THE AGRICULTURE OF MOROCCO

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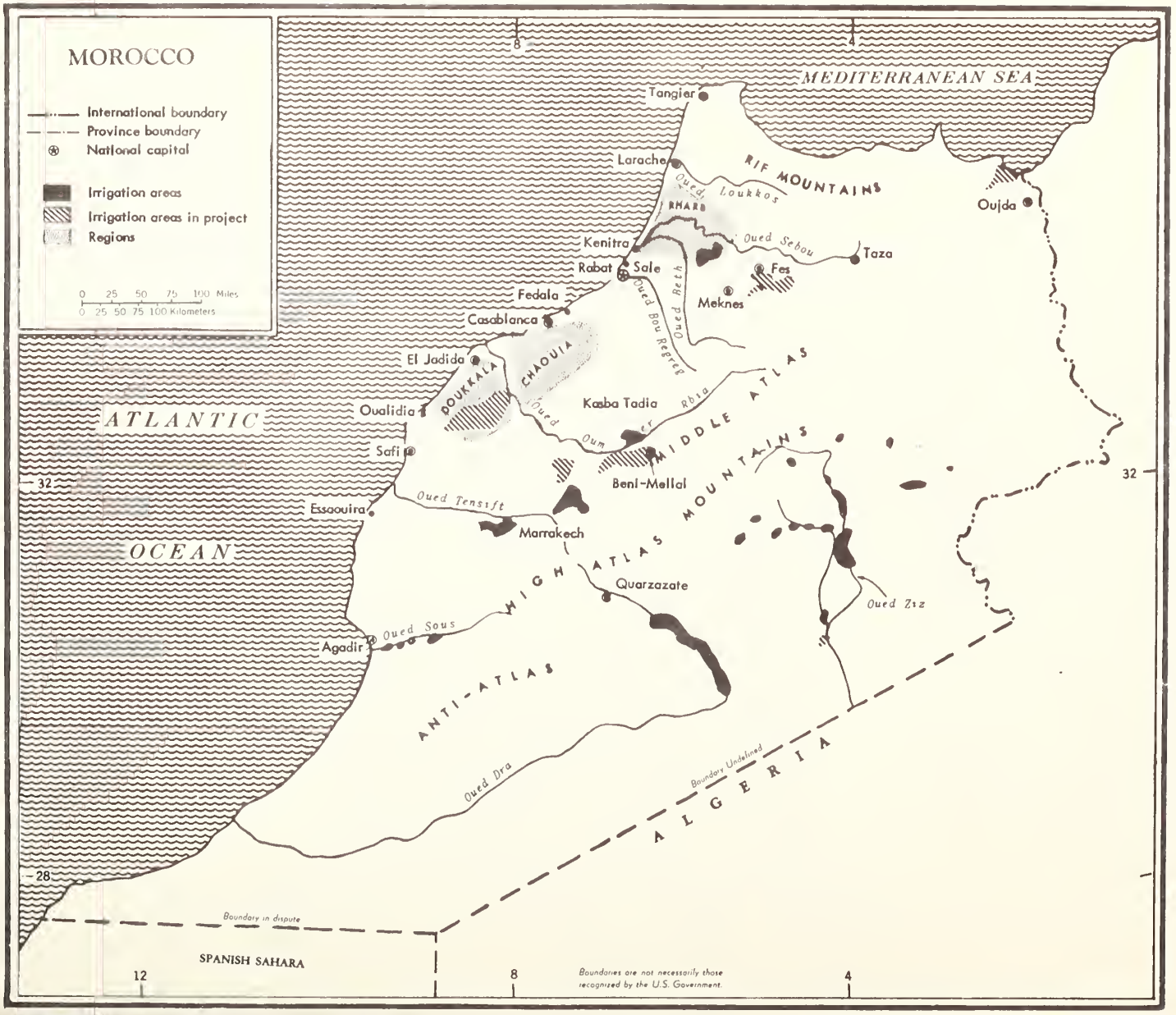

U. S. DEPARTMENT OF AGRICULTURE

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THE AGRICULTURE OF MOROCCO:

Programs, Progress, Prospects

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SUMMARY

Morocco reattained its full sovereignty in 1956, with the termination of the 44-year Spanish and French protectorates over the former northern and southern zones of the country. Tangier and the southernmost province, Tarfaya, were integrated into the Kingdom later. An old country in tradition and culture, Morocco is confronted with serious difficulties in consolidating its independent status.

Some of Morocco's problems are: a largely underdeveloped agricultural economy; backward production techniques; losses, through non-Arabic emigration of key managerial personnel and withdrawal of their investment funds; and widespread underemployment and unemployment. But much unused land is potentially suited for agriculture, and the agricultural production in many areas can be revitalized and renovated to good advantage. The Moroccan Government has been quick to recognize the need for broad development programs to increase the national product, fully utilize the abundant manpower, and conserve the natural resources and supplies of capital, thus working toward extensive improvement in the total economy.

Practically all of Morocco's most productive land lies in the areas that were, until 5 years ago, under the French and Spanish protectorates. In the vicinity of Tangier, agriculture is negligible; in the Saharan south, it comprises scattered plantings, mainly of barley, and a precarious form of animal husbandry. Both activities are severely limited by scarcity of water.

About one-fifth of Morocco is cultivated or lies fallow. Another fifth is in grazing land. However, grazing also takes place on land in alfa (esparto) grass stubble and in crop residues and on fallow and part of the land in forests. About 21 million acres are estimated to be potentially useful, although not presently devoted to agricultural production.

Grains--mainly barley, wheat, and corn--are grown on about 80 percent of the land sown to crops. These grains, citrus fruits, wine, and vegetables are major exports. On a relatively small acreage, European farmers produce the bulk of the high-value cash crops. Moroccans control most of the land in grains; they also own most of the livestock, but this large industry is now of rather minor importance in commercial markets. At present the majority of Moroccan farmers do not add materially to the national supply of other farm products for processing and sale. Since these farmers operate near a subsistence level, they cannot yet provide a constant market for the produce of the larger, more prosperous farms.

The Moroccan Government hopes to build a new agricultural economy in which traditional farming may be speedily transformed into a largely Moroccanized modern farming sector. The Government plans to redistribute and consolidate land, implement Operation Plow (Operation Labour), which stresses cooperative farming under modern methods, extend irrigation, and step up programs for reforestation, soil conservation, and livestock improvement. Efforts are being made to diversify production, to reduce imports by producing more crops for home consumption, and to increase exports of farm goods.

The bulk of Morocco's agricultural trade has been with France. Many new markets, including those in which the United States is competitive, are now being actively sought and found.

Progress has been slow in many areas of development. Qualified extension personnel and technically trained agricultural workers are too few to cope promptly with the problems of agricultural reorganization. The Moroccan farmer has been somewhat reluctant, even when able, to depart from established traditions. The system of land tenure is unwieldy, and financial pressures on the new nation have been extreme. Thus, it is doubtful that total agricultural production will expand dramatically in the immediate future.

But it is estimated that the intensification and successful completion of reform programs will secure a basis for an increase in agricultural production of possibly 40 percent within the next 10 to 15 years. The rate of accomplishment depends in large part on the amount and quality of foreign technical and financial assistance offered and accepted. In its current projects for agriculture, the Moroccan Government plans to double production by 1980. Much of the anticipated increase will be absorbed by growth of population and improvement in national dietary standards. Moroccan products will compete more strongly in world markets as soon as better techniques produce them at a greater rate.

AGRICULTURAL ECONOMY

Although a large portion of its southeastern boundary next to Algeria remains undefined, Morocco is estimated to comprise about 170,000 square miles. This area is slightly smaller than California. By 1961, its population numbered almost 12 million people--largely Moroccans of Arab, Berber, or mixed Arab and Berber descent--and it is increasing at a rate of nearly 3 percent annually. Over 70 percent of the people live in rural areas and engage in some form of crop or livestock production. Agriculture, forestry, and fisheries contribute nearly half of the gross national product.

Land Characteristics and Use

Morocco has two coastlines, one on the Atlantic Ocean, the other facing the Mediterranean Sea. The rugged Rif Mountains border much of the Mediterranean littoral. The Middle Atlas, High Atlas, and Anti-Atlas Ranges--the westernmost massifs of the great chain of mountains that stretch across northern Africa from Morocco to land's end at Cap Blanc and Cap Bon in Tunisia--extend through most of the center of the country from southwest to northeast.

