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REQUIREMENTS FOR CONTRIBUTIONS

Articles in the field of agricultural economics, suitable for publication in the journal, will be welcomed.

Articles should have a maximum length of 10 folio pages (including tables, graphs, etc.) typed in double spacing. Contribuitions, in the language preferred by the writer, should be submitted in triplicate to the Editor, c/o Department of Agricultural Economics and Marketing, Pretoria, and should reach him at least one month prior to date of publication.

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Contents

The state of South African agriculture - A Diagnosis

by

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I. INTRODUCTION

South African agriculture consists in reality of two sectors - White and Bantu agriculture. As the Agricultural Economic Society devoted its exclusive attention to Bantu agriculture during its 1969 annual conference, this paper will deal exclusively with the state of White agriculture.

The total surface under White farms in the Republic amounts to approximately 90 million hectares (± 104 million morgen). Of this, approximately 11 per cent is used for crop production. Many persons therefore tend to regard South African agriculture as being largely devoted to animal agriculture. This view is, however, not correct from the point of view of production. It has been shown that plant production contributed the following to our foods in 1967: 77 per cent of proteins, 54 per cent of fats, 99 per cent of carbohydrates and 89 per cent of calories.[1] As shown in Table 1, the gross value of field crops and horticultural products also exceed that of livestock products.

TABLE 1 - Gross values of agricultural production in the Republic of South Africa, 1966/67 and 1967/68

Origin of products	1966/67		1967/68	
	Gross value	Percentage of total	Gross value	Percentage of total
	R million	%	R million	%
Field crops	590.4	45.6	450.5	37.8
Horticulture	194.8	15.0	197.2	16.6
Total of plant origin	785.2	60.6	647.7	54.4
Pastoral	102.6	7.9	101.6	8.5
Other livestock	408.6	31.5	441.5	37.1
Total from livestock	511.2	39.4	543.1	45.6
Grand total	1 296.4	100.0	1 190.8	100.0

Source: Division of Agricultural Marketing Research (1969). Supplementary data to the abstract of agricultural statistics of the Republic of South Africa. The Government Printer, Pretoria

1) Haylett, D.G. (1969). Die verboude grond in Suid-Afrika. Publ. Univ. Pretoria, Nuwe Reeks Nr. 45.

It is also important to take note of rates of change of agricultural production and population in the Republic. Because of the instability of agricultural production, use was made of linear least squares regression and regression values of production for different years in order to calculate growth rates by means of the compound interest formula.[2] Results are shown in Table 2, from which the following may be concluded.

1. Production of all classes of agricultural products mentioned, increased, but it is clear that field crop and horticultural production increased at a faster rate than livestock production. Production of food-stuffs also rose faster than production of non-food products.

2. The growth rate of food products exceeded that of the population. Fears about the ability of agriculture to feed South Africa's growing population therefore appear to be unfounded. This conclusion corresponds with Haylett's[3] view. An important result of this trend was the improved feeding levels of the population as a whole, as illustrated by Du Plessis and Swanepoel.[4]

2) These equations, as well as other subsequent equations in the paper, were of the following nature: $Y = a + bX$
with Y = variable
X = year
a = intercept
b = regression coefficient
Unless stated otherwise, the production year 1947/48 was taken as 1, 1948/49 as 2, etc.

(0.1) : significantly different from zero at $p = 0.10$
* : significantly different from zero at $p = 0.05$
** : significantly different from zero at $p = 0.01$
*** : significantly different from zero at $p = 0.001$
NS : not significantly different from zero at $p = 0.10$

3) Haylett, D.G. (1969). Population growth and food resources in South Africa. S. Afr. J. Sci. 64: 369-374.

4) Du Plessis, A.J. and Swanepoel, C.J. (1964). The role of agriculture in the South African economy. Agrekon 2 (4) : 5 - 12.

TABLE 2 - Rates of change of agricultural production and population in the Republic of South Africa, 1947/48 to 1967/68 (a)

Items	Intercept a	Regression coefficient b	Standard error of b	Correlation coefficient r	Regression values 1947/48	Regression values 1967/68	Annual rate of change %
Indices of physical volume (b)							
Field crops	79.6	6.91***	0.78	0.90***	86.5	224.7	4.77
Horticulture	72.5	8.90***	0.28	0.99***	81.4	259.4	5.80
Livestock	93.9	3.40***	0.08	0.99***	97.3	165.3	2.65
Total agriculture	85.4	5.50***	0.32	0.97***	90.9	200.9	3.96
Food products	81.5	6.22***	0.43	0.96***	87.7	212.1	4.41
Non-food products	101.0	2.75***	0.30	0.90***	103.8	158.8	2.13
Population (millions)	-	-	-	-	11.69(c)	18.73(c)	2.36

(a) Source: Supplementary data to the abstract of agricultural statistics of the Republic of South Africa, op. cit.

(b) 1947/48 - 1949/50 = 100

(c) Actual population data for 1947 and 1967

TABLE 3 - Data on imports and exports of agricultural products, Republic of South Africa, 1957 - 1967 (a)

Items	Intercept a	Regression coefficient b	Standard error of b	Correlation coefficient r	Regression values 1957	Regression values 1967	Annual rate of change %
Imports (R million)	32.2	3.01*	1.16	0.65*	35.2	65.3	6.18
Exports (R million)							
Processed	119.7	5.32***	0.84	0.90***	125.0	178.2	3.55
Unprocessed	181.5	6.37(0.1)	3.41	0.53(0.1)	187.9	251.7	2.92
Total	301.2	11.70*	3.64	0.73*	312.9	429.9	3.18
Volume indices (b)							
Field crops	87.7	11.80(0.1)	6.07	0.54(0.1)	99.5	217.5	7.82
Horticulture	65.1	11.54***	1.71	0.91***	76.6	192.0	9.19
Livestock	90.3	4.23***	0.91	0.84***	94.5	136.8	3.70
Total agriculture	83.8	8.33***	1.65	0.86***	92.1	175.4	6.44
Processed	101.2	4.35NS	2.74	0.47NS	127.4(c)	127.4(c)	0(c)
Unprocessed	61.3	13.41***	1.39	0.95***	74.7	208.8	10.28
Index of unit value of exports(b)	106.1	-0.24NS	0.74	-0.11NS	104.6(c)	104.6(c)	0(c)

(a) Source of data: Supplementary data to the abstract of agricultural statistics on the Republic of South Africa, op. cit.

(b) 1958 - 1960 = 100

(c) Due to the absence of a significant trend, the rate of change was assumed to be zero and only mean data were put in the respective columns

Agriculture has not only thus succeeded in improving the food position in South Africa considerably, but increases in agricultural production have also had a marked effect on the country's external trade. This effect will be examined with the aid of Table 3 in which essentially the same procedure was followed as in Table 2, with the exception that observations of only an 11 year period were used.

