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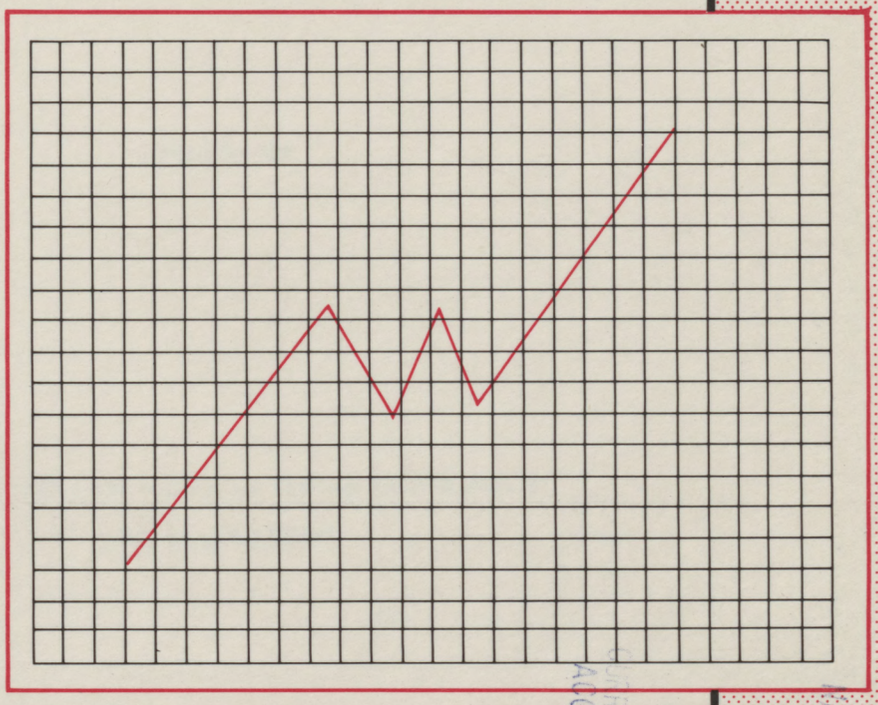

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AGRICULTURE'S CONTRIBUTION TO THE SOUTH AFRICAN ECONOMY

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ABSTRACT

Agriculture's contributions to the food supply, foreign currency earnings, provision of employment, supply of raw materials to other sectors and its role as a market and contributor to the gross domestic product (GDP) will be briefly explained, followed by a discussion of the impact made on the economy as a whole by changes in production and prices in the agricultural sector. A review of selected sectoral multipliers concludes this article.

Agriculture's percentage share in South Africa's economy is relatively small and is constantly dropping as the latter expands and diversifies. Agriculture's most important contribution is obviously that of providing employment. Each sector is differently affected by changes in agricultural production and prices. Another important consideration is that the overall impact of a change in agricultural production, for example as a result of drought, is almost twice as great as its direct impact, therefore confirming the strong forward and backward linkage of the agricultural sector with other sectors in the South African economy. If the multipliers are taken into account, it is clear that the agricultural industry should enjoy a high priority in the allocation of South Africa's relatively scarce available capital, especially where the provision of employment is an important aim.

INTRODUCTION

Natural disasters, changes in pattern of demand, technology and general economic and agricultural policy can influence the country's economy as a whole through its linkages with the agricultural sector. A shock in the agricultural sector produced by changes in these factors will modify agricultural production and its demand for production input. If the shock is big enough it is felt throughout the entire economy. It is therefore important to analyse the contribution made by agriculture to the South African economy.

It has become current practice to consider a country's economy in the light of a number of distinguishable though interrelated aspects (Groenewald 1986). Broadly speaking, this is the approach followed by Brand (1969) whose study is considered to be the most complete to date in the South African context. These aspects are food supply, foreign currency earnings, provision of employment, supply of raw materials to other sectors, agriculture as a market and its contribution to the gross domestic product (GDP).

A brief explanation of these aspects will be followed by a discussion of the impact of production and price changes in the agricultural sector on the economy as a whole. The article concludes with a review of selected sectoral multipliers.

