THE ECONOMIC RATIONALE FOR AGRICULTURAL REGENERATION AND RURAL INFRASTRUCTURE INVESTMENT IN SOUTH AFRICA

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ABSTRACT

This paper quantifies the role of agriculture in the South African economy. This is done within the context of, *inter alia,* food security, agriculture's contribution to gross domestic product (GDP), economic linkages and multipliers with respect to the agricultural sector, agriculture's employment creation capacity and its external stabilization capacity. The rationale for rural infrastructure investment is then investigated.

The quantification of the agricultural sector in relation to the total economy and that of agricultural and rural infrastructure investment, are investigated against the backdrop of declining government support, increasing production risks due to a variety of exogenous events, like climate change, and increasing dynamic trade impacts. In this paper, the authors offer both supporting arguments in terms of current economic policy and recommendations for more decisive policy measures for agricultural regeneration and rural infrastructure investment.

INTRODUCTION

The agricultural sector is the backbone of every economy. Its strategic importance lies in its forward and backward integration with the rest of the economy, the establishment and maintenance of food security, the economic welfare of rural areas and stabilization capabilities in relation to the balance of payments. In developing countries, rural development plays a crucial role in economic development and the alleviation of poverty.

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In spite of South Africa's plausible performance in terms of macro economic stability and acceptable levels of economic growth over the last decade, South Africa's international competitiveness, mostly rated in terms of the strength of its institutional arrangements, has declined. In terms of equitability, South Africa has also performed poorly. In realizing the weaknesses and failures of the economy and of government policy in addressing the needs of the unemployed and poor sufficiently, President Thabo Mbeki recently pledged accelerated infrastructure investment in underdeveloped urban and rural areas to improve service delivery. Added to this, agriculture is identified as one of the major sectors to ensure the achievement of the Accelerated and Shared Growth Initiative of South Africa (ASGI-SA). In terms of agriculture, high priority areas are agricultural production and agro processing. More recently, attention has been focused on the development of a bio-fuels industry for South Africa.

The authors see this as a sign of support and belief by the President of the crucial development potential of the rural and agricultural sector in providing a better life for all. The contribution of agriculture to accelerated growth is based largely on the Agricultural Sector Plan of the Department of Agriculture (DoA)(2001/2), with a vision of 'A united and prosperous agriculture'. Three core strategies, *viz.* equitable access and participation, global competitiveness and profitability, and sustainable resources management underpin the plan. The development of an emerging agricultural sector forms an integral part of the strategy for agriculture.

This paper is mainly aimed at decision and policy makers in all spheres of government. Although it is not possible to include all relevant research in a paper of this magnitude, the authors bring together a host of research, some very recent, in an attempt to inform policy related to agricultural and rural development. The aim of this paper is twofold: Firstly, the authors analyze and quantify the contribution of the agricultural sector to the economy of South Africa. By doing this, the authors aim to find evidence that will either prove or disprove their contention that *(i)* government policy priorities and *(ii)* government resources are not optimally distributed to take full advantage of the ability of the agricultural sector to give

impetuous to a long run sustainable and welfare optimizing economy. Secondly, it is the authors' contention that fixed investment expenditure by government should find its most efficient application. Given a Kaldor-Hicks efficiency measure, it is required then that the most welfare optimizing long run sustainable infrastructure investment takes priority.

ORGANIZATION OF THE PAPER

In this paper, the authors quantify the role of agriculture in the South African economy. This is done within the context of food security, agriculture's contribution to gross domestic product, economic linkages and multipliers with respect to the agricultural sector, agriculture's employment creation capacity and its external stabilization capacity (role as net foreign exchange earner). The authors then survey the rationale for rural infrastructure investment.

Finally, having quantified the agricultural sector in relation to the total economy and that of agricultural and rural infrastructure investment, we offer both supporting arguments in terms of current economic policy and recommendations for more decisive policy measures of agricultural regeneration and higher levels of net fixed government investment in the rural and agricultural sector, and especially investment in infrastructure.

