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The development of South African agriculture under apartheid policy

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The development of a large-scale commercial agricultural sector in South Africa was promoted by the state mainly through subsidised capital and distortions in the labour market. The separation of the agricultural and industrial labour markets by state intervention guaranteed a surplus of agricultural labourers. In general labour competed with subsidised capital, with the result that wages for agricultural labour were very low. Investment in commercial agriculture was extensively subsidised and the effective real interest rate was negative throughout most of the period 1950-1980. The political influence of white farmers via the South African Agricultural Union led to a agricultural policy that favoured large-scale agriculture.

Household income in subsistence agriculture is determined by migrant labour. While being dependant on the life cycle of a household, the opportunity costs of agricultural labour differ for each of the household members, but as a rule they are significantly higher than the marginal productivity of subsistence production, which is often almost zero because of the low prices of subsistence foods. In many cases it is more economical for the household to obtain its foodstuffs on the market than produce it themselves.

Scale effects in commercial agriculture are only recorded to a slight extent. In many cases there is a negative correlation between farm size and efficiency in commercial agriculture. Smaller enterprises are generally more labour intensive and their factor productivity is higher, especially when the public costs of the interventionist policy are taken into account.

Keywords: commercial agriculture, subsistence agriculture, household theory, efficiency, migration labour, state intervention

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Between 1700 and 1910 an agricultural sector developed in South Africa that was characterised by family farming run by black as well as white farmers. Black agriculture existed partly on the basis of leasing or crop sharing. By the turn of the 19th century black farmers had introduced new techniques which made farming more efficient. They were able to compete successfully with white farmers.

After the discovery of diamond in Kimberley in the 1870s and the Witwatersrand gold rush of 1886 the demand for agricultural products increased and the agricultural sector gained in importance as a provider of food as well as a source of labour for the mining industry. After the formation of the Union of South Africa in 1910, white farmers were progressively favoured by the State, while Africans were disadvantaged and farming later became impossible for them. In the years following this white farming developed to become a large-scale production sector dependent on hired labour, while black farming regressed gradually to become a deficient subsistence enterprise.

The commercial farming sector

The South African commercial agricultural sector is characterised by large-scale production. The horticulture sub-sector is particularly labour intensive, while cereal and stock farming are characterised as a large-scale, labour-extensive farm industry. In general commercial agriculture is highly capitalised and dependent on hired labour.

The demand for hired labour in South Africa is several times higher than in the family farming enterprises of industrialised countries. In the absence of an oversupply of labour, this should mean that wages are relatively high because of limited local availability, and that there is a drastic increase in wages during seasonal periods of high demand. However, this would also necessarily mean that the wage and transaction costs of large-scale agriculture are high, and competitiveness in relation to smaller family enterprises would no longer be a given. State and farmers together, however, ensured that the wage level remained low and that the influence and the rights of farm labourers decreased over time (MARCUS 1989). The South African Agricultural Union (SAAU) was a prime instrument in these efforts.

In order to keep wages low, agriculture and the mining sector were separated from the rest of the labour market by restricting migration of

potential labourers out of the rural areas.² Influx control to urban environments and work reservation regulations led to limited urban job opportunities for the rural black community, which provided the majority of agricultural labourers. This prevented the uncontrolled migration of labourers (MARCUS 1989). Wages were not determined on the basis of productivity or according to market forces, but were geared to the minimum subsistence requirements of the African population. For some time wages in agriculture amounted to less than one tenth of those in the mining sector. VAN SCHALKWYK & GROENEWALD (1992) estimated that wages have been generally below the marginal productivity of labour.

The second mechanism to keep agricultural wages low was prison labour. It was systematically used by the state and played an important role in agriculture. Approximately 13% of all farmers used to employ prison labour. According to conservative estimates the number of prisoners working on farms at any given time was 100.000, which was close to 10% of the total labour force in commercial agriculture (MARCUS 1989). Forced labour stood in direct competition to "normal" labour and this had an influence on wages in agriculture. The prison labour system played a particularly important role in the drive to restructure the composition of farm labour in South Africa.

In the horticultural sector, amongst others, labourers were sent as contract workers to commercial farms via so-called recruiting organisations or recruiting co-operatives. The wages differed according to different sectors and regions, but they were generally very low. Agricultural labourers' unions were disorganised and powerless against the mighty interest groups of farmers (MARCUS 1989).³

An important indirect influence on rural wages, particularly for unskilled labour, was the low cost of capital which was used to substitute labour. The result was an extremely rapid concentration and centralisation of land, capital and innovation in agriculture. This led to extensive substitution of labour by capital and to a differentiation of the labour force. SIMKINS (1987) estimated that the non-homeland rural areas lost some one million people between 1980 and 1985. Given the natural rate of popu-

² The most important legislative changes were the Natives' Land Act of 1913 that segregated Africans and Europeans on a territorial basis, restricting Africans to native reserves. Subsequent legislation restricted the ability of farm workers to change employment and prevented African farmers from joining marketing co-operatives and farmers' unions.