FOOD SUPPLY

Supplying food to the consumer at reasonable prices is one of the most essential roles of agriculture irrespective of its level of development (Brand, 1969; Shepherd & Futrell, 1982). In the first instance this is important in the less developed areas where a high percentage of workers' total earnings is spent on food. These areas also show a relatively high income elasticity in demand for food. In the more developed parts of the world, food accounts for a comparatively smaller part of consumer spending and the income elasticity of demand for food is low. However, in these societies there is a demand for the more "refined" types of food, resulting in the fact that total food production per capita has to increase constantly as living standards rise, according to the Law of Engel (Schiffman & Kanuk, 1978). Power & Holenstein (1976) have, for example, shown that grain consumption per capita is five times greater in the USA and Canada than in the world's poorer countries because in these two countries approximately 92 per cent of the grain is used to feed cattle in order to supply consumers with their preferred foodstuffs - meat, milk, eggs, cheese, butter.

It is clearly in any country's own interests to maintain a competitive agricultural sector able to keep pace with increasing internal demand. In view of the current situation, this aspect has considerable strategic importance, making it possible to frustrate attempts to paralyse the country by means of food boycotts. If, in addition, the country can produce sufficient food to export, its strategic position is strengthened even further.

Agricultural production in the RSA increased at a rate of 3,1 per cent annually between 1955 and 1986 while the population increased at a rate of 2,8 per cent. This implies that the South African population is potentially capable of raising its standards of nutrition or that, at least, its requirements in food can be met. The agricultural sector supplies food to South African consumers amounting to approximately 23 per cent of their disposable income (Central Statistical Service, 1986): the sixth cheapest food supplier amongst the industrialised nations (Shepherd & Futrell, 1982).

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The importance of food in the South African domestic economy is further emphasised in a study by Döckel & Groenewald (1970) which found that the income elasticity of demand for food is 0,60. A recent analysis by Conradie (1987) confirms these findings which imply that a high percentage of any increase in income is spent on food.

AGRICULTURE AS EARNER OF FOREIGN CURRENCY

A country's exports can play one of three possible roles in economic development, i.e. a leading, an equilibrating or a retarding role (Lindert & Kindleberger, 1982). The most important factor determining whether exports can play a leading role is the existence or lack of local social and economic systems able to supply the necessary production factors and capable of making use of opportunities for expansion (Brand, 1969). It further depends on the nature of the input used by the export sector, the size of the resulting infrastructure and the degree to which it promotes technological changes in supply industries, an aspect closely related to backward linkage (Kindleberger, 1962). In order to be regarded as a leading sector, the export sector also has to expand rapidly (Groenewald, 1986). However, it can still play an important, positive and equilibrating, if not a leading role, by acting as counterpoise where the draining of foreign currency through other sectors is a cardinal consideration. Thus capital goods and intermediate inputs may be imported. A retarding sector is one which causes the loss of foreign currency and thus a delay in the country's ability to import necessary goods and services.

The value of South Africa's agricultural exports is usually a multiple of the country's imports of agricultural products. From 1975 to 1984 (a period of ten years) the RSA imported agricultural products to the value of R378,1 million per year (1984 prices) compared to average export earnings of R2 928,1 million per year (1984 prices) (*Abstract of Agricultural Statistics, 1986*).

Statistics on the agricultural sector's imports of production means (fuel, chemicals, machinery, etc.) are not readily available but it is generally accepted that they are much smaller than those for agricultural exports (Brand, 1969; Groenewald, 1986; Department of Trade and Industry, 1986).

If trends in exports as a whole are taken into account, one reaches the conclusion, like Brand (1969), that exports have not been a leading factor in South Africa's economic growth (or at least not since 1930) but that they have played an essential, equilibrating role in which agriculture's contribution was not negligible.

PROVISION OF EMPLOYMENT

Table 1 shows statistics on the provision of employment in agriculture in South Africa from 1951. In spite of the decreasing numbers of employees taken on in agriculture, it remains an important field of employment especially amongst Coloureds and Blacks. Increasing substitution of capital for labour since 1970, especially in the summer rain sowing areas, reduces the role of agriculture as employer (Van Zyl, Fényes & Vink, 1987). The composition (population group) of the work force in the agricultural sector also shows considerable geographic differences (Antrobus, 1970).