Compared with other regions of northern Africa, Morocco is well supplied with underground and surface water. Several rivers provide or offer the possibilities for irrigation of rather large areas. The Moulouya River, rising in the High Atlas, flows through northeastern Morocco to the Mediterranean Sea. The Loukkos, Sebou, Bou Regreg, Oum er Rbia, Tensift, and Sous Rivers cross through the coastal plains to the Atlantic Ocean. And the Ziz and Dra systems flow intermittently through much of the dry areas south of the mountains.

The western plains and plateaus between the mountains and the Atlantic Ocean are by far the most important areas for crop production. Higher altitudes are devoted mainly to livestock raising, although there is minor cultivation of vegetables, expecially potatoes, and vine and tree crops.

Although the soils are generally deficient in phosphorous and, in some places, calcium, they usually respond well to good management and adequate water. Climatic variations have a greater impact on agricultural productivity. Semi-desert and desert climatic conditions mainly prevail on the inland side and to the south of the Atlas ranges. Most of the rest of the country has a Mediterranean-type climate with two contrasting seasons, one hot and dry, the other cool and rainy.

Rainfall is irregular in timing and amount, but is usually heaviest between October and May. It may be as little as 4 to 12 inches a year on the eastern plains of northern Morocco. Precipitation decreases from north to south, averaging from 20 to 40 inches a year in the western part of northern Morocco to about 9 inches at Agadir, and considerably less in the Saharan Regions. Except along the coast, irrigation is normally required to grow spring-sown crops or to produce fall-sown crops each year without allowing the land to lie fallow. Several years of moderate weather may be followed by one or more seasons of severely devastating drought over much of the land.

Almost total segregation of crop raising from animal husbandry also contributes to low agricultural productivity. The planted area is very largely used for grains, mainly barley and wheat (table 1, next page). Not enough manure and commercial fertilizer is used to counterbalance the depletion of soil fertility through continual planting of grains. Livestock, principally sheep and goats, graze on stubble and, during much of the year, on collective pastures or other uncultivated land.

Morocco has three major categories of land ownership: privately owned land, land owned communally by the tribes or subdivision of tribes, and land controlled by the State. Most recent statistics apply only to the former southern zone but thus to nearly 90 percent of Morocco's total area. These statistics reveal that about 15 percent of this land is in private ownership, with 12 percent held by Moroccans, and 3 percent by Europeans. Over 8 percent of the land is collectively owned, and the State controls the remainder.

Most Moroccan farms are small and represent the traditional agricultural economy in which land is worked by the farmer and his family, with primitive techniques, to meet their own needs. A few farmers own steel plows and assorted small equipment; most use wooden plows drawn by donkeys and camels. These farmers rely heavily on low-yielding cereal crops for subsistence and take little part in the commercial life of the nation. Their farms are usually less than

Table 1.--Land use, Morocco, (former southern zone), average 1951-55 1/

Category	Area	Percent of total area
	Million acres	Percent
Cultivated land:		
Grains	9.9	10.2
Pulses	0.7	0.7
Tree and vine crops	1.0	1.1
Forage crops	0.1	0.1
Industrial and other crops	0.4	0.4
Total cultivated land	12.1	12.5
Fallow land	6.4	6.6
Alfa (esparto) grass	5.4	5.6
Grazing land	19.0	19.6
Forests	10.1	10.5
Unproductive land 2/	43.8	45.2
Total area	96.8	100.0

1/ Comparable statistics are not available for all other areas.
2/ Includes unused but potentially useful land, built-on areas, and wasteland.

25 acres in size (table 2). Over 40 percent of all Moroccan farmers own less than 3 acres, or are landless, and work on the farms of others.

By contrast, some of the medium and larger sized Moroccan holdings are operated with European-type farming practices, including the rotation of crops and the use of chemical fertilizers and modern machinery and equipment. A large part of the output of these holdings is marketed.

About a fourth of the privately owned Moroccan farmland is held by landlords who seldom operate their land themselves. The majority of their farms are worked with the same primitive methods employed on smallholders' farms. The main differences lie in the size of the operation, in the fact that the landlord's portion of the crop may enter commercial channels, and in the hiring of outside laborers and share croppers.

Share croppers are hired by the season under three main forms of contract: the khammessat, under which the share cropper receives about a fifth of the crop in return for his labor; the khobza, under which he earns from a quarter to half the crop; and the azzaba, under which the return to the share cropper may range from one third to half of total output. It is not unusual for workers under khobza or azzaba contracts to hire further labor under the khammessat contract.

In addition to the settled Moroccan farmers there are nomadic and semi-nomadic tribes whose primary interest is in livestock raising. But they may also own date groves, or may have fields of subsistence crops sown in the fall.

Table 2.--Size of farms in Morocco (former southern zone) 1/

Category	Number of farms	Average size
	Thousands	Acres
Moroccan farms: 2/		
Under 25 acres	846.5	6
25 - 247 acres	100.0	30
247 - 1,235 acres	3.0	674
Over 1,235 acres	0.5	2,162
Total Moroccan farms	950.0	
European farms: 3/		
Under 25 acres 4/	1.8	14
25-371 acres	1.5	82
371 - 741 acres	1.7	509
741 - 1,235 acres	0.5	988
Over 1,235 acres	0.4	2,471
Total European farms	5.9	

1/ Comparable statistics are not available for all other areas.
2/ 1955 data. At present, about 900,000 Moroccan farmers cultivate 10.6 million acres.
3/ Statistics for European farms are undated. In 1958, total European farmland was estimated between 2.4 and 2.5 million acres. By 1961, only about 4,000 farms in Morocco were estimated to be European-operated.
4/ Includes suburban gardens.

After months of migration or temporary dwelling near communal pastures, in order to feed their animals, they return to reap at harvest time. Some family or tribal members may be left behind to tend the crops during their growing seasons. Since the true nomad tends to consider sedentary farming beneath his social dignity, he usually prefers to become an "absentee landlord", the actual farm work then relegated to hired laborers on a share cropping basis.

There are exceptions to this pattern. During their migrations, nomads may occasionally, as a community enterprise, cultivate the soil near grazing ranges where water from heavy rains has gathered to form small pockets of good land for barley, millet, and sometimes for melons. They may build temporary dams to prevent runoff. The men of the tribe or clan together plow, sow, and reap; the harvest belongs collectively to the group.

Farms owned by Europeans are on some of the best quality land in the country and are primarily organized to sell high-value cash crops locally and for export. The more advanced Moroccan farmers have recently forged ahead in the production of some commercial crops. However, European farms have been producing at least 85 percent of the citrus and market garden crops and about 75 percent of the grapes grown for wine; they also provide a disproportionate share of cereals for export. The yield is commonly much higher on European farms than on the average Moroccan farm.

Europeans still comprise the hard core of modern farmers in Morocco. Since independence, this sector has declined both in numbers, through emigration, and in effectiveness, as the trend toward Moroccanization of the land has brought about hesitancy to invest effort and money in farms that might be lost. Also, many European farmers have suffered because financing from France, which had been extended during the protectorate years, has been withdrawn since 1956.

Crop and Livestock Production

Wheat, barley, and other grains, pulses, and fruits occupy most of the cultivated land (table 3). Corn, wheat, and barley form the staple diet of the country; these crops, more than any other, are most affected by annual variations in climate.

Wheat is principally grown in the western plains areas north of Casablanca and Rabat, and in the regions of Larache, Fes, Taza, Meknes, Tadla and Marrakech. Both hard (durum) and soft (ordinary) varieties are produced, but the ratio of area planted in durum to other wheat is more than two to one. Durum is often exported in years when additional supplies of ordinary wheat must be obtained from abroad. Moroccans produce most of the durum wheat, and also hold over 70 percent of the acreage in other wheat, but they have recently produced only about half of the ordinary wheat crop. Wheat production suffers mainly from seasonal low rainfall, from hot winds (chergui) blowing from the desert during the ripening season, and from frequent locust invasions which imperil all Moroccan crops.

Barley, cultivated mainly by Moroccans, is grown in the same localities as wheat. Since barley requires less rainfall, it also thrives far into the southwest and in the drier regions of northeastern Morocco. Although the demand for wheat products is increasing, barley is still the principal cereal food and large quantities are used for animal feed. The areas of heaviest production of corn and sorghum are in the Doukkala and Marrakech regions; these grains, as well as millet, are largely Moroccan crops. Most of the oats, rye, and rice are produced by European farmers.