Although it appears that agricultural imports increased at a faster rate than exports, the net contribution of agriculture to foreign exchange increased from a regression value of R277.7 million in 1957 to R364.6 million in 1967. Exports of processed agricultural products increased somewhat faster than those of unprocessed products. Agricultural imports constituted 3.6 per cent of the Republic's total imports in 1967; agricultural exports constituted 35.6 per cent of South Africa's total exports (excluding gold). The volume of agricultural exports grew at a rate of 6.44 per cent per annum; the volume of exports of animal origin grew considerably slower than that of field crops and horticultural products. The index of unit value of agricultural exports remained virtually unchanged over the period.

It thus appears that agriculture has made much progress over the past decades. It will, however, be shown in subsequent discussions that there are at present large problems which will have to be tackled purposefully in the decade of the seventies.

II. THE RESOURCES OF SOUTH AFRICAN AGRICULTURE

After considering the expansion of production, it is fitting to cast a closer view over the resources of agriculture.

1. Land

The latest available data which yield a fairly comprehensive view of land utilisation on White farms, appear in the census report for 1959/60. Based largely on this census report, the Inter Departmental Study Committee on the use of Agricultural Land, analysed land utilisation. This analysis may be seen in Table 4.

About 10.2 millions of hectares are under cultivation and approximately 0.7 million hectares are under private plantations, whilst natural grazing covers 79.4 million hectares.

Of the 10.2 million hectares under cultivation, about 840 000 hectares are irrigated; approximately 635 000 hectares are under permanent irrigation and the irrigation on approximately 205 000 hectares may be regarded as being unstable. After completion of the Orange River and Pongola irrigation projects, a total area of approximately 1 170 000 hectares will be under irrigation. In addition to the areas mentioned above, about 1 490 000 hectares are covered by State forestry plantations.

(5) Republiek van Suid-Afrika (1968). Verslag van die Interdepartementele Studiekomitee oor die gebruik van landbougrond. Vertroulike verslag.

TABLE 4 - Land utilisation on White farms, Republic of South Africa, 1960 (a)

Use	Area
	1 000 hectares
Cultivated area, annual crops (b)	9 563
Perennial crops (c)	461
Artificial pastures	209
Total area cultivated	10 233
Forestry plantations (d)	698
Roads and wastage	1 499
Natural grazing	79 360
Grand total	91 790

(a) Areas were given in morgen in the report. These have been converted to metric units in this table
(b) Ordinary crops and fallow land
(c) Sugar-cane, vineyards, fruit orchards, etc.
(d) Does not include State owned plantations

Agricultural land is static and cannot be increased; White agriculture will in future, on the contrary, have to cede land to other economic sectors and to the Bantu homelands. Land is already a scarce factor and will become increasingly scarcer over time. Had the 92 million hectares under White farms consistently been land with a high agricultural potential, land would not, at present, been a scarce factor in South Africa. The problem lies in the large differences in quality of South African soils. The present area under cultivation is very close to the maximum. It has been calculated that less than 4 per cent of the agricultural land has a really high potential; only 0.8 million hectares of high quality agricultural land posses a low degree of erosion susceptibility.[6)]

6) In the interest of future agricultural development, it is essential to retain high quality agricultural land for purposes of agricultural production. This is the crux of a potentially important problem in South Africa: an encroachment of other uses into high quality agricultural land - mostly transport and township development - is taking place in many parts of the country. Witness, for example, the urban encroachment at Constantia and Tygerberg. The gravity of the situation is particularly evident in the light that the agricultural potential of the soil has little, if any, effect on its suitability for other uses. The elementary principles of welfare economics indicate that the use of high quality agricultural land for purposes where soil quality is unimportant, will constitute a deviation of the optimum direction of production with consequent adverse effects on the welfare of the population as a whole.

Another aspect involved with South Africa's land resources concern. Notwithstanding the fact that the Soil Erosion Act was promulgated more than twenty years ago, soil erosion still takes place at an alarming rate. South Africa's annual soil losses from erosion are about 450 million metric tons - largely as a result of injudiscious

6) Ibid

farming practices - and approximately one percent of the capacity of South Africa's irrigation dams (thus equivalent to the size of the Hartebeespoort Dam) is silted up every year.

It may be mentioned, to illustrate the extent of harmful farming practices, that in the Upper Orange River Catchment area, the livestock stocking rate exceeded the carrying capacity of the veld by 80 per cent in 1966, whilst the greater majority of the farmers in that area displayed a very poor perception of pasture management practices.[7]

2. Labour

Table 5 shows the total number of labourers in South African agriculture. The table shows amazing annual fluctuations in numbers of labourers. These fluctuations give rise to doubts concerning the way in which farmers interpret the term "casual labourers" when completing census forms.

The table does not give any indication of a continuous upward or downward trend in numbers of labourers of any race for the thirteen year period 1952 to 1964. Thus it appears that in this period, South African agriculture has reached a stage in which the total labour force has stopped increasing, whilst it has been shown by Brand[8] that particularly numbers of Bantu labourers increased in earlier periods. The position in South African agriculture deviates in this respect from the developed countries in the Western World, where increased agricultural production is accompanied by declining numbers of labourers.

3. Capital

The capital assets of South African agriculture were analysed in a way similar to the analysis of production trends (Table 6). It appears that capital assets used by agriculture increased at a high annual rate. A large portion of this increase was, however, the result of increased prices, which in the case of land were positively correlated with population density, technological improvement, the relationship between prices of products and inputs and negatively correlated with interest rates and urbanisation.[9] Prices of machinery and equipment increased, as will be seen later, at an annual rate of 2.61 per cent. Increases in livestock capital consisted largely of increased prices as well as quality improvements, as livestock numbers in South Africa tend to remain relatively static.[10]

It is also important at this stage to note the level of mechanisation in South African agriculture. During the last two and a half decades, South African agriculture experienced a rapid process of mechanisation as is shown in Tables 7 and 8, in which numbers of certain types of equipment are given. Mechanical draught power replaced animal draught power at a rapid rate. Transport also became mechanised, as is indicated by the increasing numbers of trucks and trailers and the decreasing numbers of animal-drawn wagons. Tractors not only became more abundant, but also gradually bigger and stronger, as is shown in Table 9, in which a distribution of tractor imports is shown. As is indicated in Table 8, farmers also gradually aquired implements adapted to mechanised farming.

Until at least very recently, agricultural mechanisation in South Africa did not lead to decreases in labour. Thus it appears that mechanisation did not improve labour efficiency to the same extent as in certain overseas countries. This bottleneck in South African agriculture should receive serious attention in the seventies. The development in other sectors as well as the contemplated development of the Bantu homelands will cause labour gradually to become scarcer and more expensive.

An important bottleneck in the process of mechanisation and farm organisation in the summer grain areas has, until very recently, been the harvesting process. Although cultivation had reached an advanced level of mechanisation, harvesting has until recently been done almost exclusively by hand, with the result that farmers had to keep large numbers of labourers. During the latest decade, this problem was tackled seriously, and is now disappearing. Between 1955 and 1960, numbers of maize pickers and combine harvesters increased considerably. Although more recent data are not available, it is clear that maize harvesting is gradually becomming mechanized. In 1965/66, approximately 75 per cent of the total area of maize was harvested by hand; this percentage declined to 58 by 1968/69.

In 1965/66, 63 per cent of all maize was still delivered and stored in bags, compared to 41 per cent in 1967/68.[11] Mechanisation may thus be expected to become more labour-substituting in the future.