TABLE 1 - Economically active population employed in agriculture and forestry, 1951-1985

Year of census	Total	Whites	Coloureds	Asians	Blacks
			Numbers (1 000)		
1951	1 509	145	98	13	1 253
1960	1 687	118	120	11	1 438
1970	2 482	98	117	7	2 260
1980	1 306	102	151	8	1 045
1985	1 180	89	178	6	908
			Percentage of total economically active population		
1951	32,9	14,7	24,3	13,8	40,3
1960	29,5	10,3	21,7	8,7	37,0
1970	30,6	6,5	16,3	3,8	39,6
1980	15,0	5,3	16,2	3,1	18,7
1985	13,6	4,5	15,9	2,0	17,1

Source: Adapted from *South African Statistics* (Central Statistical Service, 1986: 7-5)

The literature on economic development has long emphasised agriculture's ability to supply labour to other developing sectors thereby accelerating the pace of their development and at the same time creating a market for agricultural products. In the first place, this is thought to occur partly through efforts to attract surplus labour, which possibly already exists in rural areas, to work in non-agricultural sectors. Secondly, it is also said that so-called disguised unemployment is widespread in the rural regions of less developed areas (Leibenstein, 1957; Viner, 1957; Nurkse, 1957; Lewis, 1954; 1955). Although other research may cast doubt on this statement, (Kao, Ansell & Eicher, 1954; Schultz, 1955; 1956; 1964) it is a good description of conditions in some parts of South Africa's self-governing territories. Thirdly, by increasing its labour efficiency, agriculture can nevertheless make labour available for employment in other sectors even where there is no disguised unemployment. From a comparison of the physical volume of agricultural production in South Africa it appears that labour productivity in agriculture increased by 84 per cent during the period 1970-1985, an annual average of approximately 5,2 per cent (Van Zyl *et al.*, 1987), with the probable consequence that workers were freed for use in other sectors.

In the opinion of Natrass (1977), there is no doubt that the modern agricultural sector in South Africa is an important source of labour for the other sectors. According to her calculations, of the work force that was active in economic sectors outside that of agriculture in 1970, the following percentages originally came from the agricultural sector: Whites: 24 per cent, Coloureds: 33 per cent, Asians: 41 per cent and Blacks: 20 per cent.

Because of the more atomistic structure of the agricultural sector (Groenewald, 1986), individual farmers are not usually in a position to exercise any significant influence on the prices of their products

by modifying output, as is the case in many other sectors, with the result that the provision of employment during periods of recession in the agricultural sector appears to be more stable than in most other sectors. It is a common phenomenon in agriculture that during recessions farmers continue trying to produce large quantities in the hope of reducing the effect of any losses caused by falling production prices (Tweeten, 1986). The result is that employment in the agricultural sector is stable even during periods of recession.

AGRICULTURE AS SUPPLIER OF RAW MATERIALS

By supplying raw materials to secondary sectors (especially industry), agriculture contributes to their development as well as to that of the tertiary sectors which are necessarily involved in this development. During the period 1974-1986 the producers' share of the consumer value of a representative food basket varied from 48 to 56 per cent (*Abstract*, 1987). This means that between 52 and 44 per cent of the consumer rand was spent on services and processing intervening between the producer and the consumer.

According to the S.A.A.U. (1978), a large number of factories in South Africa are dependent on agriculture for raw materials. It is estimated that in 1976 these factories supplied approximately 27 per cent of the total production by industry and approximately 28 per cent of the total employment (381 000 job opportunities).

The outputs or forward linkages of the agricultural sector (1975-1985) are shown in Table 2, according to which the total intermediate turnover of the agricultural sector shows a tendency to rise. As Brand (1969) has indicated, the proportion of this sort of contribution will probably decline as time passes compared with agriculture's role as market for the suppliers of intermediate inputs. However, it does seem to be true to say that the role of agriculture as supplier of raw materials has great importance at this stage for South Africa.

TABLE 2 - Forward linkages of the agricultural sector, 1975-1985 (constant 1985 producer prices)

Sector	1985	1981	1978	1975
		R million		
Agriculture and forestry	1 707	2 005	702	653
Meat slaughtering and processing	2 491	2 472	2 189	1 931
Manufacture of dairy products	252	248	198	257
Preserving fruit and vegetables	397	430	205	152
Manufacture of animal and vegetable oils	138	217	264	124
Grain mill products	1 600	1 595	1 477	1 534
Bakery products	14	12	10	10
Sugar factories and refineries	683	598	653	565
Sweet making	30	31	51	35
Coffee, chicory and tea	153	119	171	61
Malted drinks and malt	129	182	54	53
Soft drinks	56	25	22	85
Manufacture of tobacco products	203	247	147	114
Textiles, clothing and leather	231	134	301	178
Ropework and yarns	3	6	7	10
Tanning and dressing of leather	16	17	37	27
Wood, furniture and wood products	123	142	122	123
Pulp	113	88	76	103
Rubber	49	89	86	51
Manufactured cattle feed	32	43	29	38
Winemaking	206	207	213	212
Pharmaceutical	1	1	1	1
Mines	214	193	110	142
Total intermediate turnover	8 841	9 109	7 125	6 459
Private consumption spending	2 225	2 238	1 984	2 132
Government consumption spending	55	45	42	32
Investment	70	86	73	74
Inventory changes	401	566	249	158
Exports	1 125	1 707	1 790	1 642
Imports	-436	-350	-416	-352
Total turnover	**12 281**	**13 401**	**10 847**	**10 145**