³ African labour unions were only legally recognised in 1979.

lation growth, this means that some 1,6 million people moved off the white farms during this period. The same effect could also be observed in Zimbabwe. Increased implementation of capital in the plantation industry left over 100.000 farm labourers between 1974 and 1984 unemployed (LOEWENSON 1992).

Thus credit subsidies and labour legislation lead to a reduction of the costs of labour and to the rapid growth of the size of enterprises in the South African commercial agricultural sector. The agricultural household theory, as described by SCHMITT (1992), implies that the household will allocate its labour resources towards the highest-paid opportunity and consequently take part in the off-farm labour market. The commercial farms used the advantages of the labour market and substituted family labour for low cost hired labour. Therefore farms were able to grow irrespective of their household labour resources and could allocate family labour towards highest returns. Increased transaction costs did not seem to have affected commercial agriculture significantly, or were at least not noticeable to the individual farmer. It could even be said that the extremely low wages facilitated the transformation of family-based agriculture into large-scale agriculture.

Since the seventies the real debt burden in commercial agriculture increased dramatically, while there was a simultaneous decrease in the value of farms and in income. From 1975 to 1987 the loan capital ratio (total debt/value of capital assets) rose from 11,8% to 26%. After the agricultural sector shrank to become slightly healthier, the debt rate at the beginning of the nineties was only 23% (cf. table 1).

At the beginning of the seventies the Land Bank began subsidising long-term credits in agriculture. Before 1970 effective⁴ interest was between 1% and 4%. Real interest rates fell from -0,4% in 1971 to -6,5% in 1975, then fluctuated between -4% and -4,2% from 1976 to 1978 before dropping to a low of -8,2% in 1981. After that the interest level in agriculture remained positive (WORLD BANK 1994). Because of the availability of capital, many farmers were able to expand their operations quite substantially. The cost of mechanisation was further reduced by possibilities of special tax write-offs (SPIES 1996).

⁴ Interest rate refers to real interest or nominal interest rate minus the inflation rate.

Table 1: Commercial farm debt in the RSA by creditors
(WORLD BANK 1994)

Year	Land Bank		Com. Bank		Co-ops		ACB		Others		Total Loans
	Loans		Loans		Loans		Loans		Loans		
	R	%	R	%	R	%	R	%	R	%	
1991	3.512	21	5.116	31	4.3	26	1.168	7	1.768	15	16.686
1990	3.441	22	4.95	31	3.78	24	1.013	6	2.68	17	15.864
1989	3.149	21	4.65	31	3.587	24	0.972	6	2.724	18	15.082
1988	2.924	22	3.478	26	3.412	25	0.921	7	2.778	20	13.513
1987	2.808	22	3.355	26	3.224	25	0.789	6	2.705	21	12.881
1986	2.649	21	3.437	28	3.081	25	0.684	6	2.562	20	12.413
1985	2.338	21	3.315	30	2.754	25	0.549	5	2.163	19	11.119
1984	1.923	20	2.969	31	2.234	24	0.443	5	1.927	20	9.496
1983	1.331	18	2.254	30	1.780	24	0.309	4	1.736	24	7.410
1982	0.989	17	1.600	28	1.368	24	0.247	4	1.583	27	5.787
1981	0.856	18	1.055	22	1.130	23	0.202	4	1.597	33	4.840
1980	0.676	18	0.802	21	0.867	23	0.180	5	1.315	33	3.840

(in Millions of Rand)

From 1983 onwards the massive subsidies in the commercial sector were reduced, which led to increased and positive real interest rates for farmers. The financial management in agriculture could not adapt very easily to the changed framework conditions, which meant that the debt rate of farmers increased at an alarming pace in some sub-sectors (VINK 1993).

Insolvent or near-insolvent farmers were supplied with especially favourable loans by the Agriculture Credit Board (ACB). The interest rate was set at approximately half to a third of the normal commercial interest rate.⁵ Although 64% of the farmers who were served by the ACB had fallen into arrears by 1993, the number of sequestrations has remained relatively constant over time. State intervention on the capital market and the subsidising of particularly poor farmers prevented a general transformation and a drastic price decrease for land. This would have had catastrophic consequences for the entire sector.

