, 12,763,000 bushels.

Official sources.

METHODS AND COST OF PRODUCTION

The arid character of the country operates against any broad expansion of the corn-growing area (fig. 73). Nearly all the commercial production is centered in a relatively small area where the rainfall is 20 to 30 inches per year, most of it falling during the summer months (October to March). Moisture conservation is a primary consideration in production of corn in the Union (fig. 74). The winter months, April to September, are almost rainless. Plowing and planting occur during October and November, during which months rainfall is normally 2 to 4 inches per month. Cultivation and hoeing are done during December and January, which are the rainiest months, averaging 4 or 5 inches per month. Corn is harvested during April, May, and June. The principal exporting months are August to November. The corn is customarily picked in the field, and the standing stalks are then grazed by cattle.

An official study of corn-production costs during 1928, 1929, and 1930 revealed a cost per acre of about $7. As yields on these farms averaged about 13 bushels per acre, the cost per bushel averaged about 53 cents. This was well below the average price received at that time, which was 87 cents per bushel. Subsequently, however, prices fell considerably below the average production cost.

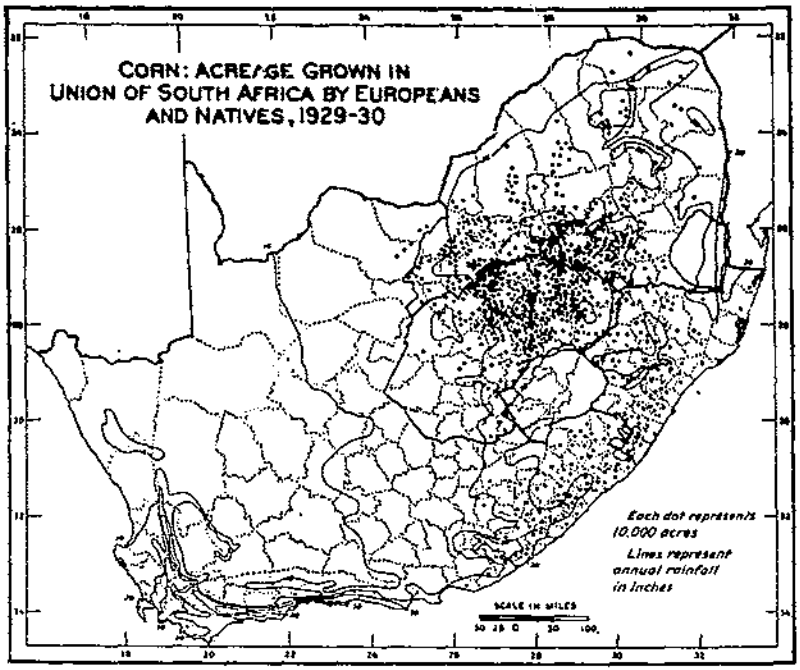

FIGURE 73.—The principal corn area lies in a triangle north of Basutoland. The native-grown area, important along the east coast, is estimated from production.

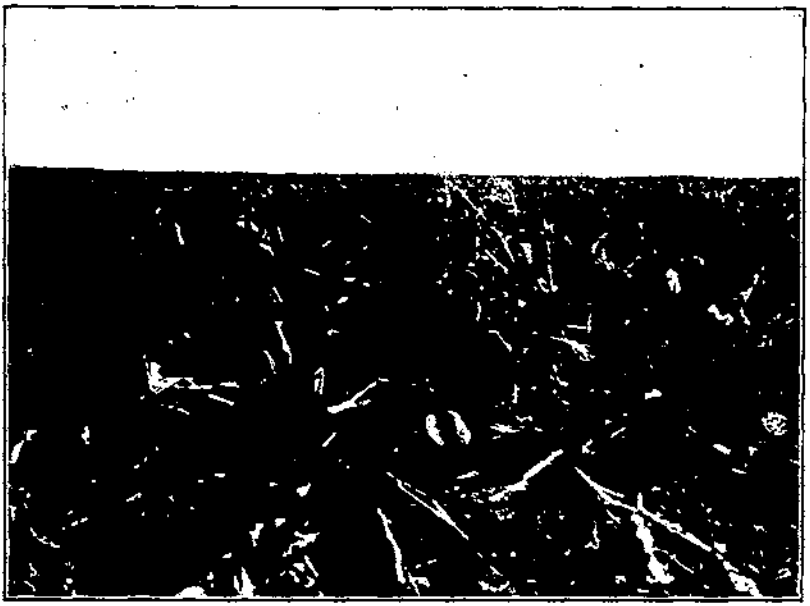

FIGURE 74.—Corn injured by drought in Orange Free State, February 16, 1933. Drought is always a factor limiting production.

Several factors contribute to the low acre cost of growing corn in this area. The farms are large, land values are low, labor is inexpensive, and there is considerable diversification of enterprises. In the investigation mentioned the average farm contained 1,864 acres valued at $1.84 per acre, and the average acreage of corn was 403 acres per farm. Oxen are used in place of horses or tractors. The cost of this labor is very low because ample grazing is available and the oxen are fattened and sold for slaughter at an increase in value. Native laborers are paid only $5 to $10 per month, and a considerable number work for no wages other than the right to live and graze their livestock on the European owner's farm. In some localities natives are paid $1 to $1.25 per 100 bags (357 bushels) for picking corn.

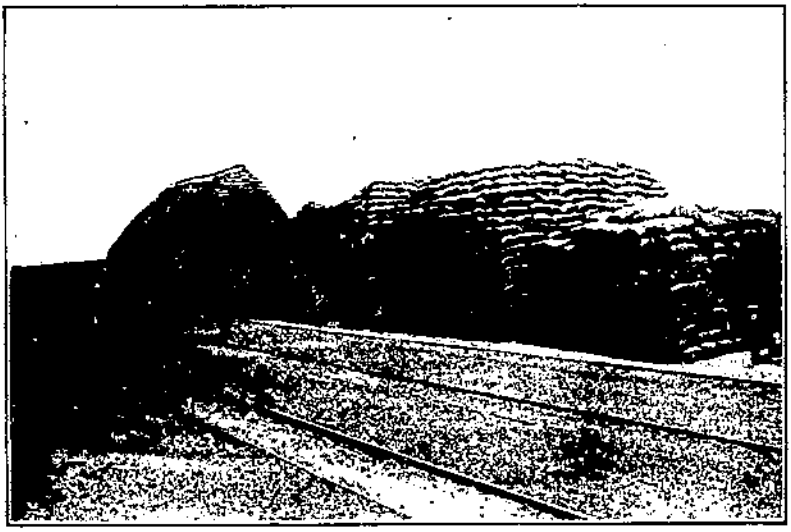

FIGURE 75.—Bags of corn awaiting shipment in Orange Free State, October 29, 1932. Dry weather from May to October permits storage in the open.

Some of the corn grown by natives residing on farms occupied by Europeans or in the native reserves enters commercial channels. The methods used by these natives are very crude; the average yield is only about two-thirds as much as that obtained by European farmers.

METHODS AND COSTS OF MARKETING

Corn is usually marketed in bags weighing 200 pounds, although an increasing quantity is now being marketed in bulk (fig. 75). Grain is usually handled through Government-owned elevators but is either sold through cooperative associations or through private dealers. In 1927–28 cooperatives marketed about 6 percent of the total corn production of the Union. Corn for local consumption is commonly handled by local storekeepers or sold by the local municipal markets.

All corn and corn products for export are graded by Government graders. There are 8 grades of corn in the Government standards, of which no. 2 (Flat White, a dent type) and no. 6 (Round Yellow, a flint type) are the most important. The white-dent varieties are preferred except in the drier or colder areas (table 157).