Source: Unpublished data (Directorate of Agricultural Economic Trends, 1975; 1978; 1981; 1985)

AGRICULTURE AS A MARKET

Agriculture is a market for products from other sectors because consumer goods are bought by those who make a living from agriculture, and it is a market for agricultural inputs. Thus the data in Table 3 show that if gross capital formation in fixed improvements and machinery is accepted as representing purchases from other sectors, the collective expenditure by South African agriculture must have amounted to approximately R4 157,8 million in 1986.

TABLE 3 - Purchases by agriculture from other sectors, 1986

Purchases and gross capital formation	R million
Purchases of intermediate inputs	
Packaging material	148,6
Fuel	813,1
Fertilisers	742,3
Stock Feed	986,5
Dips and sprays	514,8
Gross capital formation	
Fixed improvements	316,0
Tractors and machinery	636,5

Source: Abstract of Agricultural Statistics (1987)

Table 3 does not, however, provide a complete picture of agriculture's purchases from other sectors and excludes services, for example. The Commission of Enquiry into Agriculture (1972) has also shown that the agricultural population probably has an important effect on the retail and wholesale trades. It has been estimated that in 1960 there were more than 18 000 wholesale and retail businesses serving country areas, and that their continued existence was largely dependent on agriculture or institutions serving agriculture. These businesses provided employment for more than 100 000 people, accounting for 34 per cent of total employment opportunities provided by this type of enterprise.

The calculations of the S.A.A.U. (1978) show that in 1976 agriculture purchased approximately 10 per cent of the gross production value of the

industrial sector, resulting in employment opportunities for approximately 52 000 workers, about 7,1 per cent of the total number of jobs provided by industry.

The inputs or backward linkages of the agricultural sector (1975-1985) are given in Tabel 4 at basic values and constant 1985 prices.

TABLE 4 - Backward linkages of the agricultural sector, 1975-1985 (basic values at constant 1985 prices)

Sector	1985	1981	1978	1975
		R million		
Agriculture and forestry	823	1 009	714	783
Mining	43	73	57	52
Processing of cereals and stock feed	797	1 030	833	742
Clothing, spinning, weaving and knitting	45	65	59	76
Wood and wood products	26	34	36	40
Pulp, paper en paper containers	40	58	57	76
Printing and publishing	7	6	6	8
Fertilisers and pesticides	666	1 050	782	1 079
Chemical and petroleum products	508	568	310	285
Medicinal and pharmaceutical products	63	80	35	35
Paint and other chemical products	10	11	12	10
Rubber products	29	41	35	31
Plastic and mineral products	21	27	30	29
Iron and steel products	100	107	128	98
Agricultural machinery and implements	119	166	175	165
Motor vehicle spares	92	130	72	68
Other transport equipment	14	16	16	16
Electricity, gas and water	76	76	69	51
Construction	28	29	51	42
Wholesale, retail and vehicle trades	462	620	601	581
Transport and storage	299	394	276	280
Other services	67	71	70	69
Other inputs	47	52	54	39
Total intermediate inputs	4 382	5 713	4 478	4 655
Remuneration of employees	1 448	1 574	1 691	1 635
Gross trading surplus	4 966	6 581	5 726	6 430
Net indirect taxation	36	188	152	67
Total inputs	**10 854**	**14 082**	**12 075**	**12 818**

Source: Input-output tables (Central Statistical Service, 1975; 1978; 1981; 1985)

Table 4 clearly shows that the continuing drought since 1982 has had a negative effect on the agricultural sector's demand for inputs. The sectors supplying fertilisers and pesticides, and agricultural machinery and equipment, as well as the wholesale and retail trades and the motor trade have been negatively affected.

Even though this backward linkage may not play a large role in South Africa's secondary and tertiary sectors as a whole, its influence must be significant especially when possible multiplier effects are borne in mind. It also has an indirect effect on the provision of employment by the above sectors.