Pulse crops rank second in field crop production. The cultivation of peas and kidney beans is largely centered around the Rabat, Meknes, Tadla, Chaouia and Fes regions, and is usually a European enterprise. Peas are produced for seed under contract to English and West European seed firms. Broad beans, lentils, and chick-peas, common in the vicinities of Fes, Rabat, Chaouia, and Marrakech, are mainly grown by Moroccan farmers for local consumption.

Citriculture, mainly concentrated in the Rabat region and the Sebou basin, is also large industrial. Oranges comprise nearly 90 percent of the crop. Plantations are relatively extensive; over half of the groves in operation are more than 50 acres. Moroccan citrus industries are technically excellent, but the difficulties of fully developing this industry have been increased by heavy overhead expenses, close competition in world markets, and lack of specialized plantations. In recent recent years France has provided a protected market for more than half of the total citrus exports by permitting 150,000 tons of Moroccan citrus to enter France duty free.

Table 3.--Principal crops of Morocco: Area and production; average 1948-52, annual 1958-60

Crop	1948-52 average		1958		1959		1960	
	Area	Production	Area	Production	Area	Production	Area	Production
	1,000 acres	1,000 metric tons	1,000 acres	1,000 metric tons	1,000 acres	1,000 metric tons	1,000 acres	1,000 metric tons
Durum wheat	1/ 2,130	1/ 498	3,309	968	2,768	699	3,015	745
Other wheat	1/ 875	1/ 238	1,213	315	1,102	289	1,084	321
Barley	4,605	1,116	4,836	1,252	4,255	1,096	4,334	1,137
Corn	1,259	275	1,184	369	885	343	1,006	400
Sorghum and millet	482	96	371	106	341	86	396	89
Pulse crops	563	111	324	72	504	94	507	90
Citrus	1/ 64	1/ 175	49	338	51	412	51	412
Olives	264	2/ 91	n.a.	49	n.a.	198	n.a.	113
Grapes	1/ 109	1/ 92	n.a.	344	n.a.	338	n.a.	340
Potatoes		1/ 57	n.a.	119	n.a.	119	n.a.	126
Tomatoes	1/ 133	1/ 75	n.a.	172	n.a.	193	n.a.	270
Other fresh vegetables		n.a.	n.a.	255	n.a.	170	n.a.	3/ 195
Cotton (seed)	1/ 5	1/ 1	20	6	15	7	17	6
Flaxseed	1/ 193	1/ 34	121	19	106	22	86	14
Tobacco	1/ 5	1/ 2	2	2	2	2	2	2

n.a.--Not available.
1/ Former southern zone only, comparable statistics are not available for all other areas.
2/ 1947-52 average for former southern zone only.
3/ Estimate.

Production of potatoes, tomatoes, and other market garden crops, takes place largely on the coast between Casablanca and Oualidia. In the last few years, these crops have become increasingly important both for domestic consumption and for export. Olives, grapes, figs, and almonds grow well in the country's warm, dry climate. Moroccan farmers produce most of the olives, mainly for oil. Both table and wine grapes are cultivated. Over 250,000 tons of good quality wine was produced from local grapes in 1959. In that year, exports of between 175,000 and 180,000 tons gave Morocco third place among world wine exporters.

The acreage in flaxseed, formerly the most important industrial crop, has declined in the last few years. Production of long-staple cotton for export is being emphasized; less costly short-staple varieties are imported for use in Moroccan spinning mills. Morocco, like many developing countries, is expanding the area planted to sugar beets. There is a growing business in perfume plants, mainly rose-geranium and jasmine. Other minor industrial crops are tobacco, hemp, and sisal.

The area which can be planted to grapes and tobacco is strictly regulated. On parcels of recently distributed State land and on State irrigation projects, farmers are required to follow certain production practices. But, for the most part, farmers are free to produce what they wish.

The livestock industry, which brings about 40 percent of total revenue from agriculture, is usually a separate enterprise from crop production. Europeans own less than 5 percent of the country's farm animals; these are usually high-quality imported or crossbred stock. Raising of native breeds of animals is mainly in the hands of nomadic or seminomadic Moroccans, who, by custom, invest their savings in livestock and thus tend to keep too many animals for available feeds, even in years of good weather. Forage is not customarily stored from seasons of plenty for use in the dry months, and in bad years the herds and flocks suffer heavy losses. Because of poor breeding, inadequate feed, insufficient shelter, and disease, the productivity of most native Moroccan livestock is low by western standards.

Valid data for numbers of livestock are difficult to get. Official statistics have customarily been based on returns from the recently abolished agricultural tax (tertib), and these represented only animals in varying taxable age categories. Under this system, sheep, goats, cattle, and swine were taxable from weaning; horses and mules, except when owned by the Army, from the age of 3 years; camels from the age of 2 years. Considerable numbers of animals probably escaped the annual enumeration.

The livestock population, as reported in the 1959 census for purposes of taxation, is shown in table 4. Official estimates of the Ministry of Agriculture, which are considered reasonably accurate, place total animal numbers at about 30 million head, mainly by nearly doubling the census figure reported for goats and increasing that for sheep by close to 5 million.

Modern facilities for slaughter and refrigeration have been developed since World War II, and Morocco now has reasonably adequate meat control.

Table 4.--Livestock population, Morocco, 1959

Kind of livestock	Census of live animals for tax purposes		
	Moroccan-owned	European-owned	Total
	1,000 head	1,000 head	1,000 head
Sheep	10,098	164	10,262
Goats	5,323	26	5,349
Cattle	2,523	37	2,560
Horses	253	4	257
Mules	265	4	269
Donkeys	1,124	4	1,128
Camels	206	2	208
Swine	negl.	57	57
Total	19,792	298	20,090

But, mainly because of lack of sufficient feed for range animals during the dry months, total meat production has averaged only about 130,000 tons annually in the last 4 years. This is somewhat less than might reasonably be expected. Slaughter at controlled abbatoirs accounts for roughly a third of total slaughter of sheep and cattle. The remainder are slaughtered on farms or on the range for rural markets (souks) or for religious occasions such as Aid el Kabir which, in theory, requires the slaughter of one sheep for each male Muslim of the population.

Milk production is estimated at about 690,000 tons a year, the bulk of which is consumed locally. In 1960, the wool clip was 6,500 tons (clean basis), of which about a third was exported. Four million sheepskins, 2.3 million goatskins, and 900,000 cattle hides are produced annually. Poultry are not subject to the census of livestock for tax, but recent production of poultry meat and eggs is reported at about 45,000 tons each. Egg exports averaged nearly 4,000 tons annually in the 1957-59 period, and there is a small export trade in live and dressed fowl.

SITUATION IN THE WORLD MARKET

Trade Policies

Since 1956, the Government of Morocco has directed its trade to conserve foreign exchange and has emphasized reduction of dependence on trade with France. In the search for new markets, Morocco had, by early 1960, concluded trade agreements with 22 other nations. These included seven member countries of the European Payments Union and seven belonging to the Soviet Bloc, but excluded countries of the franc or dollar zone. The list of trading partners has continued to expand.

The volume of trade, and to some extent its direction, has been closely controlled through such devices as import and export licenses, indirect subsidies (including rebate of some taxes and lower prices for requisites of production) to encourage exports, and similar regulatory measures. The government has occasionally embargoed specified exports for indefinite periods to guard against shortages at home and rising prices on the domestic market.

A general import program announced in mid-1960 was designed to liberalize imports of certain products from countries other than France and countries with which bilateral agreements were in effect. These products comprised mainly raw materials, semifinished products, and equipment necessary to improve the economy and to facilitate other imports. By late summer, imports from the favored countries showed an impressive increase over the previous year.

Pattern of Trade and Competitive Aspects

About 35 percent of the value of Moroccan exports is from agricultural products (table 5). In the four years, 1956-59, citrus fruits represented close to 9 percent of the value of all exports; exports of major grains contributed an average of nearly 7 percent; fresh vegetables, 5 percent; and wines, over 4 percent. Pulses, almonds, eggs, canned fruits, seeds, tobacco, wool and cotton made up most of the remainder.

In years of normal weather, Morocco is largely self-sufficient in most basic foods. But in poor seasons, deficits in grains (particularly ordinary wheat varieties) must be added to regular imports of sugar, tea, coffee, vegetable oils, oilseeds, animal fats, fruits, nuts, and dairy products. Imports of food products have recently amounted to about a fourth of the value of all imports, and imports of sugar and tea have comprised well over half the value of all foodstuffs imported (table 6).