4. Management

Farming in the Republic is still mostly in the hands of individual small enterprises. In 1962/63, only 1.1 per cent of the farms in the country, comprising 2.75 per cent of the total surface, were in the hands of companies.[12]

7) Van Zyl, D.P. (1969). Voorligtingkundige navorsing in die Bo-Oranje-opvanggebied (1966). Department of Agricultural Technical Services, Pretoria.

8) Brand, S.S. (1969). The contributions of agriculture to the economic development of South Africa since 1910. D.Sc. (Agric.) dissertation, University of Pretoria.

9) Collett, B.H. (1969). Time series analysis of Factors affecting farm land prices in South Africa, 1939 - 1966. M. Sc. (Agric.) thesis, University of Natal.

10) Cf. Groenewald, J.A. (1965). Differences in the growth of three sectors of S.A. Agriculture. Agrekon 4 (1) : 27 - 35.

11) Editorial (1970). Maize and mechanisation. Fmg in S. Afr. 46 (3) : 5.

12) Agricultural census, 1962/63

TABLE 5 - Numbers of farm workers and domestic servants on farms of Whites, Republic of South Africa (a) (Casual labourers excluded)

Date	Total, all races	Whites		Coloureds and Asiatics		Bantu	
		Males	Females	Males	Females	Males	Females
	1 000						
Aug. 1952	929.3	10.5	.5	91.1	25.8	592.5	208.7
Aug. 1953	951.7	10.5	.5	93.0	25.7	606.0	216.0
Aug. 1954	974.1	9.1	.3	96.2	28.1	623.7	216.6
Aug. 1955	1 005.7	7.8	.3	96.8	33.1	631.3	236.5
Jun. 1956	998.5	8.9	.3	97.0	28.9	636.8	226.5
Jun. 1957	963.6	10.6	.5	96.6	28.4	623.3	204.2
Jun. 1958	961.8	13.0	.5	95.4	26.5	633.4	193.1
Jun. 1959	1 011.9	13.4	.6	96.5	27.5	659.6	214.4
Jun. 1960	913.3	12.8	.6	96.6	35.1	559.3	210.5
Jun. 1961	1 008.0	14.2	.4	103.6	31.9	629.4	228.6
Jun. 1962	1 025.1	14.1	.5	103.0	31.9	646.5	229.1
Jun. 1963	916.2	11.6	.5	95.3	29.1	577.0	202.7
Jun. 1964	888.1	12.1	.4	102.8	28.1	565.4	179.7

(a) Source: Agricultural census reports

TABLE 6 - Rates of change in the capital assets of South African agriculture, 1947/48 to 1967/68 (a)

Items	Intercept a	Regression coefficient b	Standard error of b	Correlation coefficient r	Regression values		Annual rate of change
					1947/48	1967/68	
	R million	R million	R million		R million	R million	%
Land and fixed improvements	1445.2	144.16***	4.01	0.99***	1590	4473	5.17
Machinery	247.8	18.09***	1.80	0.92***	266	628	4.30
Livestock	447.7	32.83***	1.69	0.98***	480	1137	4.31
Total	2141.0	195.08***	6.59	0.98***	2336	6238	4.91

(a) Source: Supplementary data to the abstract of agricultural statistics of the Republic of South Africa, op. cit.

TABLE 7 - Numbers of tractors and vehicles in the posession of White farmers in the Republic of South Africa, 1946 to 1967 (a)

Year	Tractors	Cars	Trucks			Trailers	Animal-drawn wagons
			Smaller than 1.5 tons	1.5 tons and larger	Total		
1946	20 000						
1950	48 000						
1955	87 451	66 675	30 332(b)	21 745(c)	52 077	45 543	43 770
1960	119 196	77 807	47 048(d)	22 328(e)	69 376	69 663	23 275
1961	122 218	78 402	47 785(f)	21 731(g)	69 516		
1962	126 923	81 800	46 089	23 453	69 542		
1964	133 552	77 174	48 459	23 324	71 783		
1967	168 000(h)						

(a) Source: Agricultural census reports
(b) 1 ton or smaller
(c) Larger than 1 ton
(d) Smaller than 3 tons
(e) 3 tons or larger
(f) 2 tons or smaller
(g) Larger than 2 tons
(h) Estimate

The later few years of the decade experienced an increase in farming activities by companies; the extent is not definitely known, but has already caused concern in Organised Agriculture. Agriculture is, however, still a sector consisting largely of small firms. The number of farms in South Africa rose from 112 456 in 1946 to 116 848 in 1950, since when it has declined to 111 586 in 1955, 105 859 in 1960, and 101 387 in 1964.[13] The number of persons with farming as main source of revenue likewise decreased from 110 230 in 1958 to 104 839 in 1960, to 79 841 in 1964 and 68 915 in 1968.[14] Thus it appears that, as is the case in the whole developed Western World, the number of agricultural operators in South Africa is on the decline.

TABLE 8 - Quantities of certain farm implements in the posession of White farmers in the Republic of South Africa, 1955 and 1960[(a)]

Type of implement	1955	1960
Ploughs:		
Animal drawn	117 044	83 099
Disc	43 749	65 927[(b)]
Moldboard	55 022	59 633[(c)]
Subsoiler	11 572	16 604
One way	16 189	35 592
Offset	16 225	24 527
Planters:		
Wheat	12 970	15 656
Maize	78 811	89 064
Fertilizer spreaders	11 757	14 645
Harrows:		
Zig-zag	110 994	86 462
Springtooth	20 768	18 349
Disc	28 401	11 693
Scufflers	156 665	120 899
Cultivators	41 131	33 266
Ordinary mowers	34 239	24 522
Power mowers	11 341	15 268
Wheat combines:		
Selfpropelled	2 650	2 712
Tractor drawn	5 853	6 570
Maize combines and pickers	438	1 272[(d)]

(a) Source: Agricultural census reports
(b) Of these, 35 809 were mounted and 30 118 drawn
(c) Of these, 27 470 were mounted and 32 163 drawn
(d) Combines: 941; pickers: 331

Operatorship and management in South African agriculture present some key problems. One problem originates from the fact that, notwithstanding the obvious decline in farm numbers, a large portion of farmers are still on uneconomically small farms - estimated at between 30 and 40 per cent of all farmers.[15] This causes these farmers to deteriorate financially, it impedes their adoption of new technology and also causes them not to derive the same benefits from new technology as farmers on larger units - recent studies have shown conclusively that farmers on larger units derive much bigger gains from new machine technology than those on smaller units.[16] The farmer on an uneconomically small unit is also not able to apply the necessary soil conservation measures - on the contrary, financial pressures force him to exploit his soil to such an extent that soil deterioration results from it.[17]

Such soil deterioration inevitably leads to further financial regression. Financial impoverishment also leads to social deterioration.[18] An American sociologist, Everett M. Rogers, states it thus: "(This) illustrates the low income subculture which act as a barrier to efforts to improve their lot by government programs".[19]

13) Agricultural census reports

14) Annual reports. Secretary of Internal Revenue

15) Report of the Interdepartmental Study Committee on the use of Agricultural Land, op. cit.