AGRICULTURE'S CONTRIBUTION TO THE GROSS DOMESTIC PRODUCT (GDP)

South Africa's GDP increased from R300 million in 1911 to R987 million in 1940 at ruling prices (factor costs). By 1950 it amounted to R2 549 million, in 1960 it was R4 983 million and in 1970 R12 037 million, subsequently rising sharply to R109 604 million in 1985, owing in part to inflation (*Abstract of Agricultural Statistics*, 1987). This rise was accompanied by a considerable degree of diversification in the economy.

As is to be expected in a country with an increasingly diversified economy and a dynamic agricultural sector which promotes development in other sectors by forward and backward linkages, the contribution of this production branch has declined in percentage terms over the years although production in absolute figures is increasing sharply. While agriculture's percentage contribution was as high as 21 per cent in 1911, it had dropped to 13 per cent in 1940. By 1970 it was 8 per cent and by 1985 it had dropped right down to 5 per cent. The absolute figures were, respectively, R63 million, R125 million, R973 million and R5 844 million. However, the relatively small contribution made by agriculture to the country's GDP tends to conceal the sector's true contribution in terms of factors such as food supply, exports and employment opportunities, which were discussed above.

IMPACT OF CHANGE IN THE AGRICULTURAL SECTOR ON THE ECONOMY AS A WHOLE

Introduction

Natural disasters (drought, hail, cold, etc.), changes in demand patterns, technology and general economic and agricultural policy influence the agricultural sector and therefore also the country's economy as a whole through its linkages with this sector.

The aim of this section is to quantify the impact of possible changes in the agricultural sector on the economy as a whole. The analysis can be divided into three parts: (i) An examination of changes in the agricultural sector's production, (ii) an examination of the consequences of agricultural price changes for the economy as a whole as well as for various individual sectors within the economy, followed by (iii) a discussion of sectoral multipliers.

Analysis method

From the above discussion of the linkages between the various production processes through their inputs and outputs it is clear that production cannot take place in isolation. Another important aspect of the technological connection between the various industries is that they are all indirectly linked with each other, either through forward or backward linkage. Each sector is thus somehow linked with every other

industry.

Complementarity of production, then, is more apparent on a broad national level than in the case of a few individual industries where there is usually some competition.

The overall interconnection can best be illustrated by the input-output table, a particularly informative instrument of economic description and analysis (Leontief, 1936; Lombard & Stadler, 1978). The introduction of the input-output table by Leontief (1936) was an important breakthrough in an effort to create an analytical instrument which not only indicates the technical relationships of input and production factors, but also the interdependence of various sectors in the national economy (Yan, 1969). The model thus provides a detailed picture of a country's economic structure and may also be used to quantify important economic relationships in such a manner that it is reconcilable with macro-analysis by means of economic models.

Since input-output analyses were first used in drafting South Africa's Economic Development Programme, which was also the first attempt in this country to use the input-output table for analysis, several research projects using these analyses have been launched. Researchers using this instrument include Du Plessis (1965), Scheepers (1969), Du Plessis (1976), Mullins (1977) and Mullins & Scheepers (1980).

In the present study, the input-output table is used to quantify the impact of production and price changes in the agricultural sector on the rest of the economy. The formal mathematical form of the table and a certain number of its applications were fully explained by Yan (1969) and Mullins & Scheepers (1980) and will therefore not be further discussed. However, certain assumptions and limitations of the model should be noted as results ought to be interpreted within this framework.

Limitations

The study focuses on linkages based on the input-output ratios in the national accounts for 1975, 1978, 1981 and 1985, published by the Central Statistical Service (1975, 1978, 1981, 1985) in input-output tables.

The ratios estimated in this way are subject to various limitations. In the first instance, it is accepted that the relationships are linear (Yan, 1969). Although this is probably not quite correct, Schilderinck (1977) wrote in this regard that "a rather sober linear model, in which the parameters are estimated by means of a simple method often shows a greater sense of reality than a model with complicated non-linear equations". Secondly, the impact of change is only measured by comparing situations where there have been shocks or changes to situations where these have not occurred. Moreover, comparisons only reflect them after the farming sector and the economy have had a few years to adapt. Thirdly, certain essential assumptions in input-output analysis may negatively influence the accuracy of results. However, these errors tend to compensate for each other and the resulting estimates are as accurate as our current knowledge and analytical techniques allow (Harrington *et al.*, 1986: 2). Three assumptions are particularly important in this regard:

- The analysis takes for granted that all industries and sectors use the same production methods and input ratios in the production process before and after the change or the economic shock. In fact, input composition may be modified in reaction to change.
- The analysis does not take into account the possible re-use of factors (land, capital, labour, inputs) that have been freed by a change in the level of economic activities. The transfer of factors between sectors is another way in which the economy can react to change.
- The analysis assumes that the prices of all goods and services remain constant in relation to each other. Change of price ratios is a third way in which the economy accommodates change.