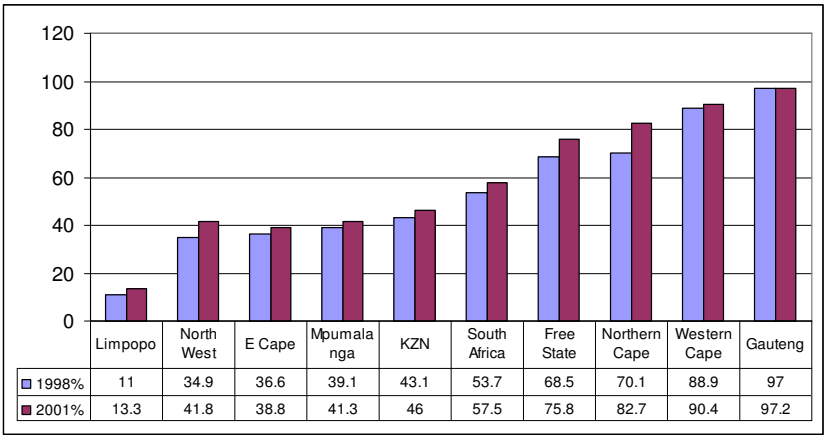
AGRICULTURE, ECONOMIC DEVELOPMENT AND URBANIZATION

In a seminal article, Johnston and Mellor (1961) encouraged economists to view agriculture as a potentially positive force in economic development and emphasize the interdependence between agricultural and industrial growth. They argued that agriculture could make important contributions to the structural transformation of economies, e.g. it could provide labour, capital, foreign exchange and food to the growing industrial and urban sector and a market for domestically produced industrial goods.

In many African countries, rural-urban migration appears to be accelerating while the so called 'industrial pull for rural labour' has been absent, contributing to growing urban unemployment, poverty, and other socio-economic problems such as higher pollution and

crime (Harris and Todaro, 1970:126; Goldsmith, Gunjal and Ndarishikanye, 2004).

Stiglitz (1969) and Todaro (1997) argue that the best way to manage rural-urban migration is to increase agricultural investment and output. The Food and Agricultural Organisation (FAO) of United Nations (2003) agrees with this view and argues that rural and agricultural development is crucial to combat national unemployment and poverty, as the majority of people in the developing world live in rural areas. Fig.1 illustrates urbanization in South Africa and its nine provinces between 1996 and 2001.



	Limpopo	North West	E Cape	Mpumalanga	KZN	South Africa	Free State	Northern Cape	Western Cape	Gauteng
1998%	11	34.9	36.6	39.1	43.1	53.7	68.5	70.1	88.9	97
2001%	13.3	41.8	38.8	41.3	46	57.5	75.8	82.7	90.4	97.2

Figure 1.Urbanization in South Africa and Provinces between 1996 and 2001
Source: Stats SA Census, 2001

From Fig. 1 it is clear that there is an accelerated increase in the rate of urbanization. In the absence of similar increases in urban employment growth, large scale unemployment and poverty results. According to Machethe (2004), approximately 65 percent of the poor in South Africa reside in the rural areas.

Asfaha and Jooste (2006) in a recent study, found that agricultural investments such as the providing adequate physical infrastructure, enhancing land resources and adopting technology such as irrigation and fertilizer boost agricultural income, reduce rural-urban migration and are consistent with policies meant to fight urban unemployment.

CONTRIBUTION OF AGRICULTURE TO FOOD SECURITY- AND SELF-SUFFICIENCY

Agriculture's contribution to the economy is illustrated using a range of measures. In this section, we analyze the ability of the agricultural sector to provide to its nation sufficient food at affordable prices, especially at the household level.

Food consumption

Table 1.The consumption of food as a percentage of total consumption expenditure, 1980 – 2005