16) Cf. Heady, Earl O. and Krenz, Ronald D. (1962) Farm size and cost relationships in relation to recent machine technology. Iowa Agr. and Home Ec. Exp. Sta. Res. Bul. 504.

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17) Cf. Tomlinson, F.R. (1966) Verslag oor die droogtegeteisterde gebiede in die Noordwes-Transvaalse bosveld. Department of Agricultural Technical Services, Transvaal Region, roneoed report.

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Kotze, J.E. (1967) Die aanneemlikheid van verbeterde boerderypraktyke in die gebied noord van die Soutpansberg. D. Agric. (Inst. Agrar.) dissertation, University of Pretoria.

18) Slocum, Walter L. (1962) Agricultural sociology. Harper and Brothers, New York.

19) Rogers, Everett M. (1960) Social change in rural society. Appleton-dentury-Crofts, Inc., New York.

TABLE 9 - Imports of farm tractors, Republic of South Africa, 1955 - 1968 (a) (b)

Year	Light		Medium		Heavy		Total number
	Number	Percentage of total	Number	Percentage of total	Number	Percentage of total	
1955	183	1.3	10 361	74.5	3 371	24.2	13 915
1958	9	0.1	5 420	67.7	2 578	32.2	8 007
1961	0	0	3 786	36.0	6 720	64.0	10 506
1964	14	0.1	5 564	38.5	8 878	61.4	14 456
1965	383	2.5	5 068	33.5	9 683	64.0	15 134
1966	275	2.1	688	5.4	11 881	92.5	12 844
1967(c)	749	4.6	5 278	32.8	10 088	62.6	16 115
1968	558	3.5	5 580	35.4	9 612	61.1	15 750

(a) Source: Supplementary data to the abstract of agricultural statistics of the Republic of South Africa, op. cit.

(b) Light: 10-20 h.p. - since 1965, less than 20 h.p.
Medium: 21-40 h.p.
Heavy: over 40 h.p.

(c) Light: Less than 35 h.p.
Medium: 35-49 h.p.
Heavy: 50 h.p. and more.

It has also been shown that these people are often not able to afford such education as will improve their children's abilities to earn higher incomes in alternative occupations; thus, many of these children are faced with only two alternatives - obtaining relatively low paid jobs in other occupations, or returning to small farms already deteriorating physically and financially. Many school boys who do not make desired progress in their studies, choose the latter alternative.[20] They will, in their turn, not be motivated to use extension services.

Another key problem in South African agricultural management stems from the apathy of many farmers concerning collecting the information needed to improve their farming activities. Van Zyl showed inter alia that in the Upper Orange River Catchment area, approximately 50 per cent of all farmers had no contact with extension services in 1966.[21] Such a condition leads to low managerial aptitudes,[22] and thus to a slower adoption of new technology, which is alarming, particularly in the light that new technology contributed over 50 per cent to higher agricultural productivity in countries such as Australia, Japan and the U.S.A.[23]

The apparent indifference of a large number of farmers with respect to the necessary information is also illustrated by their inertia as far as the keeping of adequate records - both financial and physical - is concerned, and thus their inability to plan their business accordingly. This leads to unplanned action by farmers, also where large amounts of money are involved, such as with the purchase[24] and financing[25] of expensive machinery such as tractors.

It has been illustrated in some areas that farmers with a high managerial aptitude undeniably

20) Cf. Visser, C.J. (1966) Benutting van die melkaantekeningskema in die distrik Burgersdorp. M. Agric. (Inst. Agrar.) thesis, University of Pretoria.

21) Van Zyl, D.P., op. cit.

22) Cf. Kolbé, F.F.H. (1965) Die aanvaarding van verbeterde akkerboupraktyke in die Settlersgrondbewaringsdistrik soos beïnvloed deur sekere sosio-ekonomiese faktore. Departement Landbou-tegniese Dienste, Tegn. Meded. No.34.

Visser, C.J., op. cit.

Van Zyl, D.P. (1965) Enkele kenmerke en eienskappe van suksesvolle huurders op die Vaalhartsbesproeiingskema. D.Sc. (Agric. dissertation, University of Pretoria.

Burger, P.J. (1967) Agricultural progressiveness: a South African concept. D. Agric. (Inst. Agrar.) dissertation, University of Pretoria.

23) Cf. Auer, L. (1967) Discussion: the sources and rates of productivity gains in Japanese Agriculture, as compared to the U.S. experience. J. Farm Econ. 49 : 2443-1451.

Herr, William Mc D. (1966) Technological change and the agriculture of the United States and Australia. J. Farm Econ. 48 : 264-271.

24) Cf. Smith, R.F. (1968) Farmers' machinery purchasing decisions. M.Sc. (Agric.) thesis, University of Natal.

25) Cf. Steyn, F.G. (1968) Die finansieringspatroon in die Suid-Afrikaanse landbou met spesiale verwysing na sekere streke. M.Sc. (Agric.) thesis, University of Pretoria.

showed superior physical and financial results.[26] The result is that over the long run, the less efficient farmers will not be able to enlarge their revenues sufficiently to maintain their living standards vis-a-vis city dwellers; those with a high managerial aptitude will succeed in doing so.

It can rightly be stated that the low level of interest in the necessary knowledge exhibited by so many farmers constitutes an important problem in South African agriculture.

III. THE MARKETS

South African farm products are sold both on domestic and foreign markets; in 1967, for example, exports amounted to 34 per cent of the total gross value of agricultural production. The more rapid increase in domestic production than in consumption will necessitate a larger percentage of exports in the future. This causes South African agriculture to be very sensitive to occurrences on foreign markets. There has not lately been any discernable movement - upwards or downwards - in unit prices of our agricultural exports. There is reason for concern as far as the future is concerned; effective demand is determined by demand and supply conditions in countries financially powerful enough to pay for their imports, and in almost every such country, production of agricultural products - particularly those originating from plants - is outstripping consumption. In Britain, for example, increased domestic agricultural output accounted for over 90 per cent of the increase in availability of food between 1936/38 and 1962/64; in the first mentioned period, Britain produced only 45 per cent of her food herself, compared with 60 per cent in the latter period. In 1935, France was a net importer of 17 per cent of her foodstuffs; by 1961/63 France had become a net exporter of goods to the tune of 15 per cent of domestic consumption.[27]

There are, in addition, a considerable number of countries which increasingly compete with South Africa on international agricultural markets. Agricultural prices on world markets may thus be expected to decline over the long run. There is reason for concern, particularly since South Africa's agricultural exports consists mainly of vegetative and pastoral products. In order to maintain or improve South Africa's competetive position on world markets, the efficiency of South African agricultural production, processing and marketing will have to improve - and rapidly so.

It may be mentioned that red meats form an exception to this rule - in the developed countries, the demand for these products increases faster than supply.[28] Even the U.S.A. is now an important net importer of red meats.[29]

South Africa is also a net importer of red meats. The relatively slower growth in livestock production is thus an unfortunate phenomenon.