Most of Morocco's foreign trade in both agricultural and nonagricultural commodities is with France (table 7). In 1960, the United States was second to metropolitan France as a supplier of all Moroccan imports. Other leading exporters to Morocco, which are also competitive with the United States, are: West Germany, the United Kingdom, Italy, Belgium-Luxembourg, the Netherlands, and other countries of Western Europe. Among world customers for total Moroccan exports in 1960, the United States ranked after France, other French Union countries, West Germany, the United Kingdom, Italy, and the Netherlands.

In the three years 1957-59, France took over 70 percent, in terms of value, of Moroccan exports of citrus fruits, most exports of durum wheat, and the largest part of exports of fresh vegetables, wines, and canned fruits. Citrus and grains are the major Moroccan products which compete with U.S. farm exports in the world market. Major outlets, other than France, for citrus in 1957-59 were West Germany, the Netherlands, and the United Kingdom. Barley exports in these years went principally to Italy, West Germany, Sweden, Switzerland, the Netherlands, and Denmark, and to East Germany, the United Kingdom, Portugal, Italy, Poland, and West Africa.

Most sugar is imported from Cuba, French Union countries, and Brazil.

Table 5.--Moroccan exports: Principal agricultural commodities; averages 1950-52 and 1956-58, annual 1958 and 1959 1/

Commodity	1950-52 average		1956-58 average		1958		1959 preliminary	
	Quantity	Percent of total value of exports	Quantity	Percent of total value of exports	Quantity	Percent of total value of exports	Quantity	Percent of total value of exports
	1,000 metric tons	Percent	1,000 metric tons	Percent	1,000 metric tons	Percent	1,000 metric tons	Percent
Citrus fruits	121	4.7	207	8.5	248	9.9	264	9.3
Fresh vegetables	2/ 28	3/ 2.8	110	4.9	156	6.3	219	5.6
Wines	22	1.0	128	3.9	143	5.3	177	5.8
Wheat 4/	35	1.1	101	3.0	77	2.1	87	2.5
Barley	300	9.0	181	2.8	68	0.9	41	0.6
Corn	38	1.1	90	1.8	84	1.5	75	1.2
Dry legumes	79	2.9	57	2.2	59	2.6	95	3.1
Wool	1	1.8	3	1.2	3	0.8	3	0.9
Eggs	4	0.8	3	0.6	5	0.8	4	0.7
Total above	-	25.2	-	28.9	-	30.2	-	29.7
Total principal agricultural exports	-	38.2	-	35.2	-	33.5	-	36.0
	Million dollars		Million dollars		Million dollars		Million dollars	
Total exports 5/	165.0		251.3		286.5		285.6	

1/ 1950-57 exports from former French Morocco only. Exports from former Spanish Morocco are added beginning 1958. 2/ Potatoes and onions only. 3/ All fresh vegetables. 4/ Mainly durum wheat. 5/ Conversion to U.S. dollars is at the 1959 rate: 506 francs equal $1.

Table 6.--Moroccan imports: Principal agricultural commodities; averages 1950-52 and 1956-58, annual 1958 and 1959 1/

Commodity	1950-52 average		1956-58 average		1958		1959	
	Quantity	Percent of total value of imports	Quantity	Percent of total value of imports	Quantity	Percent of total value of imports	Quantity	Percent of total value of imports
	1,000 metric tons	Percent	1,000 metric tons	Percent	1,000 metric tons	Percent	1,000 metric tons	Percent
Sugar	223	10.2	310	7.0	305	10.6	337	11.5
Tea	11	3.1	15	4.5	17	4.8	9	2.7
Vegetable oils	40	2.2	38	2.9	37	2.7	45	2.5
Dairy products	6	1.6	20	2.7	22	2.6	14	2.3
Wheat and wheat flour 2/	64	1.1	55	1.0	19	0.5	14	0.4
Coffee	3	0.9	7	1.3	7	1.4	5	1.0
Tobacco	2	0.5	3	0.4	3	0.4	1	0.1
Cotton	2	0.4	3	0.6	3	0.6	2	0.3
Total above	-	20.0	-	20.4	-	23.6	-	20.8
Total principal agricultural imports	-	25.1	-	26.1	-	25.4	-	24.1
	Million dollars		Million dollars		Million dollars		Million dollars	
Total imports 3/	300.0		307.8		329.9		286.8	

1/ 1950-57, imports into former French Morocco only. Imports for former Spanish Morocco are added beginning 1958. 2/ Mainly ordinary wheat grain and flours thereof. 3/ Conversion to U.S. dollars is at the 1959 rate of 506 francs equal $1.

Table 7.--Total Moroccan trade: Percentage value of exports by country of destination and imports by country of origin, 1958-60

Country	Exports			Imports		
	1958	1959	1960	1958	1959	1960
	Percent	Percent	Percent	Percent	Percent	Percent
France	50.0	44.9	40.3	44.5	46.2	48.9
Other French Union countries	11.5	11.9	11.5	5.0	4.5	2.5
West Germany	6.6	8.2	9.1	5.4	5.6	4.6
Italy	3.0	4.9	4.9	3.0	3.4	3.4
Belgium-Luxembourg	2.4	2.9	3.0	2.8	2.0	1.9
Netherlands	2.4	2.6	2.5	2.8	2.6	2.2
Other western European countries	3.7	4.0	8.5	6.4	6.4	7.6
United Kingdom	5.2	5.8	6.5	3.6	3.5	3.4
United States	2.3	2.9	2.8	9.1	7.4	9.0
Brazil	-	0.1	negl.	1.2	2.3	1.4
Cuba	-	-	negl.	4.0	4.7	4.8
Communist China	0.9	1.9	1.8	4.0	2.3	1.7
Other Soviet Bloc countries	2.4	1.8	3.1	1.3	2.0	4.0
Other countries	9.6	8.1	6.0	6.9	7.1	4.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.
Value of total trade 1/	286.5	285.6	357.5	329.9	286.8	410.5

Negl.--Negligible.

1/ Calculated at the 1959 rate of exchange, 506 francs equal $1.

In the 1957-59 period, nearly four-fifths of Morocco's tea, by value, was bought from Communist China; the remainder came from Japan and Formosa. The United States was Morocco's chief supplier of vegetable oils during these years. Dairy products came principally from the Netherlands, the United States, France, and Denmark. The United States, Italy, Spain, and Argentina supplied major imports of grains, mainly wheat. Imports of fruits and nuts were largely from the Canary Islands, Italy, the United States, and from French, British, and Portuguese Africa. The United States was the principal source of Moroccan imports of short-staple cotton but supplied less than 10 percent, in value, of Moroccan imports of tobacco, in competition principally with Central and South American

countries (mainly the Dominican Republic, Brazil, and Argentina) and Indonesia.

All trade in cereals is controlled by the Moroccan Cereals Office. Edible oils and oilseeds are imported by one syndicate which resells them to its members for processing. A national tea office exclusively imports, conditions, stocks, and markets tea. Most other imports are made by more or less tightly controlled syndicates.

Trade With the United States

Because of the dollar shortage, Morocco's import trade with the United States has been modest. The balance of both agricultural and nonagricultural trade between the United States and Morocco continues to favor the United States. Nonagricultural items comprise the greater part of exchanges in both directions (table 8). Most significant U.S. agricultural exports to Morocco are animal fats (mainly tallow), oilseeds, vegetable oils, wheat, wheat flour, rice, dairy products, tobacco, and sugar. These are primarily under aid programs. Principal Moroccan exports to the United States are hides, skins, canary seed, spices, vegetables, olives, olive oil, nuts, wool, and, perfume oils.

AGRICULTURAL DEVELOPMENT

Because more Moroccans are engaged in farming than in any other industry, their government has placed great emphasis on the national agricultural policy. It plans to establish programs under which short-run objectives and long-term development plans may be successfully concluded. A major consideration of those responsible for the economic development is chronic nationwide underemployment, which includes about 45 percent of the people engaged in agriculture. Production of cereal crops on minuscule acreages requires very little labor; but rural Moroccans seeking work in urban centers only add to the already excessive numbers of unemployed in the towns and cities.

Primary aims of the national policy are to make it profitable and desirable for farmers to stay on their holdings, and to use unemployed and underemployed manpower to carry out government-directed programs for modernizing the livestock industry and producing better and more varied crops. This would raise the standard of living of both farmer and urban dweller. Specific goals are to increase exports of citrus, vegetables, wool, and some cereals, and to replace, with local products, imports of food and other agricultural commodities that are needed for industrial development. Government officials expect that the number of people in agriculture after the implementation of the reform programs will remain fairly stable. However, the mechanization required to greatly increase food production will force some farmers off the land.