TABLE 157.—*Corn: Quantity of each grade exported from the Union of South Africa, 1930–31 to 1932–33*

Variety and grade	Year ended June 30		
	1930–31	1931–32	1932–33
Dent varieties:	*1,000 bu.*[1]	*1,000 bu.*[1]	*1,000 bu.*[1]
Flat white, grade 1[2]			(3)
Flat white, grade 2[2]	8,075	1,371	1,819
Flat white, grade 3[2]	2,784	842	1,905
Flat yellow, grade 4	1,841	1,211	1,349
Flint varieties:			
Round white, grade 5	489	38	697
Round yellow, grade 6	5,312	4,330	5,808
Miscellaneous:			
Mixed, grade 7	112	12	33
Undergrade, grade 8	653	82	37
Total	19,266	8,066	11,648

[1] 3.57 bushels per bag.
[2] Only 4 bushels.
[3] Defective and off-colored kernels not more than 1, 8, or 13 percent for grades 1, 2, and 3, respectively (grade 1 specified 1 percent prior to July 1932); 9 percent for other grades except mixed (10 percent defective) and no grade (40 percent defective). All but the last grade must be sound, dry, and reasonably clean. Grade 1 must be large kernels of Hickory King type and the 8-percent tolerance must include foreign matter.

Department of Railways and Harbors.

The freight rate on corn exported to Europe by ships of the South African Conference Lines is 17 shillings 6 pence ($4.26 gold basis) per 2,000 pounds. This is equivalent to 11.9 cents per bushel. Corn exporters charge about 30 cents per bushel for railage to the port, ocean freight, and commission.

EXPORTS

Prior to 1900 corn production did not meet local requirements, but since 1910 corn exports have gained increasing importance. During four successive 5-year periods since 1910–11 annual exports of corn (in millions of bushels) increased as follows: 3.6, 6.2, 15.2, and 13.9. Production increased even more rapidly, so that apparent consumption (in millions of bushels) increased as follows: 31.4, 36.4, 43.6, and 50.3. Of the apparent consumption, a part has also been exported as corn meal: 0.1, 2.4, 2.9, and 2.6 millions of bushels (corn equivalent), respectively. Annual exports vary radically owing to erratic yields, but in recent years they have been approximately 15,000,000 bushels per year. This is more than those from the United States during recent years, about 40 percent as much as exports of Danubian countries, but only about 8 percent as much as those from the Argentine. Exports of corn are more likely to be reduced than expanded in the coming years because of a probable increase in the feeding of livestock for the meat-export trade.

Recently there has been increased interest in the manufacture of fuel alcohol from corn. A factory for this purpose was in process of construction in 1933. It is possible that the Government will allow alcohol manufacturers to buy corn at the export price. Since the consumption of gasoline in the Union is about 60,000,000 Imperial gallons per year and since the percentage of alcohol in the fuel mixture may run as high as 20 percent there is a possibility that corn

exports and gasoline imports will be considerably curtailed. It is estimated that 1 bushel of corn will produce slightly more than 2 gallons of fuel alcohol.

Domestic consumption, especially among the natives, absorbs a large part of the annual crop. From 25 to 50 percent of the production is ground into corn meal by commercial mills in the Union and relatively little of this is exported. The quantity of corn meal and other corn products exported during recent years has been equivalent to about 4,000,000 or 5,000,000 bushels of corn.

Most of the exports of corn were sent to the United Kingdom during 1929 and 1930, but in the following 2 years most of the exports were sent to Canada. Other important destinations were France, Germany, the Netherlands, Belgium, and Denmark. In 1930 small quantities were exported to the United States and to Mexico.

Most of the corn is exported from August to December. Exports of corn products are more constant from month to month.

PRICES

Between 1911 and 1916 wholesale prices of flat white corn in South Africa averaged, in different years, from $0.54 to $1.18 per bushel. Between 1916 and 1929 the annual average price was never below $1 per bushel, except in 1921 and 1922, and it was as high as $1.91 per bushel in 1930. This period of high prices was associated with acreage expansion. During 1930 to 1933 prices fell, reaching a level of less than 30 cents per bushel (gold basis) in January 1933.

Prior to 1931 the price level in South Africa was determined by the prices that could be obtained for the exported portion of the crop. Since that time the Government, by legislation, has made it possible to obtain a higher price for that which is sold in the Union than for the exported portion. In July 1931, flat white corn no. 2 grade sold for 55 cents per bushel on overseas markets, while the average wholesale price for this grade in the Union was 72 cents per bushel.

AGRICULTURAL LEGISLATION

Prior to 1931, corn growers in the Union received no special assistance from the Government, but following the severe reduction in the price obtainable for export corn during 1930 and 1931, a special type of legislation was enacted to enable growers to obtain a higher price for corn consumed in the Union than was obtainable for the exported portion of the crop. This legislation is likely to be permanent since the political tone of the country is essentially agricultural. The policy now in effect increases the cost of feeding livestock, but this enterprise is of minor importance. It also increases the cost of corn bought by the mining companies as rations for their laborers, but, under present conditions, the mines are considered to be in a favorable position to meet this increased cost.

The Mealie (corn) Control Act came into effect in June 1931. It authorized the ministry of agriculture to prohibit, control, or regulate the importation into the Union of corn or corn products and provided for the compulsory exportation of certain specified quantities of corn. During the first year of operation 33⅓ percent of the

purchases were required to be exported. During the second year the quota was fixed at 50 percent. During the third year, because of near failure of the crop, no quota percentage was fixed. The 1934–35 quota percentage has been established as 50 percent.

The law worked badly for the cooperatives during 1931, for while it raised domestic prices it was evaded by some dealers, and the cooperatives were left with a large carry-over of cheap corn. The law was strengthened in 1932 to overcome this difficulty.

The ministry of agriculture designates the export-quota percentage before August 31 each year. The percentage figure is derived by dividing the estimated exportable surplus for the season by the estimated total quantity available for sale during the season, exclusive of any corn necessary for consumption by the producer in his household, or by his tenants or farm servants or for feeding to his livestock or the livestock of his tenants. Any individual acquiring in excess of stipulated quantities (25 to 300 or 600 bags, as the case may be) of corn or its equivalent in corn products, must export the quota percentage of his purchases. Since 1932 a double quota has been imposed on producers who have more than 1,000 bags unsold at a certain date and not for use on the same farm, because any such producer and the purchaser must both set aside the stipulated quota. To avoid this the large producer must either turn his crop over to a cooperative or sell early when prices are generally lowest.

SOUTHERN RHODESIA

TREND OF PRODUCTION

Southern Rhodesia is the second most important producing area of corn in south and east Africa. Here, as in the Union, most of the corn is grown by Europeans. The acreage grown by Europeans has increased from 161,000 acres in 1913–14 to 325,000 acres in 1928–29. Subsequently, the acreage declined to 253,000 acres in 1932–33 (table 158). Officials of Southern Rhodesia do not consider corn a suitable crop to produce for export and, although corn-price-supporting legislation has been introduced, a curtailment of acreage is urged. In 1929–30, 76 percent of the total summer-crop area was in corn, and other substitute crops cannot easily be found for more than a small part of this acreage. Yields per acre are normally about twice as high as in the Union and compare favorably with average yields obtained in the United States. Between 1913–14 and 1932–33 the total production of corn by Europeans has ranged between 2,000,000 and almost 7,000,000 bushels.

Corn is commonly grown by the natives in native reserves for their own consumption and a small quantity for sale. The 1929–30 crop of native-grown corn was 2,708,000 bushels, of which 624,000 bushels was sold or traded to Europeans. Yields per acre obtained by natives are very low. Assuming an average yield of 6 bushels per acre, the natives' corn acreage is about 450,000 acres, which is about twice as much as the acreage grown by Europeans. As a result of educational efforts on the part of European officials natives' corn yields are being increased, and a steadily increasing production of corn on native reserves may be expected.