As can be seen from Table 10, prices of agricultural products generally rose on domestic markets. Agricultural products as a group experienced price increases at a rate above 2 per cent per annum over a period of 20 years. These price rises were somewhat slower than those of retail and wholesale prices and it may thus be concluded that there was a decline in the purchasing power of farm products. According to Table 11, prices of farming requisites increased at a rate of 2.35 per cent per annum - somewhat slower than prices of farm products excluding pastoral products, but somewhat faster than producer prices including pastoral products. These data do not give any clear indication of a cost-price squeeze in South African agriculture.

A remarkable feature is the faster rate at which prices of two product groups - slaughtering stock and viticultural products - increased over the period, compared to other groups of products. The purchasing power of these products increased, since their prices outstripped retail and wholesale prices. Producer prices of pastoral products did not show a statistically significant trend over the period, and poultry prices increased at an annual rate of only 0.4 per cent. The group of requisites with the sharpest price increases was machinery, which may be regarded as medium term capital goods.

The analysis of price movements once again illustrates the favourable outlook for red meats as compared to the great majority of other farm products.

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26) Cf. Visser, C.J., op. cit.

Kolbé, F.F.H., op cit.

Swanepoel, G.H. (1969). 'n Bedryfsekonomiese ondersoek na sekere boerdery tipes in die Letabadistrik. M.Sc.(Agric.) thesis, University of Pretoria.

Jansen, A.A. (1968) 'n Ekonomiese evaluering van kleinboereenhede in die Letabadistrik. M.Sc. (Agric.) thesis, University of Pretoria.

Van Zyl, D.P., D.Sc. (Agric.) dissertation, op. cit.

27) Robinson, A.E.G. (1969) The desirable level of agriculture in the advanced societies. From: Papi, Ugo and Nunn, Charles (Ed.), Economic problems of agriculture in industrial societies. MacMillan, London, Melbourne and Toronto.

28) Cf. Shefrin, Frank (1966) World agricultural production and trade. Proc. Conf. on Internat. Trade and Canadian Agric. Agric. Econ. Res. Council Canada, Publ. 5. Mouton, Claude (1969). The European common market and the drive towards self-sufficiency in food production. From: Papi and Nunn, op. cit.

29) Van Wyk, S.P. (1967) Enkele ekonomiese aspekte van beesvleisproduksie. Department of Agricultural Economics and Marketing, roneoed report.

TABLE 10 - Rates of change in certain price indices Republic of South Africa, 1947/48 - 1967/68. (1947/48 - 1949/50 = 100)

Items	Intercept a	Regression coefficient b	Standard error of b	Correlation coefficient r	Regression values 1947/48	Regression values 1967/68	Annual rate of change %
Agricultural producer prices							
Vegetables	106.5	2.38***	0.49	0.74***	109	156	1.82
Viticultural products	84.0	5.16***	0.34	0.96***	89	192	3.84
Fruit	123.1	2.62***	0.63	0.69***	126	178	1.74
Total horticulture	113.5	2.97***	0.44	0.84***	116	176	2.06
Summer grains	110.8	1.82***	0.38	0.74***	113	149	1.40
Winter grains	104.2	2.14***	0.24	0.90***	106	149	1.69
Sugar-cane	107.6	3.45***	0.46	0.87***	111	180	2.22
Total field crops	107.1	2.10***	0.30	0.85***	109	151	1.63
Dairy products	101.4	3.06***	0.34	0.90***	104	166	2.31
Pastoral	151.5	-1.20^{NS}	1.49	-0.19^{NS}	138(a)	138(a)	0
Slaughter stock	92.8	8.40***	0.59	0.96***	101	269	4.89
Poultry	110.2	0.46$^{(0.1)}$	0.26	0.37$^{(0.1)}$	111	120	0.40
Total livestock	112.1	3.83***	0.54	0.85***	116	189	2.42
Total agriculture	110.3	2.98***	0.38	0.87***	113	173	2.11
Agriculture, excluding pastoral products	104.3	3.58***	0.34	0.92***	108	180	2.54
Consumer prices (all items) ..	97.2	3.90***	0.14	0.99***	101	179	2.86
Consumer prices (food)	98.1	4.88**	0.25	0.98***	103	201	3.33
Wholesale	106.7	3.81***	0.33	0.94***	110	187	2.62

Source: Supplementary data to the abstract of agricultural statistics of the Republic of South Africa, op. cit.

(a) Due to the absence of a significant trend, only mean data were given here.

TABLE 11 - Rates of change in price indices of certain farming requisites, Republic of South Africa, 1947/48 to 1967/68 (1947/48 - 1949/50 = 100)

Items	Intercept a	Regression coefficient b	Standard error of b	Correlation coefficient r	Regression values 1947/48	Regression values 1967/68	Annual rate of change %
Fertilizers	107.4	1.74***	0.33	0.77***	109	144	1.38
Fuel	133.5	3.08***	0.43	0.85***	117	178	2.12
Stock feeds	103.0	3.22***	0.28	0.93***	106	171	2.37
Packing material	77.4	5.02***	0.56	0.90***	82	183	3.98
Spray materials	105.8	2.07***	0.52	0.68***	108	149	1.62
All short-term inputs (a)	104.2	3.02***	0.24	0.95***	107	168	2.23
Tractors	114.3	3.24***	0.43	0.86***	118	182	2.19
Trucks	114.6	5.06***	0.53	0.91***	120	221	3.06
All machines	111.8	3.96***	0.42	0.91***	116	195	2.61
Material for fixed improvements	105.3	2.86***	0.29	0.91***	108	165	2.12
All requisites (b)	106.6	3.30***	0.29	0.93	110	176	2.35

Source: Supplementary data to the abstract of agricultural statistics of the Republic of South Africa, op. cit.

(a) Excluding labour

The marketing structure of many farm products is changing radically. There are for example, some fresh products - such as peas - which had previously been marketed almost exclusively on fresh produce markets, but have by now found other marketing channels.[30] Some other products are also going through the same process. The reason for this development may be found in the form in which products are nowadays been sold to the ultimate consumer. Twenty years ago, vegetables were mostly sold to the consumer in essentially the same form in which they left the farm. Today, many of these vegetables are sold in a processed form - canned, frozen, etc. In order to organise their activities in an orderly manner, industrialists involved found it advisable to negotiate contracts with farmers, according to which these farmers would sell their products directly to the industrial concern involved at predetermined prices. A process of vertical integration thus entered the agricultural scene; this process gradually moves toward more closed forms. In the case of broiler production, vertical integration has already in many cases reached the stage of industrialists being owners of a large portion of the production side.

The more processed form in which products are now been sold to consumers, inevitably widens the gap between consumer and producer prices. Although this is probably not solely responsible for the difference, it represents a considerable portion of the difference in rates at which producer prices and consumer food prices increased over two decades.

It is well known that the general retail structure in South African has changed considerably over the last two decades; supermarkets (sometimes chains of supermarkets) have largely replaced the traditional retailer. This caused large standardised quantities of groceries (including foodstuffs) to be sold to the consumer public at relatively smaller price margins. This development created a further demand for uniform, standardised products and will logically lead to further vertical integration. Many farmers will also have to adjust their production accordingly.