In spite of these assumptions, the input-output method of analysis is reasonably accurate over a period of three to four years (Harrington *et al.*, 1986). The study uses input-output tables for 1975, 1978, 1981 and 1985, on the one hand because of the considerations mentioned above and on the other in order largely to eliminate the effect of the drought which South Africa has been experiencing since 1982.

Results

Changes in production

In agriculture, a variety of factors, including technological progress and natural disasters such as drought, can produce changes in production. Thus for example the annual indices of the volume of agricultural production since 1980 (taking 1975 as a base) have been as follows: 1980 = 117; 1981 = 145; 1982 = 108; 1983 = 75; 1984 = 86 and 1985 = 108 (*Abstract,* 1987). These figures show that factors such as drought have an important influence on the agricultural sector's total production. In order to determine the effect of such changes in agricultural production on the economy as a whole as well as on its various subdivisions, the output of the agricultural sector has been changed by 10 per cent in the various input-output tables. Change is simulated throughout the entire economic system (based on the production structure of that specific year) in accordance with this 10 per cent change. The results are given in Table 5.

It is clear from Table 5 that the impact (both direct and overall) of a change in production in the agricultural sector decreases in percentage terms with the passage of time and the diversification of the economy, as predicted by Brand (1969). Although the percentage impact on the economy produced by a 10 per cent change in agricultural production at first sight appears to be very small, such a change is comparatively significant in absolute values when one considers that South Africa's total GDP for 1985 amounted to R109 604 million.

TABLE 5 - Impact (direct and overall) of a 10 per cent change in production in the agricultural sector on the production of the economy as a whole and on selected individual sectors according to the production structures for the years 1975; 1978; 1981 and 1985

Sector	1985		1981		1978		1975	
	Direct impact	Total impact	Direct impact	Total impact	Direct impact	Total impact	Direct impact	Total impact
	%		%		%		%	
Agriculture and forestry	10,00	11,29	10,00	11,28	10,00	11,12	10,00	11,09
Mining (excluding gold and coal)	-	0,77	-	0,99	-	0,83	-	1,10
Processing of grain	-	2,67	-	3,15	-	2,87	-	2,93
Tobacco processing	-	0,17	-	0,74	-	0,21	-	0,23
Paper containers	-	0,55	-	0,67	-	0,69	-	0,78
Fertilisers and insecticides	-	5,76	-	5,55	-	5,24	-	7,17
Chemical and petroleum products	-	1,00	-	1,22	-	0,94	-	1,23
Medicinal preparations	-	1,47	-	2,17	-	1,26	-	1,28
Rubber products	-	0,56	-	0,66	-	0,60	-	0,60
Agricultural machinery	-	4,20	-	3,35	-	6,25	-	5,37
Transport equipment	-	0,78	-	0,99	-	0,66	-	0,75
Water supply	-	0,62	-	0,65	-	0,47	-	0,52
Wholesale, retail and motor vehicle trades	-	0,69	-	0,79	-	0,88	-	0,85
Transport and storage	-	0,64	-	0,73	-	0,58	-	0,65
Other sectors	-	< 0,46	-	< 0,45	-	< 0,52	-	< 0,56
Total economy	**0,64**	**1,23**	**0,69**	**1,38**	**0,75**	**1,39**	**0,80**	**1,46**

The result of using the linear model is that the percentages of change, given in Table 6, would increase with higher agricultural production (as a result of improved technology or above-average rainfall for example), and decline if agricultural production were to fall (as a result of a drought for example). Similarly, the impact on all activities as well as on the economy as a whole would double if the value of the change in agricultural production were to double (to 20 per cent). Thus for example it can be calculated that the impact of the 1983 drought (with a drop in agricultural production of 48,3 per cent compared with that of 1981) would have influenced the economy as a whole, as represented by the 1981 production structure, in the following way:

Direct drop in total production: 3,33 per cent

Total drop in total production: 6,67 per cent

Furthermore, it is important to note that different sectors are influenced in different ways by changes in agricultural production, with the fertiliser and pesticide industries showing the greatest changes.