TABLE 158.—*Corn: Production, value, exports, and consumption in Southern Rhodesia, 1913–14 to 1932–33*

Year of harvest	Corn on land occupied by Europeans					Exports		Approximate consumption [3]
	Area planted	Production	Yield per acre	Price per bushel [1]	Value per acre	Corn	Corn meal [2]	
	1,000 acres	*1,000 bushels*	*Bushels*	*Cents*	*Dollars*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1914	101	2,264	14.1	72	10.15	722	47	1,495
1915	167	3,266	19.6	55	10.78	1,238	27	2,001
1916	175	2,429	13.9	53	7.37	183	47	2,199
1917	203	3,349	16.5	74	12.21	703	121	2,435
1918	192	2,112	11.0	81	8.91	765	82	1,205
1919	173	3,177	18.4	70	13.08	1,189	283	1,725
1920	173	4,000	23.1	75	17.32	1,745	443	1,812
1921	180	4,358	23.4	88	20.59	1,237	411	2,710
1922 [4]	182	2,366	13.0	50	6.50	114	186	2,068
1923	221	5,375	24.3	82	19.93	2,765	310	2,300
1924	232	3,850	16.6	58	9.63	1,110	336	2,401
1925	230	3,810	16.0	82	13.12	1,369	118	2,329
1926	240	4,975	20.7	68	14.08	1,551	185	3,239
1927	267	5,925	22.2	75	16.65	1,953	75	3,897
1928	295	4,527	15.3	73	11.17	2,134	178	2,215
1929	325	6,520	20.1	78	15.68	2,080	216	4,224
1930	318	6,845	21.5	63	13.54	2,660	630	3,555
1931	273	5,129	18.8	[5] 49	[5] 9.21	2,272	180	2,677
1932	253	6,724	26.6	[5] 44	[5] 11.70	4,058	82	2,582
1933	251	4,130	16.4					

[1] Average obtained (No. 2 grade) by the Farmers' Cooperative, Ltd., Salisbury, before deduction for cost of bag (7 cents) and cost of delivery to railroad.

[2] Converted at 49 pounds per bushel of corn.

[3] In 1930 natives' production was, in addition, 2,708,000 bushels, of which 624,000 bushels was sold to Europeans.

[4] A year of exceptional drought.

[5] Currency basis, subject to about 30-percent reduction to gold basis. Pay-out to farmers 1928–29 to 1931–32.

Southern Rhodesia Official Yearbook (37), and Econ. and Statis. Bull. (n. s.) v. 2, no. 2. Apr. 2, 1934. [Mimeographed.] Crop year ended June 30; export and consumption year ended Dec. 31.

METHODS AND COSTS OF PRODUCTION

The principal corn-producing area is in the vicinity of Salisbury, where rainfall averages about 30 inches per year. The seasonal distribution is the same as in the principal corn-producing area of the Union, but the rainfall during the months of December, January, February, and March, covering the period from the end of planting to the end of the tasseling period, is considerably heavier, so that the total rainfall for the year is about 5 inches more than in the corn-growing area of the Union. This additional rainfall, coming as it does at the critical periods of growth, produces yields averaging twice as much as in the Union. The rainy season is about a month later in Southern Rhodesia than in the Union. Planting takes place during November and December.

Both white and yellow corn are grown but, according to law, only white or yellow corn can be grown in any designated area. Most of the corn grown for export is white corn. Most of the 2,200 European corn growers grow less than 100 acres of corn, but there are over 300 growers with over 200 acres of corn per farm, and it is the larger growers who obtain the highest yields per acre.

The general practice in Southern Rhodesia differs from that in the Union in that corn is usually cut and shocked instead of being harvested from standing stalks. Labor is performed chiefly by oxen and natives. Wage rates are usually $5 to $10 per month, except for

native squatters, who receive grazing and living privileges instead of cash. Production-cost figures are not available, but despite the higher yields per acre it is generally claimed that production costs are 40 cents to 55 cents per bushel (gold basis). These costs are only slightly lower than those obtained in the Union of South Africa, but the methods of calculation are not the same.

METHODS AND COSTS OF MARKETING

Marketing methods in Southern Rhodesia are essentially the same as in the Union of South Africa (fig. 76). There is a cooperative grain-marketing association which handled considerable quantities of corn prior to 1931. Since that time it has worked in conjunction with the Maize Control Board of Southern Rhodesia, a Government monopoly created in 1931.

FIGURE 76.—Bags of corn awaiting shipment at a railway siding during the dry winter months in Southern Rhodesia.

All corn or corn meal for export must be graded and inspected by official inspectors. There are 4 grades of flat white corn, the first 3 of which have no more than 1, 8, and 13 percent, respectively, of defective or colored grain. Most of the exports are of no. 2 grade Flat White.

The cost of exporting corn from Southern Rhodesia has been officially estimated to be 24 cents per bushel (gold basis), consisting of railage 5 cents; grading, loading, insurance, etc. 3 cents; Beira port charges 4 cents; and ocean freight 12 cents. The quoted rate for ocean freight from Beira to European berth ports in 1932 was 15.7 cents per bushel without options, and 19.5 cents with optional destinations.

EXPORTS

About 3,000,000 or 4,000,000 bushels (slightly less than half the total corn production) is annually exported. The remainder is used chiefly for human consumption and, secondarily, as feed for livestock.

Shipments are made through Beira. The United Kingdom is the principal destination, but considerable quantities also reach the Netherlands, Belgium, and Germany. The principal exporting season extends from August to November.

LEGISLATIVE ASSISTANCE TO CORN GROWERS

The Government created the Maize Control Board in June 1931. All corn entering commercial channels, excepting from unimportant exempted areas, becomes the property of the control board. The latter maintains a fixed price of about 65 cents per bushel, with geographical and grade differentials, for all inland sales. All corn which cannot be marketed in the country by the control board is exported by the board. During the first year of operation the board received 34 cents per bushel for the exported portion of the crop. The board pays a substantial advance on delivery of corn and makes a final payment at the end of the marketing season. The average price realized by growers during the first year was 46 cents per bushel. The cost of operating the board was 2.2 cents per bushel. The effect of the legislation is to give growers an average price higher than export parity by reason of the higher local prices. Although originally passed as temporary legislation, the law has been continued.

BASUTOLAND, SWAZILAND, AND BECHUANALAND

There are three native protectorates, Basutoland, Swaziland, and Bechuanaland, which are adjacent to, but not part of, the Union of South Africa. The first two are small but are located in the rainy area. The third is large but arid. With minor exceptions the land in all three is reserved exclusively for natives.

Estimates of acreage and production by natives are extremely difficult to obtain, but it appears that the acreage of corn in these three protectorates is about 200,000, 40,000, and 100,000 acres, respectively (table 159). The combined acreage is less than the native-grown corn of Southern Rhodesia alone. Production of corn in the three protectorates is approximately 2,000,000, 300,000, and 400,000 bushels, respectively, including 100,000 to 150,000 bushels produced by Europeans in Swaziland. In arid Bechuanaland kafir is twice as important as corn.

Yields per acre in the native protectorates are very low, and there is practically no exportable surplus. In fact, corn is as often imported as exported. Production by these natives has shown no significant change during the last 10 years.

SOUTH-WEST AFRICA

South-West Africa is large but mostly arid and is sparsely populated by Europeans and natives. Crop production, chiefly corn and kafir, is insufficient to supply the mines and other nonagricultural interests in the territory, and importation from the Union of South Africa is necessary. In 1932 imports, chiefly in the form of corn meal, amounted to 290,000 bushels. This was slightly less than in 1931, because of mining inactivity.

During the last 10 years corn production by Europeans has varied, on account of drought, from as low as 25,000 bushels to as much as 259,000 bushels. Production by natives is probably somewhat above 1,000,000 bushels (table 160). The average yield per acre is probably not more than 5 bushels for Europeans and 2 bushels for natives. Corn acreage is believed to be about 25,000 acres for Europeans and 650,000 acres for natives.

Because of the arid conditions in the south and malarial conditions in the north, corn production will probably never become important in South-West Africa.

TABLE 159.—*Corn: Acreage, production, and foreign trade in, Basutoland, Swaziland, and Bechuanaland, 1923–32*

BASUTOLAND

Year of harvest	Area [1]	Production	Imports	Exports	Year of harvest	Area [1]	Production	Imports	Exports
	1,000 acres	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*		*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1923	250	2,139	.....	311	1928	200	2,047	55	360
1924	250	1,675	.....	35	1929	200	2,081	70	312
1925	158	838	.....	254	1930	200	1,916	219	22
1926	200	1,839	.....	20	1931	200	1,735	409	1
1927	200	1,974	.....	134	1932	200	1,606	342	7

SWAZILAND [2]

1921	28	240	.....	.....	1929	26	298	.....	.....
1925	25	247	.....	.....	1930	43	330	.....	.....
1926	29	257	.....	.....	1931	39	185	.....	.....
1927	32	344	.....	.....	1932	.....	217	.....	.....
1928	26	297	.....	.....					