As a result of developments on international fibre markets, the wool and mohair industries of South Africa are faced with definite marketing and price problems. Some of the most important wool and mohair producing regions in South Africa are also among parts with the most serious soil erosion problems. According to Table 10, pastoral products did not exhibit any long-term price trend. Economic and other researchers will in future have to devote more attention to the problems of these two industries.

30) Cf. Dippenaar, B.J. (1964) The municipal produce market in the economic structure of South Africa. Agrekon. 3 (3): 13-21.

IV. DIRECTIONS OF PRODUCTION

It has already been shown that the physical volume of agricultural production increased at an annual rate or 4.77 per cent over twenty years. A large part of this increase may be ascribed to improve productivity. Groenewald[31] showed that yields per unit of primary resources in South Africa increased significantly in the post-war era; Brand and Tomlinson[32] also mention increases in labour efficiency.

Field crop and horticultural production rose considerably faster than livestock production. (Table 2). As has already been mentioned, this phenomenon is an unfortunate one, considering present and expected market conditions. The more rapid rise in field crop and horticultural production must largely be ascribed to more rapid increases in primary resources (area under field crops and vegetables and bearing trees) than was the case with livestock (numbers of livestock); differences in productivity increases per unit of primary resources were not statistically significant.[33]

There does not appear to be much hope for inputs of primary resources in South African livestock industries to increase rapidly in the foreseeable future; while it is possible to increase livestock numbers by improved grazing practices and the dovetailing of livestock industries into intensive systems, many stock-rearing areas are presently overgrazed to such an extent that livestock numbers will have to be curbed drastically. This process has already been started under the stock reduction scheme.

The increased productivity is, although heartening, not sufficient. For example, Orchard[34] indicated in 1964 that in 1962/63 more plant nutrients were removed from South African soils in the form of harvested grain than was applied in the form of fertilizers. Although this phenomenon cannot be condemned outright as being harmful, it does point at an unfortunate condition which may lead to soil deterioration. It is obviously possible to make further contributions to productivity of field crop production merely by increased fertilization.

It has already been pointed out that the outlook on international markets is not very favourable. Improved productivity is essential in order to improve South Africa's competetive position on these markets. It is also of utmost importance for South Africa's economy. As was shown by Brand[35], the earning of foreign exchange has

31) Groenewald, J.A. (1964) Changes with respect to primary resources in the South African agriculture. Agrekon. 3 (3) : 23-27.

32) Brand, S.S. and Tomlinson, F.R. (1966) Die plek van die landbou in die Suid-Afrikaanse volkshuishouding. S. Afr. J. Econ. 34 : 26-49.

33) Cf. Groenewald, J.A. (1965) Difference in the growth of three sectors of the South African agriculture, op. cit.

34) Orchard, E.R. (1964) Maize exports give food for thought. Fmg. in S. Afr. 40(5): 25, 32, 61.

35) Brand, S.S., op. cit.

been one of the most important contributions of agriculture to South Africa's economic growth. Agriculture will still have to play an important role in this respect, particularly in the light of the expected decline of gold production - one of the pillars of our balance of payments - during the next few decades. South Africa will, in order to maintain her economic progress and standards of living, have to increase merchandise exports from the level of approximately R1 500 million in 1969 to about R11 000 million in the year 2 000. Mineral exports can be expected to rise from R653 million in 1969 to approximately R1 400 million in the year 2 000.[36] This lays a heavy responsibility on the shoulders of secondary industry and also of agriculture. Through higher productivity, agriculture will have to exert a bigger export effort, it will have to supply industry efficiently and reasonably cheaply of raw materials, it will have to be able to supply sufficient amounts of food to the population at reasonable prices and last but not least, it will have to cede labour sources to other economic sectors.

V. THE REVENUE POSITION IN SOUTH AFRICAN AGRICULTURE

Some aspects which necessarily affects the revenue position in South African agriculture have already been noted. These include the following: Production trends, trends in relation to resources (particularly land) and market trends. An analysis of the revenue position in South African agriculture will now be made with the aid of data extracted from reports of the Secretary of Internal Revenue.

Table 12 shows mean frequency distributions of taxable incomes of persons with farming as main source of income for the tax years 1958 to 1960 and also for the 1963 and 1964 tax years. In Table 13, mean, median and modal revenues of persons with agriculture as main source of revenue are compared to those of two other groups of taxpayers, viz. those earning their incomes from salaries and wages (employment) and all taxpayers.

It emerges clearly that the distribution of revenues of people living from agriculture is very skew. Although mean revenues (R1 643 in 1958/60 and R2 492 in 1964/65) compare quite reasonably with those of other groups, it still appears that in 1958/60, revenues of fifty per cent were below R1 004; almost 37 per cent had revenues smaller than R600, and the modal - thus most typical - revenue amounted to only R195. The position had improved by 1964/65, but one half of the farming population still had taxable incomes of less than R1 547 (almost 24 per cent below R600), whilst modal incomes amounted to R601. Although revenues increased fairly rapidly in the agricultural sector, a large portion of the farming population still has very low revenues - more so than in other economic sectors.

Thus agriculture has, notwithstanding the relatively high mean revenue, a serious income problem arising from the skew distribution of incomes. Mention has already been made of the serious implications of the existing rural poverty. It also appears clearly that this problem cannot simply be solved by price policy; the advantages of such a price policy accrue mainly to individuals fairly well off - as is clear in the light that approximately 20 per cent of South Africa's farmers produce about 80 per cent of the total agricultural output.[37]

The problem of rural poverty is more concentrated in some parts of the country than in others. It appears that more such poverty is encountered particularly in extensive grazing areas and certain other areas where highly risky crop production takes place, than in the more stable grain, horticultural and irrigation areas.

A result of this is the deterioration of the whole economic and social structure of large parts of our rural areas, as illustrated by Kotzé with respect to parts of the O.F.S. and Northern Cape.[38] Fortunately, this pattern does not occur in all rural areas - Du Toit, for example, showed that the Eastern Transvaal Lowveld is experiencing good and strong economic growth.[39]

The rural areas which do experience these problems, also experience a decline of the White population. This phenomenon, in its turn, gives rise to social problems - particularly in regard to social services for the remaining population. The income problem in agriculture thus leads to a whole conglomerate of other problems which should be kept in mind by policy formulators.

VI. CERTAIN ORGANISATION ASPECTS RELATED TO SOUTH AFRICAN AGRICULTURE

Agriculture constitutes a large and important sector in the South African economy; it has been shown to have its own problems. A brief review will now be made of a few organisational aspects influencing our agricultural sector and the extent to which the organisational framework is adequate or not.

Agriculture obviously has to rely upon services rendered to it. One very important service is information - in other words, extension.

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36) Gray, Bill (1970) 1876 to ... the end of the rainbow. S. Afr. Fin. Gaz., 17th July, 1970, p.6.

37) Cf. Landman, K.P. (1968) Ontvang die boer die boodskap? Proc. Symp. Agric. Communication - S. Afr. Inst. Agrar. Extn.

38) Kotzé, H.A. (1969) Features of the economic growth and development of rural areas. Agrekon 8(2): 27-39.