Many of the plans for agricultural development that were made by the French, and to a lesser extent by the Spanish, after the close of World War II were continued through 1957. They became part of the framework for the first 2-year interim program initiated by the Moroccan government in 1958. Nearly 20 percent of the total $213 million budgeted for 1958-59 went into exclusively agricultural projects. Over 15 percent was earmarked for irrigation and hydroelectric

Table 8.--Composition of trade between the United States and Morocco, 1959 1/

United States exports to Morocco			Moroccan exports to the United States		
Commodity or category	Value	Percent of total value of exports	Commodity or category	Value	Percent of total value of exports
	Million dollars	Percent		Million dollars	Percent
Animal fats	4.8	22.6	Hides and skins	0.6	5.9
Oilseeds	2/ 1.7	8.0	Canary seed	0.4	3.9
Vegetable oils	0.1	0.5	Spices	0.3	2.9
Wheat	0.5	2.3	Vegetables	0.2	2.0
Wheat flour	0.6	2.8	Olives, and olive oil	0.2	2.0
Rice	0.2	0.9	Almonds (shelled)	0.2	1.9
Dairy products	0.3	1.4	Perfume oils	0.1	1.0
Tobacco	0.6	2.8	Wool	0.1	1.0
Sugar	0.1	0.5	Miscellaneous	0.1	1.0
Miscellaneous	0.2	0.9			
Total agricultural exports	9.1	42.7	Total agricultural exports	2.2	21.6
Industrial machinery and equipment	4.3	20.2	Ferro alloys, ores, and metals	4.9	48.0
Agricultural machinery and equipment	1.2	5.6	Lead and lead manufactures	1.1	10.8
Consumer goods	3.5	16.4	All other exports	2.0	19.6
All other exports	3.2	15.1			
Total U.S. exports to Morocco	21.3	100.0	Total Moroccan exports to the U.S.	10.2	100.0

1/ Converted at 1959 rate of exchange, 506 francs equal $1. 2/ Mainly soybeans.

development which could benefit agriculture as well as other sectors of the economy.

The current Five-Year Plan, for 1960-64, aims at an ultimate goal of doubling present agricultural production within 20 years. The five major objectives of this Plan are:

1. Continuation of Operation Plow (Operation Labour), which stresses cooperative farming under modern methods of cultivation;

2. A series of reforms in systems of land tenure and land ownership to include (a) placing all government-owned land under a single statute for collective operation of the land, (b) State control over development of collective properties, (c) consolidation of individual farms and conversion into operatives, and (d) revision of farm leases;

3. Development of partially equipped and projected irrigation works;

4. Soil conservation; and

5. Promotion of the livestock industry.

Operation Plow

Operation Plow is the most comprehensive single item under agricultural development. It is largely an offshoot of a plan begun in the former southern zone in 1945 to provide extension and educational facilities to farmers at agricultural work centers throughout the French protectorate. As redrafted in 1957, the program has been expanded to undertake machine preparation of the soil on unirrigated farms at planting time, when the farmer's equipment is usually inadequate to break the ground if rains are scant or come late in the planting season, and to use machinery for harvesting. Production aids beyond the reach of the individual farmer are thus available for collective use.

Establishment of self-supporting cooperative groups of farmers, capable of carrying out Operation Plow, without government direction, subsidization, or investment, is envisaged for the future. A new, autonomous administrating agency will soon be created. The program is now administered through some of Morocco's agricultural work centers, which form a semiautonomous service of the Ministry of Agriculture. The centers maintain machinery and equipment, supplied by the government, and government technicians supervise activities on local farms. Fields are being regrouped into logically related patterns of cultivation, and crop rotation is encouraged. The work centers also provide improved seeds, fertilizers, modern small farm tools, and limited extension-educational services.

Last year, power machinery was used on more than 740,000 acres to prepare the soil for cultivation and to harvest spring-sown forage crops, corn, and chick-peas, and fall-sown cereals and broad beans. It is hoped that the

operation may be extended to cover 1.7 million acres, or about one-sixth of all Moroccan-owned farmland.

For the country as a whole, the average grain yield per acre of machine-farmed land in the three years 1958-60 roughly doubled the yield per acre obtained by farmers using traditional methods. However, the new project is not yet consistently popular with Moroccan farmers, especially those in regions where the increase in yields has not been commensurate to the cost of the work required to produce this increase. Farmers pay for the services of Operation Plow, either in money or in the produce of their farms, on a graduated scale which is based on crop returns. Payment is not required for farms yielding 1.2 quintals or less per acre or for the first 1.2 quintals per acre on any farm.1/ But charges rise sharply to 20 percent of a yield of between 1.2 and 3.3 quintals per acre, and to 80 percent of yields of more than 3.3 quintals per acre. Farmers who were at first cooperative have become less so in succeeding years as they found it difficult to pay the high price of seed, fertilizer, and mechchanized plowing. The farmers also complain that, under Operation Plow, they have little to do during the plowing and harvesting seasons. The pressure of unemployment on the agricultural economy is already intense. And traditional farmers are not fully employed.

Land Redistribution and Consolidation

In its program for land redistribution, the Moroccan Government has announced the intention of using about 2 million acres of public lands, in addition to 40,000 acres recently regained from European farmers.2/ About 2.5 million acres of collectively owned farm-grazing land are also under consideration for redistribution. Another 69,000 acres acquired by the French during the protectorate are the subject of Moroccan-French negotiations.

For some time the Moroccan Government has been distributing small parcels of State land to landless farmers. In order to maintain supervision and enforce adoption of modern farming methods, these plots are held under lease from the government rather than owned independently. The State furnishes seed, fertilizers, and the use of modern tools and equipment. It also offers advice as to suitable crops according to soil potentials and individual or national needs.

Under this system chosen farmer recipients may remain on the land as long as it is cultivated in a manner satisfactory to the Government. But neglected holdings are subject to reallocation to another farm family. Between 1956 and 1959, over 37,000 acres of State land were distributed in this way, each beneficiary receiving about 12 acres.

1/ One quintal equals 220.46 pounds.

2/ Prior to 1956, European farmers either bought and held legal title to land in Morocco, or they obtained it under an official colonization order by which certain improvements were required although no actual sale was made and no legal title was recognized by the government. Since independence, about 250,000 acres, approximately one-tenth of all European agricultural holdings, have reverted to Moroccan ownership.

Recently, a new procedure has been instituted under which large production units are being formed, generally along the lines of collective farming. In the fall of 1960, 30 farmers were assigned to work on two such projects; each project was over 1,000 acres. Latest plans call for establishing units varying in size from about 125 acres on irrigated land to nearly 1,000 acres in dry-farming areas. These large areas will be worked by small farmers grouped into collective or cooperative societies. On some irrigated land the individual operation will be restricted to about 12 acres. Machinery, equipment, and trained advisory personnel will be provided by the local work center, which is charged with full management of the units' operation.

This type of land settlement may have been undertaken as a safeguard against a possible slump in national output and also against reacquisition of small holdings by large landowners. However, it has drawn some internal criticism.

The Moroccan Farmers Union (Union Marocaine de l'Agriculture), a strong organization of about 300,000 members, pointed out that the individual farmer may lose initiative and enthusiasm as he becomes increasingly subject to and reliant on government direction. This Union contends that the small farmer should instead be given property rights and titles to his own holdings, along with adequate loans for agricultural requisites and equipment. It also advocates cooperative management of the work centers by the farmers themselves.

The government now plans to regroup individual land holdings that are too small for viability, and to subsequently establish collective farms large enough for efficient mechanization. Landowners or tenants who formerly worked non-contiguous parcels of land in irrigated areas have been required to exchange them for land belong to other farmers, so that holdings might become more economic units for canal irrigation water. Exchanges must be made on a value-for-value basis. This requires assessment of each type of land. Also, each farmer must donate about a tenth of his land for canals and roads.

Irrigation

In order to minimize the ill effects of capricious rainfall, increase total farm production, diversify crops and provide fuller use of labor, the government is continuing a comprehensive irrigation program which was begun in the former southern zone in 1926.

The amount of land under effective irrigation varies from season to season and from year to year with the availability of water from natural resources. Under fairly normal weather conditions, large areas are irrigated by the flooding or diversion of Morocco's numerous rivers and streams (oueds), or by water pumped from privately owned or community wells. Medium sized irrigation works, in the valleys of the Sous, Dra and Ziz Rivers of the south, and the larger installations at Beni Amir, Beni Moussa, west of Beni Mellal, Abda Doukkala, northeast of Safi, Sidi Slimane-Sidi Kacem, northwest of Meknes, the Triffa project on the Moulouya River, northwest of Oujda; and Haouz-N'Fis in the province of Marrakech, are a source of regular and permanent irrigation in these areas.