BECHUANALAND

1921	[3] 184	[4] 736	.....	.....	1931	.....	.....	50	9
1930	.....	.....	81	3	1932	100	400	.....	.....

[1] Acreages in these native protectorates are only approximate.
[2] Of these acreages, European farmers grew (in thousands of acres) 11, 6, 9, 11, 10, 9, 13, and 10, respectively. Of these productions, European farmers up to 1931, inclusive, produced (in thousands of bushels) 120, 112, 115, 173, 151, 148, 132, and 77, respectively.
[3] Production divided by 4.
[4] Native population multiplied by 4.0.

Basutoland agricultural officer; South African Crops and Markets; Government secretary, Swaziland; Imperial Secretary, Pretoria.

NORTHERN RHODESIA

Northern Rhodesia has about 1,400,000 natives, but only 400 European farmers. Native production of corn amounts to about 11,000,000 bushels, all for their own consumption. The production of corn by Europeans, chiefly for the copper-mine laborers, was 821,000 bushels in 1931–32 (table 161). Yields per acre are usually 15 to 20 bushels for Europeans and possibly 5 bushels for natives. The natives apparently use 2,200,000 acres for growing corn and the Europeans 43,000 acres (1931–32). Imports from Southern Rhodesia in 1931 came to 140,000 bushels, including corn meal, and, in 1932, to only 46,000 bushels, due to mining inactivity. No significant increase in corn production in Northern Rhodesia is to be expected for many years.

TABLE 160.—*Corn: Production and foreign trade in South-West Africa, 1924–31*

Year of harvest	Production by [1]—		Foreign trade		Year of harvest	Production by [1]—		Foreign trade	
	Europeans	Natives	Imports [2]	Exports [3]		Europeans	Natives	Imports [2]	Exports [3]
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*		*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1924	28				1928	259		199	0.7
1925	190				1929	41	[5] 1,270	311	8.5
1926	25		198	(4)	1930	50		280	4.8
1927	85		200	0.4	1931	193			

[1] Acreage is not reported; Europeans, about 25,000 acres, natives probably 650,000 acres.
[2] Including corn meal converted at 49 pounds per bushel of corn.
[3] Cereals of all kinds, chiefly corn; converted at 56 pounds per bushel.
[4] Insignificant quantity.
[5] Native population multiplied by 4.6.

Union of South Africa Official Yearbooks; officials of South-West Africa; customs reports. Crop year ended June 30; trade year ended Dec. 31.

TABLE 161.—*Corn: Acreage, production, and foreign trade in, Northern Rhodesia, 1924–32*

Year of harvest	Acreage on land occupied by		Production on land occupied by		Foreign trade [1]	
	Europeans	Natives	Europeans [2]	Natives	Imports	Exports
	1,000 acres	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1924	35		461		61	163
1925	36		339		71	198
1926	30		632		99	231
1927	44		893		25	386
1928	43		653		20	284
1929	39		719		174	233
1930	47		720		691	284
1931	43	[3] 2,200	691	[4] 11,000	[5] 158	
1932	43		821		[5] 48	

[1] Yield per acre in each year, 13, 9, 18, 20, 15, 18, 15, 16, and 19 bushels, respectively.
[2] Including corn meal, calculated at 49 pounds per bushel of corn.
[3] Production divided by 5.
[4] Native population multiplied by 8.2. The natives consume about 2 pounds of grain per day per capita (13 bushels per year). In the north the diet consists largely of cassava root; in the west, of corn, kaffir, and millets; in the drier southeast, of millets and kaffir. The average is probably 25 percent cassava, 12 percent kaffir and millets, and 63 percent corn.
[5] From Southern Rhodesia.

Department of Agriculture annual reports. Crop year ended June 30; trade year ended Dec. 31.

NYASALAND

Nyasaland, with 1,500,000 natives and only 3,000 Europeans and Asiatics, produces about 3,000,000 bushels of corn on about 350,000 acres. Europeans produced only 39,000 bushels on 1,400 acres of land in 1931–32. Corn is produced almost entirely by the natives for their own consumption. Yields obtained by Europeans are about 20 bushels per acre, which is two or three times as much as yields obtained by natives. However, the acreage of European-grown corn is not expanding and, since 1927, has apparently declined. The country is more suitable for cotton and tobacco. Corn will not be grown for export (table 162).

TABLE 162.—*Corn: Acreage, production, and foreign trade in Nyasaland, 1923–32* [1]

Year of harvest	Corn on land occupied by—			Exports	Year of harvest	Corn on land occupied by—			Exports
	Europeans		Natives, production			Europeans		Natives, production	
	Acreage	Production				Acreage	Production		
	1,000 acres	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*		*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1923	4.0	83	.....	.....	1928	4.8	82	.....	7
1924	3.6	75	.....	.....	1929	3.8	80	.....	6
1925	3.6	72	.....	.....	1930	2.7	59	[2] [3] 3,000	6
1926	4.9	82	.....	.....	1931	3.2	73	.....	6
1927	5.3	95	.....	.....	1932	[3] 1.4	[3] 39	.....	.1

[1] Data for acreage and production include millets. Exports include corn meal and flour.
[2] Native population multiplied by 2.5.
[3] Corn only.

Nyasaland Department of Agriculture and reports of external trade. Crop year ended June 30; export year ended Dec. 31.

MOZAMBIQUE

South of the Zambesi River corn is the principal crop of Mozambique; sugar is of secondary importance near the Zambesi River, and cotton is of secondary importance in the southern district of Lourenço Marques. North of the Zambesi coconuts and sisal are most important. Corn is grown by or in conjunction with natives in all parts of the colony. Yields obtained by non-natives are usually 15 to 20 bushels per acre, and their production is slowly increasing. In 1929–30 the non-native acreage was 127,000 acres, from which the production was 1,612,000 bushels, but the yield per acre that year was only about two-thirds of normal. The annual production of corn by natives is unknown, but is probably about 18,000,000 bushels, of which less than 2,000,000 bushels enters commercial channels. Exports are less than 1,500,000 bushels per year, and there is no apparent tendency to expand production beyond domestic needs. To maintain prices profitable to producers in the colony a high import duty prevails, and the chartered company (Manica and Sofala districts) in 1931 bought the exportable surplus at 55 cents per bushel, thereby enabling the local price to be fixed at 95 cents per bushel.

ANGOLA

The Portuguese colony of Angola varies from dense tropical forest in the Congo basin, in the north, to dense thorn bush in the south. Most of the European settlements are on the high plateau at elevations of 4,000 to 6,000 feet. Corn is grown chiefly in the vicinity of Benguella and in the hinterland of Luanda. Corn production averages between 4,500,000 and 6,500,000 bushels, obtained from an acreage of 400,000 or 500,000 acres. Most of the corn is grown by natives for their own consumption. In 1933, a good year, approximately 3,581,000 bushels were exported. Corn exports in that year exceeded in value the exports of coffee, sugar, coconuts, or palm oil. About three-fourths of the exports of the colony go to Portugal.

The Government of Angola is attempting to stimulate the production of corn by assisting the natives in the selection of seed and the cultivation of the crop.

TANGANYIKA

Corn is grown throughout Tanganyika, but it is of secondary importance except in the central semiarid area. Corn is produced chiefly but not entirely by natives. Production during recent years has reached 6,000,000 to 11,000,000 bushels. It is produced on approximately 700,000 to 1,000,000 acres. Corn is considerably less important than the millets and only slightly more important than kafir. The total area of grain crops in 1930, including rice and peanuts, was 4,300,000 acres, representing about 90 percent of the total cultivated area. Yields obtained by Europeans are about equal to those obtained in Southern Rhodesia, although at one of the experiment stations yields of 27 to 45 bushels per acre were obtained in 1930 from properly fertilized and cultivated plots. Locusts constitute a serious handicap, and the tsetse fly bars work oxen from certain areas. Both imports and exports of corn are less than 100,000 bushels each (table 163).