39) Du Toit, J.P.F. (1968) Die makro-ekonomiese struktuur van die Oos-Transvaalse Laeveld. M.Sc.(Agric.) thesis, University of Pretoria.

TABLE 12 - Average frequency distributions of taxable incomes of persons with farming as main source of revenue, Republic of South Africa, 1958 to 1960 and 1964 to 1965

Income group	Interval size	1958 - 1960		1964 - 1965	
		Number of persons	Percentage of total	Number of persons	Percentage of total
R	R	1 000	%	1 000	%
Loss	-	12.8	11.8	3.6	4.7
0- 599	600	27.0	25.1	14.2	18.7
600- 999	400	14.0	13.0	9.5	12.5
1 000- 1 199	200	6.0	5.6	4.3	5.6
1 200- 1 599	400	10.3	9.5	7.4	9.8
1 600- 1 999	400	8.0	7.4	6.0	7.9
2 000- 3 799	1 800	-	-	16.6	21.6
2 000- 3 999	2 000	19.0	17.6	-	-
3 800- 5 999	2 200	-	-	7.8	10.2
4 000- 5 999	2 000	5.9	5.4	-	-
6 000- 9 999	4 000	3.3	3.1	4.5	6.0
10 000-13 999	4 000	1.0	0.9	1.3	1.7
14 000-17 999	4 000	0.3	0.3	0.5	0.7
Over 17 999	-	0.3	0.3	0.4	0.6
Total	-	107.9	100	76.1	100

Source: Annual reports of the Secretary of Internal Revenue.

TABLE 13 - Comparison of mean, median and modal revenues of three categories of taxpayers, Republic of South Africa, 1958 to 1960 and 1964 to 1965 (a)

Period	Farming main source	Employment main source	All taxpayers	Farming as percentage of:	
				Employment	Total
	R	R	R	%	%
	(a) Arithmetic mean				
1958-1960	1 643	1 966	2 426	83.6	67.7
1964-1965	2 492	2 219	2 568	112.3	97.0
Annual rate of increase (b)	7.57%	2.20%	1.02%	-	-
	(b) Median				
1958-1960	1 004	1 593	1 883	63.0	53.3
1964-1965	1 547	1 826	2 128	84.7	72.7
Annual rate of increase (b)	7.86%	2.20%	2.22%	-	-
	(c) Mode				
1958-1960	195	742	831	26.3	23.5
1964-1965	601	974	907	61.7	66.3
Annual rate of increase (b)	20.37%	4.95%	1.58%	-	-
	(d) Difference, arithmetic mean minus mode as percentage of arithmetic mean				
1958-1960	88.1%	62.2%	65.7%	-	-
1964-1965	75.9%	56.1%	64.7%	-	-

(a) Source of original data: Annual reports, Secretary of Internal Revenue.

(b) Average 1958-60 to 1964-65, calculated according to compound interest method.

There is a large gap between the availability of technological knowledge and the adoption thereof. Landman[40] divided information which should be useful to farmers into five categories:

(a) Information on basic farming practices;
(b) management information;
(c) information concerning the use of certain means of production such as machinery and implements, stock medicine, feeds, fertilizers, pesticides, etc.;
(d) market information (including prices);
(e) organisational and general information.

Landman concludes that technical and economic information reach farmers slowly; information concerning inputs reach them rapidly, and farmers display a lack of knowledge on market outlook as well as organisational aspects.

It must be mentioned that the large number unusable mechanical equipment found under trees on farms gives rise to questions regarding the quality of the information farmers receive on this aspect; Smith[41], for example, found that purchases of much mechanical equipment are based on exceedingly little planning. The Commission of Enquiry into the Costs and Profit Margins of Agricultural Implements made a similar statement, and also recommended that more should be done - also by the State - to inform farmers of mechanical aspects.[42]

Landman gave some reasons for the failure of information to reach farmers[43]: extension agents often have, in addition to other duties, too little time available for real extension work; the emphasis by extension agents on long-term, rather than short-term aspects; duplication and contradictory information which often tends to be fragmentary, i.e. dealing with only one aspect of a production process; the inability of certain extension agents the keep abreast of new developments; a continuous change of extension agents; a lack of balance between technical and economic extension. In general, co-ordination between the State and the private sector can be improved in this respect. More research on communication should be done, and extension methods should be adjusted as fast as possible to such improved knowledge. It may be rightly stated that much progress has been made in this respect over the last few years; it is, however, as true that much room still exists for improvement.

Another service of great importance to South African agriculture is financing. Total indebtedness of South African agriculture amounted to R655.4 million in 1961.[44]

This amount obviously became larger since as a result of increases in farming activities, price rises and the unfavourable weather conditions of the sixties. It is generally appreciated that medium-term credit constitutes an important bottleneck in the financing pattern in South African agriculture. It has already been mentioned that many farmers use short-term credit and hire-purchase financing (which is very expensive) for the acquisition of medium-term capital items. In the maize triangle, for example, 46 per cent of tractor purchases are financed by hire-purchase credit, although 55 per cent of farmers complain about this credit being expensive.[45] Such a state of affairs is obviously not a healthy one. Farmers can obtain long-term loans at reasonable conditions from the Land Bank and, under certain circumstances, from the Department of Agricultural Credit and Land Tenure.

Financial institutions, particularly commercial banks, also supply a considerable amount of credit for long-term needs. In the maize triangle, the Land Bank and commercial banks have financed 32 per cent and 21 per cent respectively of land purchases; commercial banks, co-operatives and State institutions have respectively supplied 55 per cent, 25 per cent and 12 per cent of the credit for the erection of fixed improvements.[46] Short-term credit is supplied mainly by co-operatives, commercial banks and private companies.

The Land Bank was created specially for purposes of agricultural credit. The extent of its activities can be gauged by loans it extended in 1969: A total number of 3 538 mortgage loans were granted, involving a total amount of R69.3 million (an average of R19 600 per loan) and in addition, 97 charge loans involving R287 000 (averaging R2 950) were granted. The Land Bank, however, granted only 2 188 medium-term loans amounting to R6.7 million (average, R3 056) to farmers. As far as short-term credit is concerned, the Land Bank extended loans of R2 million to sugar-cane growers, fruit and wine producers, citrus producers and wattle producers, whilst cash credit loans to co-operatives - of which most is lent out to farmer members as short-term credit - amounted to R521 million.[47] Thus, the activities of the Land Bank regarding short and long-term credit assume large proportions; a need, however, exists for the Land Bank - preferably by means of an agency system - to make more medium-term credit available to farmers.

The Department of Agricultural Credit and Land Tenure is presently the institution extending by far the most emergency credit. The Department nowadays follows a policy of granting credit

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40) Landman, K.P., op. cit.

41) Smith, R.F., op. cit.

42) Report of the Commission of Enquiry into the Costs and Profit Margins in respect of Agricultural Implements and the Components thereof. Government Printer, Pretoria, RP 10/1962, par. 757, 989.

43) Landman, K.P., op. cit.

44) Agricultural census

45) Cf. Steyn, F.G., op. cit.

46) Ibid.