⁵ The nominal interest rate of the ACB's long term credits was 8% for farmers who are qualified for the scheme, while the Land Bank offered 16%. Short-term credits for crop production were also offered at 8%, while commercial credits cost 21%.

The STRAUSS COMMISSION (1996) mentioned that the ACB represented the major direct intervention by the state in the provision of subsidised agricultural finance to commercial farmers, especially those in financial crisis. It was generally accepted that, even with great economic losses, the minority of commercial farmers should be supported for policy reasons. In a financial environment marked by intervention, the farms developed into large-scale units. Because of transaction cost advantages in access to credit, large farms in particular could benefit from this policy (BINSWANGER et al. 1995).

In 1988 22.190 farmers (33% of the commercial farming population) owned more than 1.000 ha each, which together constitutes 84% of commercial land. They generated 50% of gross income and 64% of farm profits. This concentration was promoted by the Subdivision of Agricultural Land Act of 1970 and the Agricultural Credit Act of 1966. The former prohibited farms from being subdivided into smaller subdivisions without permission from the Minister of Agriculture. This prevented farms from being split up into smaller units in the case of sale or the bequeathing of a farm and thereby contributed indirectly to the concentration of landownership.

The Agricultural Credit Act also contained provisions for the consolidation of what are defined as non-viable small farming units into viable units. One viable unit was defined as a farm size which yields a full-time agricultural income comparable to urban income. The transition to small-scale, part-time farming was also hardly possible, while growth from part-time to full-time farming was actively promoted. The viability definition became a self-fulfilling prophecy, because under the Agricultural Credit Act all farms below the viable size were excluded from assistance (VAN ZYL 1995).

The controlled marketing environment was dominated by producer organisations. The co-operatives had a monopoly of power in many agricultural sub-sectors, which favoured the commercial producers. This was further supported by the fact that the co-operatives were represented by certain farmers in the South African Agricultural Union (SAAU). At the same time the SAAU advised the Minister of Agriculture on important agricultural marketing issues (LIPTON 1996). The producers played a major role in the institutions that controlled and implemented the various marketing schemes, while small-scale producers had very limited power to intervene in the management of controlling institutions (FAO 1995).

The co-operative movement and the Marketing Boards in South African agriculture were marked by "collective action" to ensure state support of the commercial agricultural sector. VINK & KASSIER (1991) saw in the use of "collective action" a reason why a minority group of the population could have such effective political influence.

The security of markets and of prices promoted the growth of commercial farms, since prices and markets were never restrictive factors. The presence of the single-channel marketing system for many crops tended to promote concentration in the marketing and processing industry as well. The South African abattoir industry, for example, has been concentrated by the quota control system under the meat scheme. In the processing sector the single-channel marketing system led to a concentration on the demand and supply side through economies of scale. In the process the different marketing schemes had an active influence. Certain larger producers could, because of economies of scale, expand in an oligopolistic market. Especially in the poultry industry dominant producers developed extremely efficient, low-cost production systems in the course of the eighties (FAO 1995).

The complicated market regulations and the exclusion of South Africa from the world market forced producers to focus on the domestic market. Fixed prices and quotas made market entry and competition difficult, and a system of licences as well as a focus on production, processing and distribution was successful.

The subsistent farming sector

Migrant labour remains an important factor in the South African economy. The greatest demand for migrant labour is traditionally within the mining sector (YUDELMANN 1983). In the subsistence farming areas migration income contribute significantly to household income. HERON (1991) found that in the Transkei between 40% and 73% of all adult males earned a migration income. In a typical Transkei household about 90% of the total income was generated by migrant work (cf. table 2). ECKERT & WILLIAMS (1995) determined a non-agricultural income of 94% for the Ciskei. This implies that the households depend on migrant labour to cover the cost of basic foodstuffs, and also that a large part of household members are not available for subsistence food production.