TABLE 163.—*Corn: Production and foreign trade in Tanganyika, 1927–28 to 1930–31*

Year of harvest	Production	Imports [1]	Exports [1]
	1,000 bushels	*1,000 bushels*	*1,000 bushels*
1928	10,930	.....	34
1929	5,930	.....	14
1930	7,030	.....	9
1931	144	.....	[2] 12

[1] Includes corn meal calculated at 80 pounds per bushel. Exports are from Tanga and Lindi districts only.

[2] Exports from Moshi district 52,400 bushels additional.

From official sources. Crop year ended June 30; trade year ended Dec. 31.

KENYA

Although Kenya is located on the Equator, much of the colony is at such a high elevation as to provide a temperate climate. About 4 percent of the total land area is in farms owned by Europeans, and about one-tenth of this is in crops. Corn represented 28 percent of the crop area in 1932, as against 42 percent in 1926. The average size of farm in 1932 was 2,480 acres. Individual farmers commonly grow 200 to 3,000 acres of corn, and 800 acres is described as a satisfactory economic unit.

The acreage of corn grown by Europeans in the colony increased from 32,000 in 1920 to 234,000 in 1929–30 and then declined to 164,108 acres in 1932–33. Production increased from less than 1,000,000 bushels to nearly 7,000,000 bushels during this period of expansion. The yield per acre averaged 25.4 bushels during the first 5 years and 20 during the next 4 years. The decline in yield is probably due to a bringing into production of less suitable areas. However, the expansion during the last 14 years seems to be justified by economic conditions, and when price conditions are more favorable the upward trend may be expected to be renewed (table 164).

TABLE 164.—*Corn: Acreage, production, and foreign trade in Kenya, average 1920–24 to 1930–34, annual 1929–34*

Year of harvest	Corn on land occupied by Europeans [1]			
	Acreage [2]	Production	Yield per acre	Exports [3]
Average:	*1,000 acres*	*1,000 bushels* [3]	*Bushels*	*1,000 bushels*
1920–24	61	1,551	25.6	1,021
1925–29	169	3,800	22.5	2,354
1930–34	179	4,601	25.7	
1920	32	1,134	35.4	671
1921	31	588	19.0	[4] 260
1922	57	1,210	21.2	[4] 180
1923	75	1,849	24.7	[4] 1,660
1924	108	2,976	27.6	[4] 2,315
1925	130	3,188	24.5	[4] 2,481
1926	156	3,308	21.2	[4] 1,825
1927	178	4,693	26.4	3,784
1928	177	3,887	22.0	2,043
1929	205	3,925	19.1	1,635
1930	234	6,635	28.4	4,609
1931	201	5,890	29.3	3,705
1932	161	[5] 2,723	16.9	1,043
1933	164	[6] 4,070	[7] 24.8	2,320
1934	113	[8] 2,667	23.6	

[1] Native-grown corn, 1929–30, was 4,950,000 bushels.
[2] Produced chiefly in Trans Nzoia, Nakuru, and Uasin Gishu districts.
[3] Including corn meal at 49 pounds per bushel of corn. Exports in 1914 were 65,000 bushels.
[4] Year ended July 31; exports from Mombasa only.
[5] Of which 600,000 to 700,000 bushels estimated available for export.
[6] Of which 2,856,000 bushels estimated available for export.
[7] The most important district, Trans Nzoia, averaged 47 bushels.
[8] Of which 1,430,000 bushels estimated available for export.

Kenya Colony agricultural census reports. Crop year ended June 30; export year ended Dec. 31.

The production of corn by natives in Kenya in 1929–30 was almost 5,000,000 bushels, which is almost equal to the production by Europeans in that year, but in view of the much lower yields per acre obtained by natives it is probable that the natives use about 560,000 acres of land for growing corn, as compared with a much smaller acreage used by Europeans.

The Kenya Department of Agriculture estimates that the cost of producing corn is $8.50 to $16.50 per acre (conversion at par), including bags and transportation, from which it is concluded that at least 46 bushels per acre are essential for the profitable exportation of corn when the price in Europe remains about 71 cents per bushel. These costs appear unreasonably high in relation to costs in the Union of South Africa and Southern Rhodesia and are open to question.

Kenya exports about as much corn as does Southern Rhodesia. The largest quantity thus far exported was 4,609,000 bushels (including corn meal) in 1930. Most of the corn for export is Kenya Flat White variety, a hybrid from Natal White and Hickory King.

UGANDA

Uganda is rather densely populated by natives, but there were fewer than 2,000 Europeans in 1927, very few of whom were farming. The production of corn by natives is not known with any degree of accuracy. On the basis of native population it has been esti-

mated to be approximately 600,000 bushels, although in the last 10 years it has probably ranged between 50 and 200 percent of this figure. About 70,000 acres were used by Uganda natives in 1931 for growing corn, as compared with 3 or 4 times this acreage used for kafir. In the preceding year the natives' acreage was 142,000 acres, which was a record. Between 1923 and 1928 acreage varied between 30,000 and 41,000 acres.

Corn acreage is increasing, particularly on heavier soils in areas bordering on Lake Victoria, but the extension of production is limited by the lack of suitable local milling facilities. Corn production is also hampered by frequent attacks of locust. Corn is not considered an exportable crop at prices likely to be ruling, and the encouragement of its cultivation is confined to the settled part of the Province and is entirely for local demand. Annual exports during recent years have not exceeded 22,000 bushels.

WHEAT

Wheat production in the African countries south of the Equator is of minor importance. The total production of wheat in the 13 British and Portuguese countries amounts to less than 12,000,000 bushels, practically all of which is produced in the Union of South Africa and Basutoland. Almost no wheat is produced in the vast summer-rainfall area separating the Capetown area of the Union from Kenya on the Equator. In Kenya the rainfall during winter months is sufficiently heavy to permit moderate production of wheat. The general use of corn meal, especially among the natives, makes it unnecessary to import much wheat. Production and importation of wheat will continue to be small so long as the European population is small (table 165).

TABLE 165.—*Wheat: Acreage, production, and foreign trade in south and east Africa, 1930*

Country	Acreage [1]	Production [1]	Yield per acre [2]	Imports [3]	Exports [3]
	1,000 acres	*1,000 bu.*	*Bushels*	*1,000 bu.*	*1,000 bu.*
Union of South Africa	[4] 1,295	[4] 9,287	7.3	4,897	302
Basutoland	[5] 89	[5] 607	6.8	17	430
Southern Rhodesia	7	53	7.8	345	67
Northern Rhodesia [6]	2	32	13.9	71	.....
Angola [7]	37	296	.....	158	169
Kenya	69	648	9.4	.....	492
Uganda	[8] 2	[8] 2	[8] 10	[9] 02	.....
Total	1,469.2	10,925	7.3	5,550	1,460

[1] On farms of Europeans.
[2] Calculated from the unrounded figures.
[3] Including milled products, wheat equivalent 47 pounds per 60-pound bushel
[4] Europeans produced about 98 percent of the total production in 1923 to 1925.
[5] Produced by natives; acreage in Uganda has varied erratically from 172 (1929) to 506 acres (1923).
[6] Mostly irrigated; acreage and production have not changed materially since 1925.
[7] Acreage approximate; production, 1929; flour imports, 1928
[8] Approximate.
[9] Transferred from Kenya.

From official sources.