Description	PCE	Total Food Consumption		CPI FOOD	PCE 2000	Total Food Cons. 2000	
	R Million	R Million	%	2000=100	R Million	R Million	%
1980/12/31	11782.30	8765.00	74.4	8.8	133889.77	99602.27	74.4
1981/12/31	15230.40	10852.00	71.3	10.7	142340.19	101420.56	71.3
1982/12/31	17193.20	12738.80	74.1	11.9	144480.67	107048.74	74.1
1983/12/31	18118.20	13889.70	76.7	13.3	136227.07	104433.83	76.7
1984/12/31	20566.50	15257.00	74.2	14.7	139908.16	103789.12	74.2
1985/12/31	22127.96	17301.30	78.2	16.5	134108.85	104856.36	78.2
1986/12/31	25977.95	20492.40	78.9	19.8	131201.78	103496.97	78.9
1987/12/31	31623.83	24918.70	78.8	24.3	130139.20	102546.09	78.8
1988/12/31	37920.87	29171.98	76.9	28.1	134949.71	103814.88	76.9
1989/12/31	44242.52	33282.08	75.2	31.2	141802.96	106673.32	75.2
1990/12/31	54565.58	40369.96	74.0	36.2	150733.64	111519.23	74.0
1991/12/31	61130.40	44026.96	72.0	43.4	140853.44	101444.60	72.0
1992/12/31	72796.01	53211.48	73.1	54.3	134062.63	97995.36	73.1
1993/12/31	78007.72	57080.97	73.2	58	134496.06	98415.46	73.2
1994/12/31	88453.31	65407.74	73.9	66	134020.16	99102.63	73.9
1995/12/31	95443.22	68833.42	72.1	71.7	133114.67	96001.98	72.1
1996/12/31	106360.93	76413.28	71.8	76.1	139764.69	100411.66	71.8
1997/12/31	121129.32	86858.34	71.7	83.3	145413.35	104271.71	71.7
1998/12/31	128187.84	89201.25	69.6	88.4	145008.87	100906.39	69.6
1999/12/31	138290.08	94419.79	68.3	92.7	149180.24	101855.22	68.3
2000/12/31	145486.53	102698.57	70.6	100	145486.53	102698.57	70.6
2001/12/31	162999.70	125710.05	77.1	105.4	154648.67	119269.49	77.1
2002/12/31	194467.40	147232.85	75.7	122	159399.51	120682.66	75.7
2003/12/31	226560.40	167510.60	73.9	131.9	171766.79	126998.18	73.9
2004/12/31	232127.40	166256.60	71.6	134.9	172073.68	123244.33	71.6

Source: Agricultural Statistics - Dept. of Agriculture (Time Series Explorer 2006 Software)

The importance of food to the domestic population was emphasized by Döckel and Groenewald (1970) who estimated the income elasticity of food to be 0.60 for the average South African. As a lower income group, the rural population is inclined to spend a higher percentage of their earnings on food. This expectation is based on the law of Engel, which in South Africa was confirmed to hold by Breitenbach (1992), in a study of consumer patterns and consumer behaviour of different income groups.

On a macro economic level, food consumption constitutes an average of between 17-20 percent (excluding tobacco and beverages) of total private consumption expenditure (PCE). This is illustrated in Table 1.

Food provision

Table 2. 2006/07 All Cereal Requirement, Demand and 2006 Production Estimates Compared to 2005 and 10-Year Average ('000 tonnes) as on 8th August 2006.

	2006/07 Required* ('000 tons)	2006/07 Available** ('000 tons)	2006 Produc-tion ('000 tons)	2005 Produc-tion ('000 tons)	2006 percent Change Over 2005	10-year Average	
						Produc-tion ('000 tons)	2006 percent change
Angola	1,514	696	672	881	-24	600	12
Botswana	356	56	49	19	159	29	66
DR Congo	Na	Na	Na	Na	Na	Na	Na
Lesotho	415	173	126	120	5	143	-11
Madagascar	Na	Na	Na	Na	Na	Na	Na
Malawi	2,456	2,833	2,754	1,302	111	1,942	42
Mauritius	209	6	2	2	0	2	0
Mozambique	2,638	2,265	2,098	1,836	14	1633	28
Namibia	306	143	110	100	10	105	5
South Africa	14,347	13,835	8,269	13,884	-40	11,618	-29
Swaziland	195	81	61	67	-10	88	-31
Tanzania	6,216	5,300	5,189	5,068	2	4,124	26
Zambia	1,600	1,618	1,597	1,060	51	1,161	38
Zimbabwe	1,711	2,102	2,026	880	130	1,839	12
SADC	32,961	29, 109	22,951	25,218	-9	23,282	-1

* Includes requirements for SGR

** 2006 production plus carryover stocks. NA – Data not available

Source: SADC (FANR Directorate and Member States)

South Africa's record of accomplishment with food provision is

not enviable. Despite being self-sufficient in the production of most major crops, nutritious food remains inaccessible to large parts of rural South Africa. More than 16 million people are suffering from malnutrition and are facing starvation in certain areas. Thus, the fact that food production has kept up with population growth does not say much for the nutritional status of the population. Table 2 presents the cereal food balance situation in Southern Africa.