Table 2: Migration and agricultural earnings in the former homelands, 1985 (WORLD BANK, 1994)

Territory	Total mi- gration earnings (R'1000)	Total agri- cultural earnings (R'1000)	%	Σ Household earnings (R'1000)	Number of households	Earning/ household R
Ciskei	449.625	19.564	4.2	469.189	199.146	2.356
Transkei	1588.423	163.700	9.3	1752.123	1.671.873	1.048
KwaZulu	3028.582	208.000	6.4	3236.582	990.993	3.266
Venda	205.790	26.241	11. 3	232.031	155.621	1.491
Lebowa	1121.126	45.000	3.9	1166.126	679.561	1.716
Gazankulu	307.168	23.580	7.1	330.748	224.236	1.475
Bophutha- tswana	1671.247	52.400	3.0	1723.647	514.061	3.353
KaNdwane	382.180	17.600	4.4	399.780	1.18.138	3.384
KwaNde- bele	361.651	2.300	0.6	363.951	99.849	3.645
QwaQwa	258.093	3.990	1.5	262.083	95.477	2.745
Total	9373.886	562.645	5.7	9936.531	4.173.260	2.381

The preference of migrant labour for crop production is a function of the off-farm wages. Between 1975 and 1985 the average monthly wages of a mineworker were approx. R200 (YUDELMAAN 1983). LOW (1986) calculated an average yield of 2.600 kg maize for a four- to five-member Swazi family with access to 2 hectares of arable land. In 1977 this had a retail value of R343.⁶ This is equivalent to a net production value of approx. R75 per household member in subsistence production, compared to R2.200⁷ in off-farm wages.⁸

⁶ Presupposing that one household member can earn migrant income of approximately R 2.200 and the remaining household generates a subsistence income of R 340, the contribution of subsistence income to the total household income is about 15% after subtracting the maintenance costs of the migrant worker. This figure corresponds roughly with the proportion established in the Transkei by HERON (1991).

⁷ A contract period of 11 months is presumed.

⁸ The value of subsistence production per household member only relates to the marketable field crops. In practice, however, it is very difficult to determine household production, which must also be taken into account.

SCHEJTMAN (1992) explains the relative advantage of wage employment with a modification of the TSCHAJANOW farm household model. He presumes that in a peasant economy, given the neo-classical curve of the production function, production generally occurs at or near the point of maximum intensity. This implies a marginal labour productivity of zero or almost zero. On the off-farm labour market, however, the marginal productivity of labour is positive as a result of competition.

Migrant labour has a clear influence on agricultural production in subsistence production areas. The decade-long policy of migrant labour indirectly prevented the development of agricultural production in the homelands. Therefore, subsistence production has even decreased over the years, while most farmers remain net deficit producers, which implies an increasing market for commercially produced South African food (MAKENETTE et al. 1997).

The typical life cycle of a peasant household is described by TSCHAJANOW (1966) and BECKER (1981). The different phases have distinct consequences for the subsistence household as far as production economics is concerned. In the first phase the household consists of several members who are fit for work. However, the head of the household is at the best age for migrant labour. The opportunity costs of subsistence cropping are correspondingly high. The model of a African household, as described by LOW (1986), implies that the household will allocate its labour resources towards the highest-paid opportunity. This *de facto* results in the phenomenon that the rural household is led by a woman who is prevented from engaging in extensive field labour by her household and child-rearing responsibilities. Labour-intensive farm technology is probably not appropriate in this setting (ECKERT & WILLIAMS 1995).

In the second and third phases of the life cycle subsistence production is limited by demographic factors. The number of household members fit for work has decreased, while the number of consumers increases. Total income and specifically subsistence production decreases. Life cycle and opportunity costs of labour influence subsistence production. Although the largest number of labour resources is present in the household in the first phase of the life cycle, subsistence food production is not necessarily highest at that stage because of the high opportunity costs. However, total income is at its highest, since the household allocates its resources in such a way as to maximise utility.

Table 3: Market involvement of rural households in the former homelands (VAN ZYL & VAN ROOYEN 1990)

Crop	Market involvement in %			% of total Production marketed %	Sales concentra- tion		
	Net buyers	No. net sales or buyer	Net sellers		% of total sales		
					50%	70%	80%
KaNgwane (n=394)							
Maize	68.7	7.4	23.9	62	2.8	7.4	11.2
Groundnuts	81.7	4.6	13.7	52	3.0	6.1	8.6
Dry beans	96.1	0.3	3.6	0.0	0.1	1.3	1.5
Yuco beans	95.9	0.0	4.1	66	1.0	1.8	2.5
Kwa Zulu (n=193)							
Maize	95.2	0.1	4.7	49	0.5	1.3	2.4
Beans	84.0	6.2	9.8	54	3.0	6.0	9.2
Potatoes	93.6	3.3	3.1	40	1.6	2.6	3.6

Cash crop farming is only an efficient source of income for the household if the net revenue is equal to the employment wage. The household theory, as described by LOW (1986), implies that it therefore depends heavily on the opportunity cost of labour in cash crop production and the crop value at the farm gate. Under the assumption that the household allocates labour with low opportunity costs to crop production and an optimal return to labour is reached, it depends only on the crops' farm gate price whether the household produces for its own consumption or for the market (*cf.* table 3). Under fixed opportunity costs of labour, the price level is the crucial factor. If the net profit of production surpasses the income from wage employment, labour with higher opportunity costs can be taken away from wage-employment and allocated to cash crop production. The crop price decides under *ceteris paribus* assumptions whether a household is a deficit or a surplus food producer.