Over 55 percent of the land under some form of irrigation is in cereals, and nearly a third is planted to citrus and other tree crops. The remainder is used for market garden or fodder and forage crops and vineyards.

The important areas for expansion are those serviced by the large permanent irrigation works. Over 70 percent of their full potential with existing equipment was yet to be realized at the beginning of 1958, as indicated in the following tabulation:

Project	Total area in project	Area completed, January 1, 1958
	1,000 acres	1,000 acres
Beni Amir	101.3	50.9
Beni Moussa	199.7	49.4
Abda Doukkala	366.9	6.2
Sidi Slimane-Sidi Kacem . .	74.1	35.6
Triffa	148.3	20.0
Haouz-N'Fis	86.5	37.1
Total	976.8	199.2

Nearly 270,000 acres in these large irrigation perimeters and over 625,000 acres in small and medium sized irrigation works were complete at the end of 1960 in the government-assisted projects. Private irrigation covered between 125,000 and 250,000 acres. Present plans call for development at the rate of about 37,000 acres a year. More efficient use can also be made of underground water in the arid regions of southern and central Morocco and on the coastal strip from Tangier to Agadir. Here, good crops of early fruits and vegetables could be produced with regular irrigation. Also, drainage operations on more than 600,000 acres in the Rharb have been nearly completed; a large part of this land can now be used for cultivation.

Under the Five-Year Plan, a National Irrigation Office (Office National des Irrigations) was recently created to coordinate all phases of irrigation development that affect areas larger than 2,500 acres, from location of water sources through marketing the farm product grown on the irrigated land. Responsibility for irrigation work was formerly shared jointly by the Ministry of Agriculture and that of Public Works. The National Irrigation Office will also have jurisdiction over the agricultural work centers.

Soil Conservation

A soil conservation program which was begun under the protectorates is being continued in the effort to preserve soil eroded by centuries of overgrazing and cropping on hillsides and to prevent further flood damage. By increasing possibilities for production, the program should also reduce the tendency of farmers to abandon the land. The program provides for building broad terraces in hilly regions, reforesting, sowing grass seed, and building small dams. Some land which is marginal for cereals has been sown to grass for grazing. Fruit trees, particularly olive, apricot, and fig, are planted on some of the terraces. Thus, additional work and more food are provided for some of

the local population. Windbreaks are under construction to save the soil in the forage areas. Some 160,000 acres are to be reforested; soil conservation and reclamation will cover about 350,000 acres.

On privately owned or tribal holdings, costs of these projects are to be repaid in part by the owners or the tribes over a period of years. The money is to be held in a revolving fund for use in later projects. Public funds are used to pay for flood control and reforestation.

Livestock Improvement

Broad plans for developing the livestock industry include: the adaption and specialization of breeds best suited to Morocco's natural conditions; substantial increases in production of forage crops; and improvement of marketing practices and facilities. Among proposed lines of specific endeavor are: setting up forage centers to store feed for use when grass supplies are inadequate; encouraging better pasture management by a program of seeding ranges, planting spineless cactus (particularly in the south), and controlling the grazing in other areas to re-establish pasture; building additional livestock breeding centers to upgrade the quality of Moroccan livestock; organizing animal breeders' cooperatives; and promoting trade in livestock products. Although procedures are being studied, progress has been limited. Livestock is traditionally regarded as reserve savings, rather than investment property, making some of these projects difficult to coordinate.

In 1959, a program was begun whereby Morocco's frozen meat industry could provide an even flow of meat for home use and export throughout the year.

The largest amount of Morocco's fresh meat is available in summer; demand is greatest in winter. Producers customarily keep animals which are fat in late summer beyond the time when they should be slaughtered. Feed is often scarce during the dry fall and winter months; the animals become thin and many die of starvation. Expansion of meat freezing facilities was expected to reduce greatly the number of animals lost each year through inadequate winter feed and shelter. It also held promise for increased profits to the producer, if he could be induced to offer more of his fat stock for slaughter at the end of the summer grazing period. Producer's sales to freezing plants were subsidized by the government in the early fall of 1959, and consumers were urged to buy the frozen product.

However, in its first full year of operation, the program fell short of initial expectations. This was largely due to the reluctance of stockraisers to accept changes in established customs of sales. Also, the retail price of frozen meat during that winter was high. And public resistance to a relatively new food product, in place of freshly killed meat, was such that small stocks of the frozen meat were difficult to market at any price.

Nevertheless, efforts to educate both producers and consumers are still in progress. Some acceleration of the program to even out supply to meet demand is anticipated.

Other modest gains are being made. Of 19 projected poultry production centers, 10 were put in operation by 1960. These produced hatching eggs and served as demonstration centers for Moroccan farmers.

Reforms in Agricultural Taxation, Credit, Research, Extension, and Education

Attaining the five major objectives of the Five-Year Plan will undoubtedly entail reforms in agricultural taxation, credit, research, extension, and education.

Taxation

The abolition of the tertib, a long-standing agricultural tax based on a traditional Moroccan assessment on crops and fruit trees (achour) and on animals (zekat) was announced in mid-June 1961. Under this system, taxes were levied on a graduated scale and varied with type of crop produced and average yield per acre, or presumed yield per tree in the case of fruits. Over specified ages, farm animals were taxed by the head. This form of taxation, increasing with the yield of crops and the age and number of livestock, and thus mainly linked to production rather than to net income, had become increasingly controversial, particularly as it related to the small farmer on low-yielding land.

The tertib is estimated to have contributed about 5 to 6 percent of total domestic revenue annually. The impact of its abolition on Moroccan agriculture will depend, in part, on other tax levies that may be imposed under a complete reorganization of the fiscal system, which is anticipated for the near future.

Credit

Morocco does not have an adequate system of farm credit. Many farmers operate almost entirely on a subsistence basis. The little credit now used is in the form of loans from government-sponsored agencies. Formation of a consolidated agricultural credit bank is projected for the near future. At present the three principal sources of farm loans are: The Societies for Agricultural Credit and Insurance; a group of seven regional savings banks (Caisses Regionales d'Epargne de Credit); and The Federal Bank of Mutual Insurance and Cooperation.

Branches of the Societies for Agricultural Credit and Insurance (Societes de Credit Agricole et de Prevoyance), or SOCAP, disburse loan funds obtained from the government through the Central Bank of Credit and Insurance (Caisse Central de Credit et de Prevoyance). Short-term loans, limited to about $300 per farmer, are made for production expenses, mainly for seed. Longer term loans, up to $600, of from 1 to 5 years duration may be granted to buy farm equipment.

The regional savings banks (Caisses Regionales d'Epargne de Credit) were organized in 1937 to make loans to farmers, to artisans, and for building houses.

Primarily these banks provide credit for the more prosperous farmers. Short-term loans range up to $1,800. Longer term loans, up to $6,000, are usually made against real estate mortgages, with interest at moderate rates.

The Federal Bank of Mutual Insurance and Cooperation (Caisse Federale de la Mutualité et de la Coopération Agricole) obtains loan funds from the government and the State Bank of Morocco to make short- and medium-term loans. Until recently, its principal beneficiaries have been European farmers, who formerly could buy a farm, without using cash, by obtaining a real estate loan from another credit agency for three-fifths of the cost of the farm and a loan from the Federal Bank for the balance. Under current law, long-term real estate loans can be made by this bank to non-European farmers only, and few of these are able to use the facilities offered.

Most credit is now in the form of seasonal loans (for seeds or fertilizer or for harvesting or working the soil) or as equipment loans (for farm animals, trees, or tools) through the SOCAP, the cooperatives, or Operation Plow. Under the present system, most of the farmers are ineligible for adequate farm credit from government-controlled sources or they are in the category of "poor credit risk." This is principally due to lack of technical know-how in the large traditional farming sector, and inability, without some form of subsidization, to redeem loans with the income from uneconomic holdings.

Research and Extension

The principal difficulty in agricultural research and extension lies in the scarcity of trained Moroccan workers. Research facilities are valued at about $5 million, and $600,000 has been spent annually on this work. The principal state-supported agricultural research organization, Agricultural Research Service and Agricultural Education (Service de la Recherche Agronomiques et de l'Enseignement Agricole) at Rabat, conducts general research in soils, crops, and food technology, at Rabat and on 4 experiment farms and 10 regional stations throughout Morocco. The problems of irrigation and farm mechanization are studied at the Center for Research and Experimentation in Agricultural Engineering at Rabat and its two stations, at Tadla and in the vicinity of Marrakech at Souelha. The Institute of Animal Biology at Rabat carried on research in animal diseases, and the Laboratory for Livestock Research at Casablanca specializes in bacteriology, vaccines, and biological chemistry. In addition, there are six experimental farms for research in animal genetics and feeding.