The availability of, access to and control of resources in society determine largely who in society will and will not suffer malnutrition. The underlying causes of malnutrition are in turn, determined by ecological, technical, economic, social, political and ideological conditions. Causes of malnutrition at this level are referred to as basic causes. The resources referred to in this context are of three main types: human capabilities (people, their knowledge, skills and time); economic resources (assets, land, income, *etc*.) and organizational resources (formal and non-formal institutions, extended family and childcare organizations). Poverty, understood as a lack of resources and opportunities, and the structural factors that give rise to poverty, are thus basic causes of malnutrition.

Food self-sufficiency and food security

South Africa's food and agricultural policy historically placed national self-sufficiency as a major objective. This goal, in South Africa, was largely met over the last 5 to 6 decades, as a surplus was produced in most of the agricultural commodities. Despite national self-sufficiency, the large inequalities, inefficient food distribution networks, poverty and hunger continue to prevail in large parts of the urban periphery and rural areas of South Africa. Instability in South Africa's neighbouring country, Zimbabwe, has added fuel to the proverbial fire. It is estimated that millions of illegal Zimbabwean immigrants now populate squatter communities on the periphery of urban South Africa, in search of a livelihood.

Two essential elements of food security are the 'availability of food and the ability to acquire it'. This is also the two sides of the hunger equation, namely supply and demand for food.

It is therefore crucial that South Africa maintains a competitive agricultural sector that is able to meet the demand for basic foodstuffs. South Africa has, in the short term, no need to import food (on an average net basis) as the agricultural sector has

succeeded in increasing production at a rate of growth higher than that of the population.

Agricultural production trends and food security

According to the Department of Agriculture (DoA), the estimated volume of agricultural production in 2005/6 was 6.4 percent lower than the preceding period. The volume of field crop production decreased by 21.1 percent over the same period, mainly as a result of declines in the production of maize, sorghum and dry beans. Horticultural production increased by 4.6 percent while animal production decreased by 2.3 percent over the corresponding period (DoA, 2006).

Total production of staple cereal crops and oilseeds are on a declining trend. Breitenbach & Meyer (2000) and Breitenbach & Fényes (2000) show in a study of production trends of grain crops and oilseeds in South Africa, that the area planted to these crops declined as a result of trade liberalization and deregulation of the agricultural sector. The impact of climate change and drought on production and food security should also be recognized. The most important restriction on agricultural production is the availability of water. Rainfall is unevenly distributed and South Africa is periodically affected by severe droughts. Water restrictions are expected to impact negatively on the availability of water for irrigation. Drought aid is limited or virtually non-existent. At present, there is also no clear policy or basis on which the impact of drought, which affects both commercial and emerging farmers, is managed. Table 3 illustrates the decline in field crop production. This declining trend is confirmed by a trend analysis of time series data on the area planted and of output since 2000.

The latest threat to food security comes from the planned replacement of fossil- with bio-fuels. With grain crop production at their long run optimal levels, additional demand for field crops to supply the bio-fuels industry is widely expected to put additional pressure on land and water resources. In turn, land, field crop and stock-feed prices are expected to go on the rise. Stock-feed price increases impact directly on animal product prices and together with an impounding water scarcity and adverse weather conditions, nutritious food would remain inaccessible to large parts of rural South Africa, and this inaccessibility could be expected to spread to a

large part of the South Africa's population.

Table 3. Production trends ('000 ton), 2004/05-2006/07

Production season	**2004/05**	**2005/06**	**2006/07**
White maize	6 510	4 187	3 800
Yellow maize	4 909	2 430	2 300
Sunflower seed	620	520	200
Soya beans	272	424	180
Groundnuts	64	74	30
Dry beans	96	67	35
Total	**12 501**	**7 702**	**6 545**

Source: Harvest Forecast Committee, 2007

Unless government acts meaningfully and support agriculture in the application of corrective policies and possibly emergency measures, rural and urban poor economies could collapse. The long-term sustainability of food supply will depend on the interrelationship of the natural resource base (affected by earth warming and climate change), energy supply (which is finite), international food production and competitive trends, demographic trends, level of technology, level of fixed investment and the research capability of a country, among other things.