47) The Board of the Land and Agricultural Bank of South Africa (1969). Annual Report.

only where there are indications that the applicant will be able to place his activities on a profitable basis with the aid of such credit. This is indeed a realistic policy. Nowadays, the Department also grants credit for purposes of farm consolidation. The question may now be posed whether it will not be advisable to make such credit, as granted by the Department, conditional to receivers thereof participating in the record keeping scheme of the Division of Agricultural Production Economics, and also applying Departmental advice regarding farming organisation, soil utilisation, etc.

The marketing of the majority of farm products is now controlled by control boards operating under the Marketing Act. It is of utmost importance that these control boards will keep abreast with the newest marketing trends and technology. Exports of controlled farm products also take place on an organised, planned basis. In certain cases, however, the efficiency of control boards can still be improved substantially. There are, moreover, many farm products - mostly perishable - for which potentially good markets may exist, particularly in Western Europe (due to the seasonal differences between the Northern and the Southern Hemisphere). Exports of such products do take place, but largely sporadically. This branch of our agriculture needs a special organisational structure, not yet in existence, with the aim of informing such producers about European demand for their products, the type of product demanded, types of packaging required, etc. The organisation should also aim at searching new markets for products, examining these markets and utilising these markets by purposeful marketing action and information. The development of new irrigation schemes may in future add to the urgency of this aspect.

Although other organisational aspects of our agriculture definitively warrant attention, time does not permit us to pursue these as well. I regard the points mentioned here as being among the more important ones.

VII. CONCLUSION

It has been pointed out that South African agriculture achieved much over the last few decades; this appears from increased production, improved feeding of the South African population, increased exports and earnings of foreign exchange and generally higher productivity.

There are also some key problems which will be felt more severely in the next decade and which warrant serious attention - expected unfavourable market and price conditions on export markets, a sluggishness of our agriculture in decreasing its labour use while labour is expected to become scarcer and more expensive, the relatively slower rise in livestock than in field crop and horticultural production, and certain organisational aspects.

There are also some key problems which have already existed for a long time, but are still assuming large - in cases increasing - dimensions, such as the income problem in South African agriculture which is accentuated by unstable weather conditions, the relatively slow adoption of new technology, the problem of soil deterioration, uneconomic farm sizes, and land fragmentation.

These problems are fairly narrowly related. The income problem, the problem of uneconomic farm sizes, technological problems, soil erosion problems, etc. dictate that a group of agricultural producers will have to be removed from the land. This problem is not unique to South Africa, but is felt over the entire developed Western World. According to Ojala[48], it is necessary in order to ensure a satisfactory level of living for agricultural producers in the face of modern technology, to remove the surplus human material from agriculture. Robinson[49] states: "Equally it implies that agricultural structure must continuously be adapted to a declining manpower; that sizes of farms need to be adjusted to changing circumstances; that production methods need to be adjusted to higher real wages. But agriculture is one of the most difficult of industries in which to make adjustments."

Artificially increased agricultural prices as well as injudicions credit extension may contribute to a retardation of the needed adjustments. Drastic price declines, on the other hand, will force more farmers into the poorer classes. The statement may, however, be made that over the long run, average and marginal value earnings, and thus revenues, will rise slower in farming than in many other occupations. Thus the problem is, as stated by Renborg[50], to create alternative employment opportunities for the portion of the farming population. According to Thoday[51], ".... otherwise the surplus populations must be unemployed and hence discontented and belligerent".

According to Du Plessis[52], rural poverty and uneconomic farm sizes (and, we may add, soil erosion) are narrowly related, and consolidation of farm units should thus receive high priority. He proposes three policy measures:

1. Granting of pensions to the aged from farms to prevent them from becoming destitute.
2. The preparation as far as possible, of middle-aged people leaving agriculture to enable them to deliver useful service while retaining their self-respect.
3. Training of children for alternative occupations.

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48) Ojala, E.M. (1969) Agriculture in the world of 1975: General picture of trends. From: Papi and Nunn (Ed.), op. cit.

49) Robinson, E.A.G., op. cit.

50) Renborg, Ulf (1969) Tendencies towards concentration and specialisation in agriculture. From: Papi and Nunn (Ed.), op. cit.

51) Thoday, J.M. (1969) The problem. From: Hutchinson, Sir Joseph (Ed.) Population and food supply. Cambridge University Press.

52) Du Plessis, S.J. (1968) Die rol van die landbou in die proses van gemeenskapsontwikkeling. Agrekon 7 (4) : 5-13.

There are, however, certain limiting factors:[53] In many occupations, young people are preferred. Secondly, older people find it difficult to adapt to other occupations; it may thus be unrealistic to place middle-aged or aged people in other occupations.[54] This problem is less serious if the change is not associated with large geographical shifts.[55] Industrial decentralisation is therefore important for South Africa, also in this respect. Other potential barriers are uncertainty about the future and limited or controlled entry to other types of work as dictated, inter alia, by labour unions.[56]

In certain European countries other policy instruments are used in addition to those proposed by Du Plessis. These also warrant close attention in South Africa:[57]

1. Quittance grants and other financial inducements to leave farms.
2. Loans and grants to farmers in order to move from over-populated to thinly-populated areas.
3. Special and cheap credit for purposes of farm consolidation.
4. Compulsory purchases of additional land at easy credit terms for farmers on too small holdings. (Only applied in Italy).
5. Large tax consessions to farmers who consolidate holdings.

Consolidation may be expected to make substantial contributions to the easing of revenue and soil erosion problems. It should be the aim to retain individuals with high managerial aptitudes on the farms. These are the people who will maintain or improve the soil; who will increase productivity rapidly; who will often be leaders in public life. It is clear from the general viewpoint of welfare that the best farm land should be retained for agriculture; it is as clear, particularly in the light of what will be expected from agriculture in the future, that of our best human material - in the sense of managerial aptitude, progressiveness, individuality and ability for leadership - must be retained in agriculture.

Where rural growth potentialities exist - in other industries - this growth potential must be utilised fully. The population is expected to be doubled before the end of the century. If the entire population becomes concentrated in our present urban areas, South Africa will be faced with the same congestion problems as experienced in some of the older developed countries; it is therefore essential, economically as well as sociologically, to have geographic economic diversification. Planning will have to be based on resources; the systematic development of service areas will also have to receive attention. The theoretical framework for this is already in existence.[58]

Everything will depend ultimately on the development of our human capital. In the future our agricultural extension, education facilities, etc. will also have to comply with more strict requirements. Other types of institutions will also have to consider this factor. The challenge faced by our agriculture is formidable indeed; the material to meet this challenge successfully exists - what is needed, is the correct development and use of this material. Our whole agricultural policy, our whole organisational framework must be aimed at this.

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53) Cf. Bishop, C.E. (1969) The mobility of rural manpower. From: Papi and Nunn (Ed.), op. cit.

54) Clawson, Marion (1953) Aging farmers and agricultural policy. J. Farm Econ. 45: 13-30.

55) Bishop, C.E., op. cit.

56) Ibid.

57) Cf. Allan, William (1969) Land tenure and productivity, From: Hutchinson (Ed.), op. cit.

58) Cf. Du Toit, P.J.D. (1969) Service areas and rural development. Agrekon 8 (2) : 40-53.