TABLE 6 - Impact of a 10 per cent price change in the agricultural sector on prices in selected individual sectors as well as consumer and production prices

Sector	1985			1981			1978			1975	
	Impact[1]	Sector[2]	Households[3]	Impact[1]	Sector[2]	Households[3]	Impact[1]	Sector[2]	Households[3]	Impact[1]	Sector[2]
		%			%			%			%
Agriculture and forestry	10,00	11,28	11,85	10,00	11,27	12,14	10,00	11,11	11,98	10,00	11,09
Processing of meat, dairy products and fish	-	6,46	7,30	-	7,23	8,33	-	7,18	8,28	-	7,23
Processing of cereals, sugar and cattle feed	-	5,41	6,20	-	5,76	6,81	-	5,85	6,84	-	6,12
Processing of other types of food	-	2,97	4,04	-	3,39	4,72	-	3,97	5,35	-	3,93
Liquor industry	-	1,42	2,49	-	2,02	3,48	-	2,42	3,85	-	2,47
Tobacco industry	-	1,70	2,24	-	4,00	5,11	-	4,17	5,28	-	4,94
Wool-washing and cotton-ginning	-	2,75	3,78	-	2,64	3,88	-	4,30	5,45	-	4,30
Leather and leather products	-	2,02	2,74	-	3,19	4,63	-	1,70	3,23	-	2,05
Wood and wood products	-	1,71	2,80	-	2,25	3,66	-	1,79	3,36	-	1,88
Pulp and paper	-	1,50	2,67	-	1,63	3,13	-	2,02	3,33	-	1,83
Other sectors	-	<0,75	<2,03	-	<1,03	<2,69	-	<0,95	<2,30	-	<0,84
Consumer price	0,48	1,41	2,52	0,2	1,49	2,80	0,38	1,38	2,66	0,38	1,40
Production price	0,13	1,05	2,10	0,1	1,27	2,62	0,11	1,33	2,66	0,11	1,34

[1]Impact = Origin of price change

[2]Sector = Price after all sectors have recouped the change

[3]Household = Same as sector, but including households

Also of significance is the fact that the overall impact on the economy of such a change is almost twice as great as the direct impact, thereby confirming the existence of strong forward and backward linkages between the agricultural sector and the other sectors of the South African economy.

Price changes

As in the case of production changes, the consequences of a change in agricultural prices on those in other economic sectors are determined by making a 10 per cent change in the former in the input-output tables and then simulating this throughout the economic system. In this way the effect of price increases in agricultural products can be determined not only on inflation but also on prices in the various economic sectors considered individually. The results, subject to the same conditions and assumptions as above, are indicated in Table 6.

From Table 6 it is clear that the meat, dairy products and fish processing sectors are influenced more than any other by changes in agricultural prices. It is also apparent that price changes within the various sectors do not differ significantly from each other over a period of years ($p < 0,01$). In interpreting the data one should keep in mind that some time elapses before the various sectors have recouped a change and that it takes even longer for households to do so. Furthermore it is interesting to note that if the original price change in the agricultural sector is 10 per cent, it rises as each subsequent sector, including private households, reacts to it. The reason for this is that agriculture's input prices change as a result of other sectors' reactions to price changes in agriculture, and this change is recovered in turn.

Sectoral multipliers

The impact of possible changes in the production levels of the various economic sectors resulting from changes in capital, employment, income and final demand can be calculated in the form of sectoral multipliers. Thus one can evaluate the consequences of policies influencing the levels of these factors.

The formal mathematical form of the input-output table also serves as point of departure for the calculation of sectoral multipliers, mainly based on the pioneering work done by Moore & Petersen (1955), and later contributions by Hirsch (1959) and Miernyk (1967). In South Africa, sectoral multipliers have been worked out by Mullins & Scheepers (1980). The methodology followed in this study for calculating sectoral multipliers is analogous with and based on that described by Mullins & Scheepers (1980).

Table 7 indicates selected sectoral multipliers calculated according to the 1978, 1981 and 1985 production structures of the South African economy.

TABLE 7 - Selected sectoral multipliers (direct and indirect effect) according to the production structures for the years 1978, 1981 and 1985