According to Van Rooyen *et al.* (1996), this situation clearly emphasizes the vital role of farm level production, environmentally adapted farm technology and early warning systems for future food policies and food security strategies. A productive farming sector at commercial and small-scale levels must be viewed as an important feature in future food security strategies.

GROSS DOMESTIC PRODUCT (GDP)

Agriculture's contribution to GDP in South Africa (at current factor cost) increased from R 190 million in 1946 to R 41 935 million in 2005. The economy had grown at an average annual growth rate of 3.8 percent between 1946 and 2005. The value added by the agricultural sector had grown by only 2.4 percent during this period, averaging a growth rate of 0.4 percent from 1996 to 2005. Being heavily affected by climatic conditions, its growth was very volatile with negative growth rates recorded for several consecutive years, as opposed to a more steady growth experience by the overall

economy (see Fig.2).

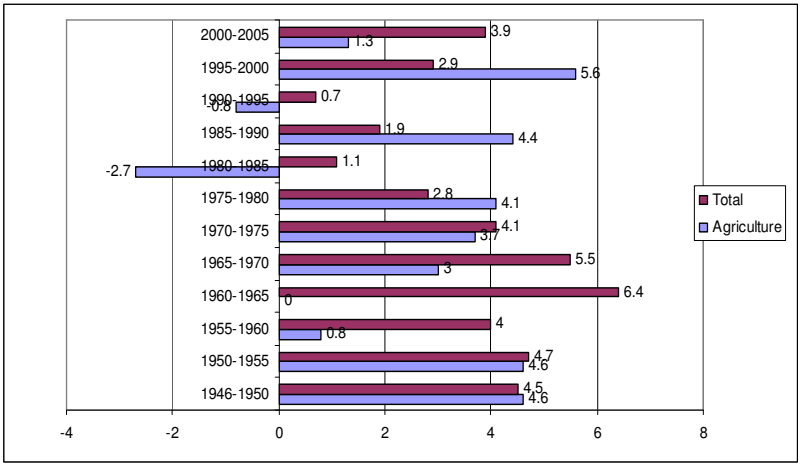


Figure 2. Average annual growth in the GDP, 1946 – 2005
Source: SARB, 2006

The growth in GDP was accompanied by a high degree of diversification of the economy. The lower growth rate of the agricultural sector relative to that of the overall economy resulted in its share in the GDP steadily declining. This has been part of a broader transformation of the economy over the past century from one dependant on the primary sector (agriculture and mining) to a broadly diversified manufacturing and services economy. Table 5 shows the marked changes in the structure of South Africa's economy in the last 40 years. As can be seen from Table 5, the gross value added in the agricultural sector declined from 11.2 percent in 1960 to 3.8 percent in 2003.

Table 5. Gross value added by kind of economic activity, R million

Year	Agriculture, Forestry and Fishing R million	percent of Total	Gross value added at basic prices R million
1960	559	11.2	4 988
1970	861	7.2	12 020
1980	3 654	6.2	58 972
1990	12 184	4.6	263 151
2000	25 375	3.2	793 993
2003	41 935	3.8	1 100 929