UNION OF SOUTH AFRICA

TREND OF PRODUCTION

Wheat production was introduced at Capetown as early as 1652. By the time the Union of South Africa came into being in 1910 the wheat-growing area was well established in the vicinity of Capetown. In recent years the wheat-growing area has extended eastward along the south coast and has assumed minor importance as a dry-land crop along the western and southern border of Basutoland. Wheat is also grown under irrigation in the Transvaal and a few other isolated areas (fig. 77). Until 1928 the Union imported 25 to 30

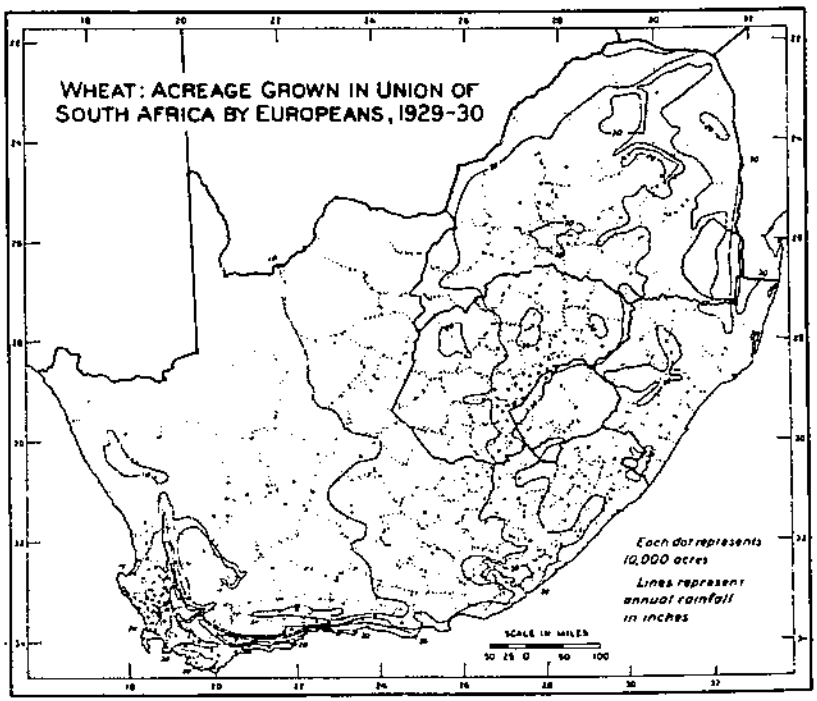

FIGURE 77.—The chief wheat-producing areas are in the southwest and near Basutoland.

percent of its requirements of wheat from Australia and Canada, but, under the increased protection accorded in 1930, production was increased to a point that imports became almost unnecessary.

During four successive 5-year periods ended in 1930 the consumption of wheat in the Union increased from 9,600,000 to 13,400,000 bushels per year. At the same time production increased from 7,040,000 bushels per year during 1911–15 to 8,340,000 bushels in 1926–30. Imports also increased during this period, but as previously stated, production in 1931 was increased to 13,700,000 bushels and in 1932 to 10,616,000 bushels, making importation of wheat (except from Basutoland) unnecessary. The recent expansion in production was made possible by increased tariff protection, which guaranteed that

the landed cost of imported wheat would be $1.64 per bushel (conversion at par). The guaranteed price is endangered by the expansion of production to the point that imports are no longer required, and no further expansion of production is to be expected. In fact, if the duty is lowered, wheat production will diminish (table 166 and fig. 78).

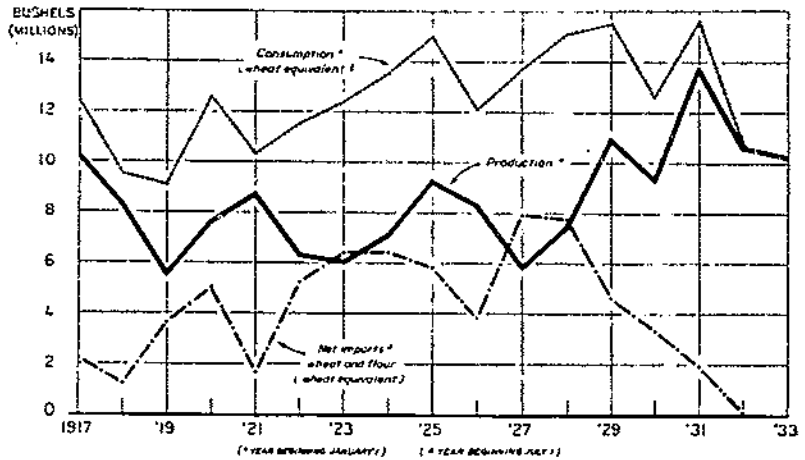

FIGURE 78.—PRODUCTION, IMPORTS, AND CONSUMPTION OF WHEAT, UNION OF SOUTH AFRICA, 1917-33.

Wheat import restrictions have recently increased prices and production and have decreased both imports and consumption.

TABLE 166.—*Wheat: Acreage, production, and foreign trade in Union of South Africa, average 1910–29, annual 1925–38*

Year [1]	Wheat				Flour and meal (wheat equivalent) [4]		
	Acreage [2]	Production	Imports [3]	Ground in mills	Imported	Exported	Consumed
	1,000 acres	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Average:							
1910–14		7,640	3,475	7,126	2,502	295	9,633
1915–19		7,657	2,325	9,068	1,160	228	9,040
1920–24	868	7,140	3,415	9,489	1,734	291	11,022
1925–29	900	8,340	4,961	12,464	1,206	234	13,376
1925	968	9,210	4,660	11,650	1,304	229	12,734
1926	881	8,282	2,809	12,288	1,070	200	13,158
1927	774	5,838	6,919	12,495	1,155	207	13,443
1928	825	7,435	6,590	12,631	1,394	242	13,783
1929	1,084	10,034	3,789	12,955	1,108	302	13,761
1930	1,206	[5] 9,207	2,992	.....	589	[5] 9	.....
1931	1,736	[5] 13,213	2,069	.....	31	[5] 2	.....
1932	1,530	[5] 10,627	322	.....	16	[5] 2	.....
1933 [6]	1,257	[5] 10,227	.....	.....	.....	.....	.....

[1] Acreage and production are for year beginning Jan. 1; other figures are for years beginning July 1.
[2] Europeans only, producing about 98 percent of total production 1923 to 1925.
[3] Imports of wheat, less reexports, excluding about 300,000 bushels per year from Basutoland.
[4] 47 pounds per 60-pound bushel of wheat.
[5] Preliminary.
[6] 1934 production was 13,950,000 bushels.

Agricultural census reports, official yearbooks, and customs reports.

METHODS AND COSTS OF PRODUCTION

The principal wheat-growing area is in the winter-rainfall belt near Capetown and has about 18 inches normal annual rainfall, practically all of which comes between April and October. Here wheat is sown during April and May and harvested during October, November, and December. In the secondary wheat area in the Orange Free State, normal annual rainfall is about 28 inches, nearly all of which comes during October to April. In this area planting must be done during March or April in order to escape the effects of the winter drought, which begins in June. Production in this area is at all times hazardous.

A typical wheat farm near Capetown contains about 1,600 acres, of which 400 are in wheat, 190 in other crops, 760 in fallow and stubble lands, and 250 in grazing and waste lands. The rotation is usually 2 or 3 years long; stubble and fallow occur in the second and third years. Methods of production are similar to those found in the Palouse wheat area of Idaho and Washington. However, grain binders are used, and the shocked grain is eventually stacked to await the coming of the threshing machine. The stubble lands are used for grazing sheep, mules, and a few cattle and hogs. Mules are much more commonly used than work oxen in this area.

The labor supply consists chiefly of Cape colored men (partly white) hired at a cost of 70 cents per day for regular work and $1.09 per day for extra work. White labor costs about $1.70 per day. Between 2,000 and 3,000 days of labor per farm are usually employed during the year at an average cost of about 75 cents per day. In addition the laborers receive privileges and food and wine approximately equal to the amount of cash received. Hired labor represents about one-third the total expenses and fertilizer about one-sixth. The cost of mule labor averages 37 cents per day, as compared with 3.6 cents per day for ox labor in the western Transvaal.

The average wheat farm in this area (1929–30) represents a large capital investment ($56,000), of which land, at $24 per acre, represents 69 percent; improvements, 15 percent; implements, 5 percent; and livestock, 11 percent. Some of the wheat farmers own tractors, and the number of tractor owners has apparently increased. The number of tractors on all farms in the Union increased from 231 in 1918 to 3,684 in 1930. During the same period the number of threshing machines increased from 1,428 to 8,602.

The average cost of producing a bushel of wheat in the Malmesbury area during 1929–30 was $1.32, including interest and allowing a credit for the value of grazing. The average profit per bushel was 30 cents. Of course, there was a wide variation in costs among the different farms included in the study.