Year	Sector	△ Capital / △ Production (per unit)	△ Employment / △ Production (labourers per R mill)	△ Income / △ Production (per unit)	△ Final demand / △ Production (per unit)	△ Income / △ Capital (per unit)	△ Employment / △ Capital (labourers per R mill)
1978	Agriculture	2,4	244,1	0,90	1,6	0,38	101,7
	Goldmining	1,7	189,6	0,94	2,3	0,55	111,5
	Fertiliser and pesticide industry	2,1	133,1	0,70	2,3	0,33	63,4
	Agricultural machinery	1,3	127,9	0,86	1,8	0,66	98,5
	Electricity, steam and gas	5,1	94,2	0,94	1,7	0,18	18,5
	Construction	1,7	263,1	0,87	2,3	0,51	154,8
	Trade	1,7	140,1	0,93	1,5	0,55	82,4
	Transport	4,0	122,7	0,89	1,5	0,22	30,7
	Services	2,3	27,7	0,97	1,3	0,42	12,0
1981	Agriculture	2,1	136,8	0,87	1,6	0,41	65,1
	Goldmining	1,5	88,3	0,94	1,3	0,63	58,9
	Fertiliser and pesticide industry	1,8	64,6	0,58	2,1	0,32	35,9
	Agricultural machinery	1,0	58,8	0,74	1,6	0,74	58,8
	Electricity, steam and gas	5,6	56,1	0,93	1,7	0,17	10,0
	Construction	1,5	140,6	0,83	2,3	0,55	93,7
	Trade	1,6	78,2	0,93	1,6	0,58	48,9
	Transport	3,8	73,7	0,88	1,5	0,23	19,4
	Services	2,3	16,3	0,96	1,3	0,42	7,1
1985	Agriculture	2,8	100,9	0,88	1,6	0,31	36,0
	Goldmining	1,8	51,1	0,95	1,3	0,53	28,4
	Fertiliser and pesticide industry	2,2	43,2	0,76	2,2	0,35	19,6
	Agricultural machinery	1,3	43,9	0,86	1,8	0,66	33,8
	Electricity, steam and gas	6,5	29,2	0,94	1,6	0,14	4,5
	Construction	1,6	82,8	0,88	2,2	0,55	51,8
	Trade	1,7	46,5	0,94	1,5	0,55	27,4
	Transport	4,4	45,2	0,90	1,5	0,20	10,3
	Services	2,2	6,4	0,98	1,2	0,45	2,9

Amongst other things, the table shows how an increase in capital and employment in the various economic sectors leads to increased production and income. These multipliers reflect the overall effects, direct and indirect, produced by forward and backward linkage in the economy. The multipliers, having been derived from the input-output table, are subject to the same limitations and assumptions as the latter. According to Mullins & Scheepers (1980), this means that the sectoral multipliers, as indicated here, underrate the real effect on the economy in terms of increased production and capacity.

Table 7 indicates that, according to the 1985 production structure, agriculture has the highest employment/production multiplier of the selected sectors while the income/production multiplier is the second lowest. This suggests that when there is a general increase in production, the associated increase in agricultural production will create the greatest number of job opportunities throughout the economy, but that the accompanying rise in income will be comparatively low.

At the moment it is generally accepted that provision of employment should be given a high priority in South Africa's development policy (Brand, 1985; Truu, 1986). In view of the country's shortage of capital (De Kock, 1986; Stals, 1987), it also means that the importance of capital's marginal contribution to the provision of employment and income should be recognised. The relevant multipliers (income/capital and employment/capital) are given in Table 7, from which it can be deduced that, with the exception of only building construction, agriculture created the greatest number of job opportunities in 1981 and 1985 per unit increase in capital. The income earning potential per unit increase in capital was however comparatively low, in contrast with the findings of Mullins & Scheepers (1980) for 1975. It would therefore appear that agriculture's income earning potential per unit increase in capital has been somewhat reduced since 1975, perhaps partially as a result of the drought and inflation in input prices (Van Zyl, Van der Vyver & Groenewald, 1986).

Nevertheless, in view of the shortage of capital in South Africa and, especially, the high priority that the economic development policy should give to the provision of employment, it seems that the agricultural sector will continue to be expected to make an important contribution to the provision of employment in the foreseeable future.

CONCLUSION

The percentage share of the agricultural industry in the South African economy is relatively small and continues to decline as the economy grows and becomes more diversified. The most important role played by agriculture is clearly that of employer.

The various sectors are affected in different ways by changes in agricultural production and prices. Another important consideration is that the overall impact of a change in agricultural production, for example as a result of drought, is nearly twice as great as the direct impact. This confirms the strong forward and backward linkage of the agricultural sector with other sectors in South Africa's economy. Thus for example it has been calculated that the negative effects on the total GDP of the 1983 drought were as follows: Direct = 3,33 per cent; Overall (direct and indirect) = 6,67 per cent. It seems that the overall impact on consumer prices in reaction to changes in agricultural prices eventually amounts to three times the direct impact.

If the multipliers are taken into account it seems that agriculture should be assigned a high priority in the distribution of the RSA's relatively scarce available capital,especially where the provision of employment is an important objective.

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