The directors of these research institutions are Moroccans, but most of the trained technicians carrying out research projects are French or other foreigners.

The Moroccan extension service employs less than 500 men as field agents and in work centers. With this limited number of leaders, service is largely confined to encouraging farmers to use selected seed and fertilizer. It is hoped that, with improvements in the Moroccan educational system, at least 2,000 well-qualified extension agents can be put in the field to give advice on all phases of farm management.

Education

In agricultural education there is great need for advanced training for Moroccan students in Morocco. No schools in the country offer graduate degrees in the agricultural sciences. And Morocco has only one general agricultural school at the college level, the National School of Agriculture, near Meknes. The curriculum for the first 2 years of the 3-year course, which leads to a degree of "Agricultural Engineer", is devoted to basic sciences and general agricultural subjects. In the last year, the student selects a problem for detailed study and prepares a thesis. The school's modern 568-acre farm is used for demonstration purposes, but the students do not work on it themselves. Of the 50 enrollees, all Moroccan, attending the college during 1959-60, 8 were graduated at the end of the school year. Some students obtain scholarships for further studies in France.

National secondary schools of agriculture are maintained by the Ministry of Agriculture at Ellouisiz (near Casablanca), Souillah (near Marrakech), at Sidi Aissa, and Meknes to prepare graduates for technical jobs in the government or as farm managers. The Ministry of National Education operates schools at Kenitra, Moulay Youssef, and Meknes to provide secondary training in rural engineering.

Below these levels of instruction are four regional centers for practical training in agriculture and the handling of farm machinery; each offers instruction to about 25 Moroccans between the ages of 15 and 16 years. The better students from the regional centers compete for admission either to the School of Mechanics at Rabat or the agricultural school at Fourat (Kenitra), which offers one year of further practical training in agriculture. The Ministry of Agriculture hopes to recruit extension agents from the Fourat school.

Civilian Mobilization

Most recent government plans call for civilian mobilization for service on public works, particularly rural land improvement. This program will include military instruction as well as agricultural education beyond that offered in schools. All Moroccan men between the ages of 18 and 30 will participate for one year. Rural men of any working age will contribute their labor when not employed on farm operations.

The training will create a cadre of technical supervisory personnel. Full mobilization of labor is expected to continue the work on community development projects when local farmers must be primarily occupied with planting and harvesting. It is also hoped that mixing all social classes of rural and urban youth will bring about greater national unity.

Plans are under consideration for work on: reforestation; woodcutting; pest control; small irrigation projects; terraces for fruit trees and soil improvement; control of rainwater and runoff; removal of stones and dwarf palms from the fields; and construction of schools and roads. Some of these projects are already under way.

Foreign Aid

French aid to Morocco, which furnished the bulk of funds for development budgets during the protectorate years, declined after independence. Last year, France contributed about $3.5 million for French administrative and technical personnel in a wide range of services in Morocco and for training Moroccan students and observers in France. The extent of aid which Morocco is receiving from other countries, except the United States, is not precisely known.

U.S. economic assistance and special technical assistance programs have averaged over $35 million annually in the last 5 years. Some of the projects made possible by these funds in the past were: the planting of more than 3 million trees in 2 years; large scale demonstrations of deep plowing and fertilizing under Operation Plow; and a low-cost housing program. A $4 million grant was made to ease unemployment by providing work in road building, irrigation, and forestry in northern Morocco.

For fiscal year 1961, a total of $50 million was allocated to Morocco under the United States Mutual Assistance program. About one-fourth of this sum was designated for use in procurement of agricultural import products, largely edible oils and oilseeds.

In June 1961, two additional aid programs were launched. Two hundred thousand tons of U.S. wheat, valued at $17 million, is beginning to move into Morocco, under Section 202 of the Mutual Security Act, to be used as payment in kind on public works projects. One hundred thousand tons of barley and feed grains are being donated under Title II, Public Law 480, for drought relief.

Nearly $13 million was spent in furnishing U.S. wheat to Morocco during the 1957 drought year. Volunteer agencies have provided smaller quantities of U.S. food, clothing, and medicines in other emergency situations from time to time.

American experts in soil classification, soil science, irrigation, farm credit, town planning, vocational education, cottage industries, public administration and telecommunications have been active in Morocco. Technical training and observation in the United States have been provided for a number of Moroccan specialists and administrators.

In 1960 the U.S. Development Loan Fund supplied a $23 million loan to continue development of the large Triffa irrigation project, under which about 10,000 farms will be improved by 1975.

United Nations technical assistance programs have been under way in Morocco since 1956. These include the Food and Agriculture Organization (FAO), World Health Organization (WHO), and the United Nations Children's Fund (UNICEF).

OUTLOOK

Morocco can produce much more than it does. Within the next 10 to 20 years, agricultural production can be expanded to supply and increase per capita allowances of many foods and to provide larger margins of agricultural commodities for export.

Much time and effort have been spent in formulating a discriminating approach to agricultural reforms and finding the most economical means of integrating the low-income traditional farming sector. Much work has been devoted to determining the kinds and amounts of farm goods that will be needed to maintain or exceed self-sufficiency and the best methods for procuring these goods either by home production or importation. Although the development projects have appeared to fall short of intended goals, the plans are in the early stages and the years since 1956 have been arduous ones for all components of the Moroccan economy.

Basically, the Moroccan economy is sound. But the short period of independence has been marked by lack of working funds and trained leadership. Among other difficulties, independence coincided with the end of a postwar upturn in construction and industry, which added to the burden of unemployment. There was also a sizable trade deficit, coupled with flight of investment capital which, under prevailing monetary restrictions, could not be halted by exchange controls.

Agriculture was possibly less seriously affected by the withdrawal of foreign funds than were other sectors of the economy. However, many European farmers and agricultural companies discontinued support of their interest in Morocco and transferred capital back to France and Spain. These had been the bulwark of the modern farming sector and the prime source of private cash for agricultural investment.

European farm managerial and technical skills were also withdrawn. The number of experienced personnel declined, through emigration, by more than 60 percent between 1956 and 1960. There were too few trained Moroccan technicians and administrators to effectively replace the departing Europeans. This was primarily due to lack of educational opportunities under the protectorates.

Thus money and know-how, two imperatives in building a modern farm economy, steadily diminished at a time when each was most desperately needed.

A further blow to economic equilibrium was the disastrous drought of 1957. Depression in almost every phase of the economy continued until mid-1960, forcing emphasis away from agricultural reforms.

In general, high priority has been given to rural development projects, since these involve the greatest number of Moroccans and the highest rate of underemployment. Some impressive gains have been made. There are also hopeful signs for the future.

Operation Plow is unique in northern Africa. It has led to regroupment of many fragments of farmland into economic units for machine cultivation and has served to demonstrate the use of fertilizers and selected seeds. Its program

for intensive rotation of crops will soon bring into cultivation from 75,000 to 1 million acres of land that has been allowed to lie fallow in the better agricultural sections. In addition, 500,000 acres of rangeland is being reclaimed for crop raising.

Significant increases in production, resulting from improved techniques, mechanization, fertilizers, and insecticides will come rather slowly.

More immediate gains are expected from diversified crop production and increased yield per acre in the irrigated areas. These will affect only about 10 percent of all Moroccan farmers.

Over 1 million acres were cropped under irrigation in 1960. Plans call for a 75-percent increase in the larger irrigation perimeters before 1965; 150-percent increase before 1970; and realization of full present potential--roughly a gain of about 400 percent by 1980. The rate of expansion for small irrigation works is projected at nearly 7,500 acres a year. The irrigated areas may not be extended with such statistical precision over each of the next 18 or 19 years. However, it is possible that the goals will be ultimately attained. Recent estimates indicate that, since the beginning of 1960, over 10,600 acres in large irrigation perimeters and more than 4,500 acres in small projects have been added to the areas already equipped and organized.

Assuming steady progress in the implementation of all current programs, several hypotheses may be presented. Some of those following are adapted from a detailed study of Morocco as part of the Mediterranean Development Project, recently completed by the Food and Agriculture Organization of the United Nations. Others are independently estimated.