AGRICULTURAL LEGISLATION

Since March 1930 the Union Government has imposed a duty on imported wheat equal to the difference between the landed cost and 11 shillings 3 pence per 100 pounds ($1.64 per bushel). No wheat can be imported except under license by the minister of finance. Only

such quantities of wheat are allowed to be imported as are imperative to the operation of the South African milling industry. During 1932 the commissioner of customs made four successive reductions in the quantity of hard wheat which could be imported by millers for blending purposes, which reduced the percentage from 20 percent to 1 percent of the wheat milled. In 1931 the principles of the law were extended to apply to the importation of wheat flour and wheat meal. This was done to protect local millers and to prevent evasion of the law by the importation of flour instead of wheat.

BASUTOLAND

Basutoland is the only country in south and east Africa in which natives produce any considerable quantity of wheat. The natives produce about one-third as much wheat as corn, and almost as much wheat as kafir. Production of wheat during the last 10 years has ranged between 600,000 and 1,200,000 bushels. Some of the wheat is consumed in Basutoland, but the larger part of it finds its way duty-free into the Union (table 167). Unusual weather conditions and the relatively high prices obtainable for wheat of the Union since 1930 have caused some expansion of wheat production in Basutoland. Yields averaged only about 8 bushels per acre, as compared with 8.7 bushels per acre in the Union of South Africa during the 10 years 1923 to 1932 and 10 to 15 bushels per acre in the more favored areas near Capetown.

TABLE 167.—*Wheat: Acreage, production, and foreign trade in Basutoland, 1923–32*

Calendar year	Approximate acreage	Production	Imports [1]	Exports [1]	Calendar year	Approximate acreage	Production	Imports [1]	Exports [1]
	1,000 acres	*1,000 bu.*	*1,000 bu.*	*1,000 bu.*		*1,000 acres*	*1,000 bu.*	*1,000 bu.*	*1,000 bu.*
1923	94	586	(2)	214	1928	89	728	23	394
1924	94	676	(2)	103	1929	89	668	18	240
1925	89	643	(2)	278	1930	89	607	17	430
1926	89	920	(2)	345	1931	156	1,153	16	345
1927	89	716	(2)	345	1932	(2)	400	13	650

[1] Including wheat and wheat meal, both calculated at 3½ bushels per bag.
[2] Data lacking.

Basutoland agricultural officer and South African Crops and Markets, March 1932 and April 1934.

SOUTHERN RHODESIA

Wheat is not grown by natives in Southern Rhodesia and is grown only to a slight degree by European farmers. However, the acreage of wheat grown by Europeans has increased from 3,300 acres in 1924 to 14,200 acres in 1932. Production has correspondingly increased from 18,000 bushels in 1924 to 141,000 bushels in 1932. The average yield per acre during the 9 years ended in 1932 was 8.2 bushels per acre, which is low considering that the winter wheat of Southern Rhodesia is grown under irrigation or on wet, low-lying land which dries up sufficiently for cultivation only during the

winter months. Prior to 1932 production was less than 20 percent of consumption requirements. Production is being encouraged by the Government and is gradually increasing. Since 1928 the Government has granted a rebate of customs duties on wheat imported by millers for blending with wheat grown in the colony in the manufacture of flour and meal, provided that the finished product is 20 percent Rhodesian grown (fig. 79). In 1931 and 1932 the Government maintained an arrangement with millers for the stabilized price of 23 shillings per bag ($1.68 per bushel at par), as compared with $1.70 per bushel in 1930 and $1.37 in 1929. Wheat imports, chiefly from Argentina and Canada, have fluctuated around 300,000 bushels per year and, although production is increasing, the domestic requirements will not be produced for many years, if ever (table 168).

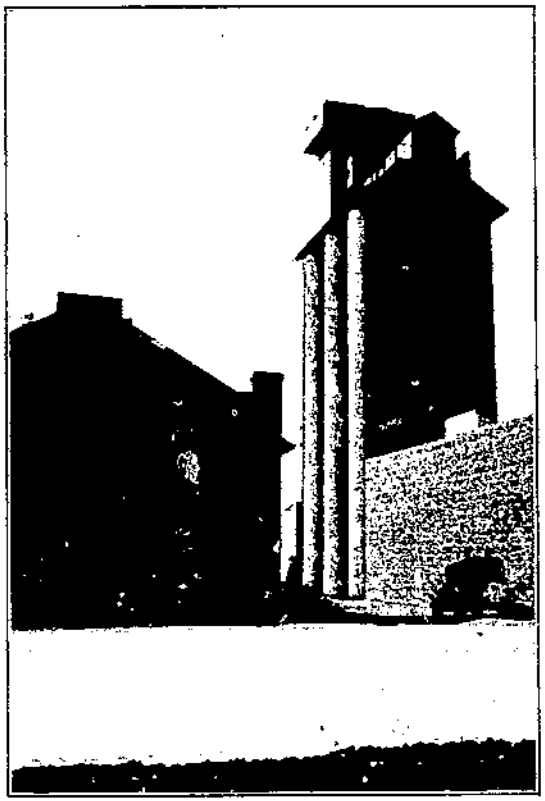

FIGURE 79.—Grain elevator at Bulawayo, Southern Rhodesia. Until recently most of the wheat has been imported.

TABLE 168.—*Wheat: Acreage, production, and foreign trade in Southern Rhodesia, 1924–32*

Calendar year	Acreage	Production	Yield per acre	Imports[1]	Exports[1]	Calendar year	Acreage	Production	Yield per acre	Imports[1]	Exports[1]
	1,000 acres	*1,000 bu.*	*Bushels*	*1,000 bu.*	*1,000 bu.*		*1,000 acres*	*1,000 bu.*	*Bushels*	*1,000 bu.*	*1,000 bu.*
1924	3.3	19	5.5	245	43	1929	4.0	45	9.8	336	76
1925	4.5	38	8.4	235	28	1930	7.0	53	7.6	315	67
1926	4.7	39	8.3	265	57	1931	8.7	65	7.5	388	81
1927	3.3	32	9.7	221	57	1932	14.2	141	9.9	320	68
1928	3.3	23	7.0	339	40	1933	16.0	147	9.2	----	----

[1] Including wheat flour and meal at 47 pounds per 60-pound bushel of wheat.

Official Yearbook and Annual Statement of Trade of Southern Rhodesia and Economic and Statistical Bulletin of Southern Rhodesia, Aug. 21, 1933.

ANGOLA

Angola produces moderate quantities of wheat, and the trend is upward. Between 1926 and 1929 wheat production increased from 55,000 to 296,000 bushels.

Exports increased from 7,000 to 138,000 bushels and in 1933 reached 297,000 bushels (table 169). Most of the exports were sent to Portugal. The Portuguese Government is endeavoring to increase this colonial supply of wheat. There is some prospect of finding wheatlands in the southern and higher parts of Angola, where the climate is temperate. Some of the lands now covered with wild hay could be plowed for wheat. The Angola Department of Agriculture and Commerce is urging both European and native growers to produce more wheat to eliminate the necessity for importing flour. Prizes are offered to both Europeans and natives for the largest quantity of wheat produced.

TABLE 169.—*Wheat: Production and foreign trade in Angola, 1924–33*

Calendar year	Production	Imports [1]	Exports	Calendar year	Production	Imports [1]	Exports
	1,000 bushels	*1,000 bushels*	*1,000 bushels*		*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1924	(2)	(2)	1	1929	296	(2)	140
1925	(2)	122	7	1930	(2)	213	169
1926	55	132	8	1931	(2)	268	173
1927	(2)	116	55	1932	(2)	146	201
1928	(2)	158	56	1933	(2)	(2)	297

[1] Flour converted to wheat at 47 pounds per 60-pound bushel of wheat.
[2] Data lacking.

Economic Conditions in Angola, Department of Oversea Trade (British) and Consul Cameron, Lourenco Marques.

KENYA

TREND OF PRODUCTION

Although Kenya is located on the equator, wheat production is possible because of the high elevation of the inland plateau. In fact there are glacier-covered mountains in Kenya which are over 17,000 feet in elevation. Production is still of minor importance, although it reached almost 1,000,000 bushels in 1929 after a 5-year period of rapid expansion. Since that time wheat production has decreased. An average yield of 15.5 bushels per acre was obtained in 1929, but over a 9-year period yields have usually averaged from 7 to 9 bushels per acre. This is to be compared with average yields of about 14 bushels per acre in the United States (table 170).