The producer price for food is, besides the off-farm wage, a factor which has a significant influence on the development of a subsistence economy into a more commercially orientated economy. In South Africa wages in the mining sector were relatively high in earlier decades, and food prices quite low in comparison. In many subsistence households there is a lack of enthusiasm to produce cash crops, since the additional

benefit is very small. Low producer prices for food together with high off-farm wages tend to reduce subsistence farming activities to a minimum.

Productivity in South African agriculture

Differences in productivity between small and large farms are difficult to measure. Land area is a cause of measurement problems because agro-climatic potential and land quality differ from region to region. The only sensible way to measure productivity is in terms of invested capital rather than per area unit.

In theory, the market mechanism leads to a production structure in which the factor productivity is the same for large and small farms. However, this is only valid for perfect factor markets. BISNWANGER et al. (1995) explain the variety of farm size distribution and productivity structures as a multiple market failure. In different analyses he shows that, assuming credit and rental markets are perfect, a difference in productivity exists between large and small farms merely because of differences in efficiency in the input factor labour. Farms depending mainly on hired labour are at a disadvantage compared to family farms because of transaction costs in terms of productivity. BISNWANGER et al. (1995) reach the conclusion that a negative relation between farm size and land productivity is likely to emerge because of imperfect input markets.

There have been a great variety of studies concerning size and productivity in South African agriculture, but the results have differed every time. On the one hand, statistics show that 30% of the largest farms generate more than half of the total gross farm income (CSS 1993). On the other hand, subsectoral efficiency analyses have shown an increase in factor efficiency between small and medium-sized farms, before decreasing again on larger farms (HATTINGH 1986). In maize farming areas a scale effect could only be proved in the 50-300 hectares range. The evidence concerning economies of scale in South African agriculture is mixed, but many analyses give reason to believe that the occurrence of scale efficiency is caused by policy distortions. A large majority of agricultural production function studies, including some conducted in South Africa, have found either no or little economies of scale (BISNWANGER et al. 1993).

VAN ZYL (1995) used data from South African commercial agriculture between 1975 and 1990 as the basis for an efficiency study. Farm size is adjusted for differences in land quality within regions by using land

value to standardise areas. Farmers' input and output prices are the same, which implies that the monetary value of inputs and outputs can be treated as quality-adjusted quantities. The results show a negative relationship between farm size and efficiency for commercial agriculture. The total factor productivity (TFP) index of the bottom third is larger than that of the top third. The TFP differences have different results in the respective regions. The negative relationship between TFP and farm size decreases after 1985 with the cutting of privileges for large-scale agriculture. For smaller commercial farms the labour-machinery ratio is significantly higher, which indicates that small-scale commercial farming is much more labour-intensive.

The differences in efficiency in the various periods illustrate the influence of agricultural policy and state intervention. From the viewpoint of agricultural structural policy, the public costs (i.e. the social efficiency) of an interventional policy are important. In order to analyse social efficiency, data from 1981 to 1989 collected in the regions with the smallest and largest difference in TFP, and the social opportunity costs for labour, capital and other inputs were analysed. The respective periods at the beginning and then at the end of the eighties represent the efficiency situation before and after agricultural policy liberalisation. The TFP analysis was repeated, investigating social opportunity cost instead of private opportunity cost. The results show:

- (1) The average TFP is lower than average private TFP in all regions.
- (2) The difference in TFP is largest during the early eighties, which indicates to what extent policy had a distorting effect.
- (3) Larger farms are less efficient than smaller ones. This results from the difference in importance of capital and labour, depending on the farm size.
- (4) Since the social opportunity cost of labour is lower than the wages, and the social costs of capital are higher than the subsidised prices farmers face, the total value of inputs of large farms increases and vice versa.

Policy is an important factor in farm size efficiency. Although South African agricultural policy was particularly favourable towards large-scale farming, it could not set off the disadvantages concerning labour supervision and transaction costs. The results prove that economies of scale result from imperfect markets. However, the cost associated with hired

labour in many cases more than offset this advantage over smaller or family farms. The efficiency losses of large farms occur mainly in connection with labour. This is an indication, possibly the most important one, that family farms are the most efficient organisational form in agriculture.

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