Proposed changes in land use, if carried through, could bring an increase of about 15 percent in the total area cropped at the end of 10 years (table 9). Allocation of farmland for specific uses (tables 10 and 11) would be governed by the adaptability of individual crops to certain parts of the country, by customs, and by prices. The farm products that would probably be increased most in the irrigated areas would be food grains and forage crops. A two-crop system would permit additional plantings of corn and feed crops. Citrus production could move forward also at the rate that irrigation is developed in coastal regions. Other fruit plantations and industrial and market garden crops could expand with improved farming practices.

Morocco appears to have the potential for an increase, under ideal conditions, of about 40 percent in both animal and crop production the next 10 years. Ideal conditions would consist of normal weather, adequate funds and technical assistance to forestall setbacks on development projects, and no major economic dislocations. A more realistic estimate would take into consideration periods of brief recession. This would mean a gain of between 2 and 3 percent annually, or roughly equal to the rate of population increase, then approaching a total of 25 percent at the end of 1970 and approximating 40 percent in the following decade.

Table 9.--Land use, Morocco (former southern zone), average 1951-55, estimated 1970 1/

Category	Average 1951-55		Estimated 1970		Estimated change
	Percent		Percent		Percent
Cultivated area:					
Grains		81.7		71.4	-12.6
Pulses		5.6		6.7	19.6
Trees and vines		8.7		13.4	54.0
Dry-farmed	6.9		11.3		63.8
Irrigated	1.8		2.1		16.7
Forage crops		0.5		3.2	540.0
Dry-farmed	0.4		2.5		525.0
Irrigated	0.1		0.7		600.0
Industrial and other crops		3.5		5.3	51.4
Dry-farmed	2.5		3.5		40.0
Irrigated	1.0		1.8		80.0
Total, cultivated area		100.0		100.0	
All land:					
Cultivated area		12.5		14.4	15.2
Fallow		6.6		5.7	-13.6
Grazing land		19.6		18.9	- 3.6
Forests		10.5		10.5	--
Alfa (esparto) grass		5.6		5.6	--
Unproductive land 2/		45.2		44.9	- 0.7
Total, all land		100.0		100.0	--

1/ Comparable statistics are not available for all other areas.
2/ Includes unused but potentially useful land, built-on areas, and wasteland.

The status of agricultural production, at current or slightly improved levels of domestic consumption when Morocco's development programs have been completed, is estimated below:

Domestic production will satisfy the demand for:	Imports will be decreased for:	Main agricultural exports will be:	Exports will be increased for:
Durum wheat	Cheese	Citrus fruits	Fruit juices, other than grape juice
Barley	Milk	Dried fruits	Tomato juice
Pulses	Butter	Fresh vegetables	Eggs
Fruits		Durum wheat	Meat
Vegetables		Wines	Hides and skins
Wines		Grape juice	Seeds
Eggs		Pulses	Spices
Hides and skins			Perfume plants
			Medicinal plants

Table 10.--Estimated maximum area and production of major field crops in Morocco (former southern zone), 1970 1/

Crops	Estimated maximum cultivated area						Total area	Estimated maximum production	Estimated change from 1951-55 period to 1970
	Traditional farming		Improved farming		Modern farming with irrigation				
	Area	Yield per acre	Area	Yield per acre	Area	Yield per acre			
	1,000 acres	Bushels	1,000 acres	Bushels	1,000 acres	Bushels	1,000 acres	1,000 metric tons	Percent
Grains:									
Durum wheat	990	8.9	1,235	14.1	495	17.8	2,720	954	159
Other wheat	495	8.2	495	14.9	370	19.3	1,360	505	126
Barley	3,955	14.9	245	18.6	60	26.0	4,260	1,416	87
Oats	-	-	50	25.1	75	30.6	125	51	102
Corn and sorghum	990	8.0	370	12.7	150	22.2	1,510	405	129
Total grains	6,430	-	2,395	-	1,150	-	9,975	3,331	-
Pulses:									
Beans	60	8.2	125	9.7	75	10.4	260	68	165
Chick-peas	125	6.7	125	8.2	-	-	250	51	147
Peas	-	-	60	8.9	135	10.4	195	53	134
Lentils	35	5.2	75	5.9	-	-	110	17	350
Kersenneh	75	3.0	10	4.0	-	-	85	12	119
Total pulses	295	-	395	-	210	-	900	201	-
				Metric tons		Metric tons			
Cultivated forage	-	-	185	16.1	125	20.2	310	5,504	1,000

1/ Comparable statistics are not available for all other areas.

Table 11.--Area in specified crops in Morocco (former southern zone), average 1951-55, estimated maximum area 1970 1/

Crops	Average 1951-55		Estimated maximum area, 1970 1/	
	Dry-farmed	Irrigated	Dry-farmed	Irrigated
	1,000 acres	1,000 acres	1,000 acres	1,000 acres
Citrus groves	-	104	-	150
Vineyards	173	-	245	-
Olive trees	247	62	470	75
Other fruits	247	49	495	75
Almond trees	173	-	295	-
Potatoes	12	-	25	-
Market garden crops	69	89	110	125-150
Spices	42	-	60	10
Oilseeds	105-250	0.5	255	5
Perfume plants	1.2	1.2	8	5
Lucerne and other fodder crops	-	15	35	85
Cotton	-	7-11	-	25-40
Tobacco	-	2-5	-	8
Sugar beets	5-10	-	35	-

1/ Comparable statistics are not available for all other areas.

A considerable part of Morocco's exports in farm products will be in crops that are now in world surplus. Morocco will still be dependent on imports for major supplies of sugar, tea, coffee, fats, oils, and oilseeds. Occasional imports of ordinary wheat varieties may be required from time to time.

In the next few years, the greatest agricultural income will probably continue to derive from grain and livestock. The integration of crop farming with stock farming would involve a complicated, or perhaps impossible, process of complete reversal of customary farm organization. However, Morocco has good possibilities for increasing its livestock industry fairly soon. Animal production could expand at a rate equal to or in excess of crop production. Considerable capital is already invested in the nation's herds and flocks. A relatively small additional investment for improved foddering and range management and for intensive stock farming, both for dairying and livestock fattening, in the irrigated zones could yield rapid returns. But marketing practices and facilities must be improved at a comparable pace.

There is wide latitude for speculation concerning the effect of mechanized farming on underemployment in agriculture. But much of this effect could be offset by employment in labor-intensive crops, additional crops because of rotation, and rural construction between the heaviest periods of farmwork. Table 12 shows the estimated maximum employment in agriculture, exclusive of part-time employment on public works, based on rapid completion of proposed reforms.

Table 12.--Estimated maximum employment in agriculture in Morocco (former southern zone), 1970 1/

Kind of farming	Work days per acre	Estimated maximum employment	Estimated change from 1951-55 period to 1970
	Days per acre	Million days	Percent
Crop farming:			
Market garden crops; tobacco; (irrigated)	80	11.0	172
Lucerne (irrigated)	50	4.2	583
Cotton; traditional vineyards, (irrigated)	45	7.7	281
Market garden crops; sugar beets; modern vineyards; miscellaneous foodcrops (dry-farmed)	40	15.3	139
Annual forage; flax; other industrial crops (dry-farmed)	25	13.8	276
Spring-sown grains	20	30.8	97
Pulses	15	15.0	156
Winter-sown grains	12	90.8	89
Irrigated permanent annual crops	8	1.2	150
	Days per tree		
Citrus; dates	1	16.0	139
Olives	1/4	8.0	200
Other fruit plantations	1/2	17.0	200
Total crops	--	230.8	119
Livestock raising	--	240.6	120
Total employment in agriculture	--	471.4	120

1/ Comparable statistics are not available for all other areas.

Only a fraction of the funds necessary for attaining the envisaged development are now available within the country. Of nearly equal significance is the lack of an extension service that is competent to supervise all phases of rural development, and to reach out to all Moroccan farmers. Making modern farmers out of seminomads will be, at best, a Herculean task. Educating even settled traditional farmers will be a long-term job. There has not been time for formation of a new, large Moroccan entrepreneurial class. Large-scale programs to train Moroccan technicians and administrators to efficiently occupy and extend the positions left by their European counterparts of protectorate days will take, at least, the better part of twenty years.

Morocco has made a good start toward better use of its land, increased agricultural output, and greater prosperity for all of its peoples. But, as is the case in many newly independent countries trying to make the most of their human and material resources, help and guidance is needed. It is unlikely that this young nation can meet as ambitious a schedule for agricultural development as has been drafted without well-timed foreign financial aid and high caliber technical assistance.

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