In 1931 wheat was grown by 273 out of a total of 2,107 European farmers. The average acreage was 158 acres per grower. Combine harvesters are in common use. Production is made difficult by the frequent depredations of large swarms of locusts and by rust and other wheat diseases.

During recent years 400,000 to 500,000 bushels of wheat have been milled. There has been an exportable surplus of as much as 492,000 bushels per year. Prior to 1926 exports amounted to less than 10,000 bushels. In 1931 and 1932 exports fell considerably; in 1932 there was a deficit, and imports amounted to 195,000 bushels.

TABLE 170.—*Wheat: Acreage, production, and foreign trade in Kenya, 1924–33*

Calendar year	Acreage [1]	Production [1]	Yield per acre	Milled [2]	Exports [3]	Calendar year	Acreage [1]	Production [1]	Yield per acre	Milled [2]	Exports [3]
	1,000 acres	*1,000 bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*		*1,000 acres*	*1,000 bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*
1924	24	204	8.5	------	(4)	1929	[5] 63	[5] 978	15.5	510	206
1925	31	267	8.6	212	4	1930	69	648	9.4	495	492
1926	47	402	8.6	225	11	1931	43	290	6.7	391	186
1927	75	580	7.7	299	14	1932	30	212	7.1	407	75
1928	83	760	9.2	415	297	1933	35	485	13.9	430	98

[1] Europeans only.
[2] Period ended in the following year: November 1926 to 1929, July 1930, February 1931 to 1933.
[3] Includes flour calculated at 47 pounds per bushel of wheat. Years ended July 31, 1924–26 (exports from Mombasa only), calendar year thereafter.
[4] Insignificant quantity.
[5] Natives grew, in addition, 914 acres and produced 12,000 bushels.

Agricultural census reports.

Wheat production is not likely to exceed consumption requirements in Kenya and adjoining territories. Consumption is not likely to increase more rapidly than the European population.

AGRICULTURAL LEGISLATION

In September 1930, a law went into effect whereby the Government appoints exclusive agencies for all wheat grown in the colony. These agencies must sell only to registered millers, and the latter may purchase wheat only from authorized agencies. The demands of the colony and of other eastern territories must be supplied to the satisfaction of the colony before sales may be made elsewhere. Uniform prices are established within the colony, and each agency must bear (to an extent proportionate to the quantity of wheat handled by such agency) the difference, if any, between the export value of wheat and its selling price in the colony, consideration being given to the ratio between the wheat exported from the colony by all agencies and the quantity sold for consumption within the colony or any other east African territory.

MISCELLANEOUS GRAINS

KAFIR

Kafir is a favorite item in the diet of the natives except in Uganda and more humid areas, where plantains, millets, cassava, sweetpotatoes, and beans are more important in the native diet. It is in the arid areas that kafir predominates. Yields per acre among European farmers in the Union of South Africa are about 6 or 7 bushels, in Basutoland about 12 bushels, and in the Rhodesias only about 5 or 6 bushels per acre. In these 13 countries, with about 2,000,000 Europeans and nearly 30,000,000 natives, kafir production amounts to approximately 41,000,000 bushels per year, which is one-third as much as the production of corn. Of this, only about 1,000,000 or 1,500,000 bushels are produced by Europeans in the Union and practically none by Europeans elsewhere.

Kafir: Approximate production in south and east Africa, 1930–31

Country	Bushels	Country	Bushels
Union of South Africa	[1] 5,000,000	Mozambique	[4] 10,000,000
Basutoland	900,000	Angola	
Swaziland	[2] 150,000	Tanganyika	6,500,000
Bechuanaland	850,000	Kenya	[5] 5,000,000
South-West Africa	[3] 1,250,000	Uganda	2,000,000
Southern Rhodesia	5,000,000	Total	40,650,000
Northern Rhodesia	1,000,000		
Nyasaland	3,000,000		

BARLEY, OATS, AND RYE

The other small grains—barley, oats, and rye—are produced scarcely at all by natives and in very small quantities by Europeans. In the Union the area of barley harvested for grain, chiefly near Capetown and primarily for brewing purposes, amounted in 1929–30 to 110,000 acres. The production was 2,200,000 bushels. The acreage of oats reaped, chiefly near Capetown, was 687,000 acres and the production 9,400,000 bushels. Rye acreage was only 148,000 acres, and the production 1,350,000 bushels. The production in that year was unusually high for all three of these grains, but no permanent upward trend is evident. In Kenya barley and oat acreage is slightly above 2,000 acres, but rye is insignificant. Elsewhere these grains do not merit mention.

A considerable acreage of these grains in relation to the total, especially in the Union, is grown for grazing or for fodder but not for grain. The production of these grains in south and east Africa will not increase significantly because of adverse climate, limited demand for brewing, the small number of horses, and the vast grazing lands that make the feeding of grain to livestock unnecessary. Where feed is needed for livestock, corn and kafir are more promising crops to grow.

PEANUTS

Peanuts should be mentioned as an important related crop, especially among the natives. Peanut production is especially important in the Union of South Africa, Southern Rhodesia, the two Portuguese colonies, and the three east African countries. In the Union of South Africa and Southern Rhodesia most of the peanuts are grown by Europeans, while in the other countries peanuts are grown by natives for their own consumption and significant quantities are exported. Commercial production has declined since 1930 on account of low prices, but this is doubtless only a temporary condition. The peanuts are chiefly of the Valencia type used for obtaining oil, although to a certain extent Virginia Jumbo, Virginia Bunch, and Spanish peanuts are being grown, especially in east Africa.

In the Union of South Africa European farms produced 20,000,000 pounds of peanuts in 1929–30, not including about 3,000,000 pounds

[1] Grown on about 800,000 acres. Includes 1,000,000 to 1,500,000 bushels grown by Europeans.
[2] Includes about 12,000 bushels grown by Europeans.
[3] Includes 1,000 to 13,000 bushels grown by Europeans.
[4] Includes production from 6,000 acres grown by Europeans.
[5] Including millets.

grown by natives. Acreage on European farms increased from 6,557 acres in 1917–18 to 29,274 acres in 1929–30.

In Southern Rhodesia the acreage grown by Europeans increased from 5,881 acres in 1923–24 to 9,674 acres in 1928–29 but then declined to 6,007 acres in 1931–32. Production in Southern Rhodesia reached 5,244,000 pounds in 1928–29. If, and when, export prices again become profitable, production will probably be increased to 15,000,000 or 20,000,000 pounds within 5 or 10 years. In 1932 Southern Rhodesia exported 3,300,000 pounds, chiefly to nearby countries.

Exports from this colony amounted to 55,000,000 pounds in 1930, besides 2,000,000 pounds of peanut oil. Exports have increased materially since 1911.

In Tanganyika peanuts are commonly grown. In 1929–30 natives produced 71,000,000 pounds on 130,000 acres. A large part of the crop was used by the natives for their own consumption, and 38,826,000 pounds were exported. As early as 1913 peanut exports were 20,000,000 pounds, second only to sisal in weight exported. At one of the experiment stations plot yields have ranged from 2,000 to 3,000 pounds of unshelled nuts per acre. The peanuts are bought by Indian and Arab traders through a system of barter for cloth, salt, beads, and some cash. This does not encourage production.

In Kenya peanuts are not grown by Europeans, but in 1929–30 the natives grew 13,000 acres and produced 5,000,000 pounds, an average of 385 pounds per acre, as compared with an average yield of 700 pounds per acre obtained in the United States. Exports from the colony increased from 103,000 pounds in 1914 to 3,971,000 pounds in 1929, but have since declined.

In Uganda the natives grew 104,000 acres of peanuts in 1931, chiefly for local consumption. Exports in 1930 were 2,887,000 pounds, but this figure was unusually high.

In Mozambique production of shelled peanuts by Europeans is reported as follows: In 1929–30, 16,000 acres produced 3,921,000 pounds of shelled nuts (245 pounds per acre), but this does not include large quantities produced by natives. Most of the natives' production is for their own consumption, but in addition the natives in the districts of Manica and Safola brought to market 2,365,000 pounds in 1928, while the other natives in the colony, in 1929–30, marketed 64,500,000 pounds.

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