Source: Abstract of Agricultural Statistics, 2006

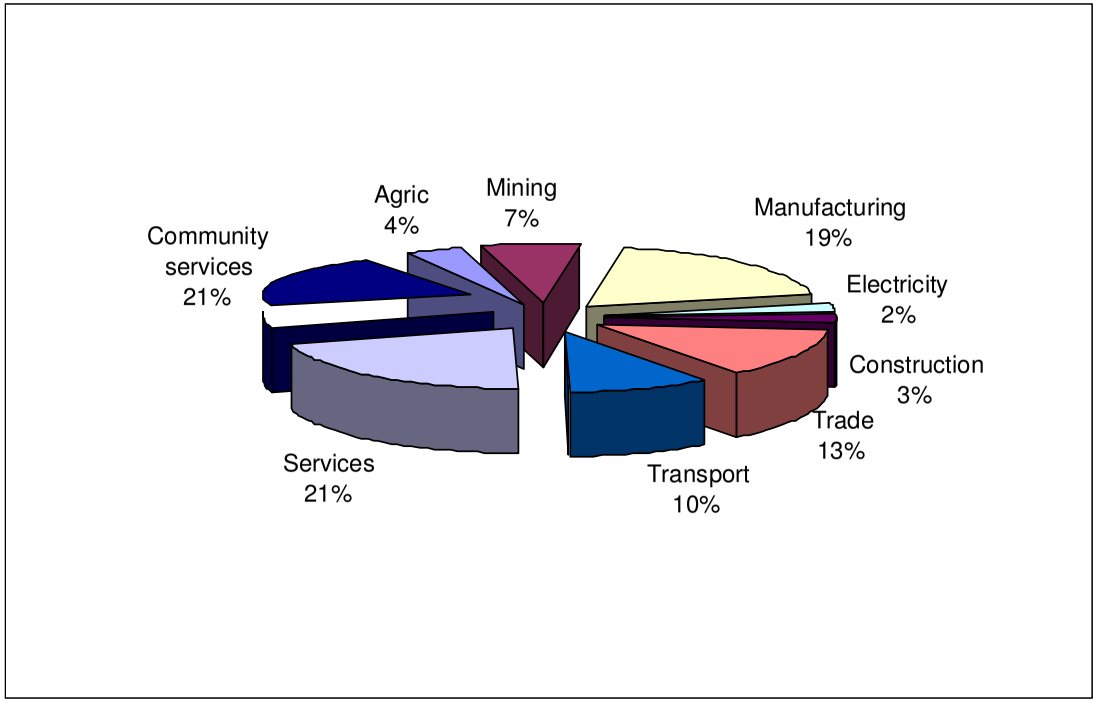


Figure 3: GDP at factor cost: percent contribution by sector, 2003
Source: DBSA, 2005

Table 6 presents South Africa's real gross domestic product (GDP) from 2004 to 2006. The GDP expanded at a rate of 4 percent in the first half of 2006. The sustained increase in GDP is mainly attributed to growth in the real value added in the secondary and tertiary sectors of the economy.

Following a decline of 1.7 percent in 2004, the real value added by the agricultural sector increased by 5.5 percent in 2005. Field crops, which contributed 27 percent to the real value added by the agricultural sector, performed well in 2005. Real output by the agricultural sector in 2005 peaked in the second half of the year when growth in real value added accelerated to an annual rate of 6.7 percent.

The low price of maize in 2006 affected the area planted to maize, reducing the contribution of field crops to the real value added by agriculture in the first half of 2006. Good rainfall raising the carrying capacity of the land prompted farmers to hold back livestock and expand their herds, thereby reducing the real value added by the agricultural sector.

Table 6. Real gross domestic product, percentage change at seasonally adjusted annualized rates, 2004-2006

	2004	2004	2005	2006
	Year	1st half	Year	1st half
Primary sector	1.50	4.50	3.25	-7.25
Agriculture	-1.75	4.75	5.50	-17.50
Mining	2.75	4.50	2.50	-2.75
Secondary sector	5.00	2.50	4.25	5.00
Manufacturing	4.50	1.50	4.00	3.50
Electricity, gas and water	2.50	1.00	1.50	3.75
Construction	10.75	10.00	10.00	13.50
Tertiary Sector	4.75	5.50	5.25	5.25
Commerce	5.75	6.25	6.00	6.25
Transportation and communication	4.50	5.50	5.25	5.75
Financial and other services	7.50	8.50	7.75	7.50
Non-agricultural sector	4.50	4.75	5.00	4.50
Total	4.50	4.75	5.00	4.00

Source: SARB, 2006

ECONOMIC LINKAGES, MULTIPLIERS AND LABOUR

In terms of its forward linkages, agriculture supplies raw materials as inputs for other primary and secondary sectors. A large number of factories in South Africa are dependent on agriculture for raw materials. Agriculture also creates a demand for goods and services through its backward linkages.

Regional studies also confirm the importance of agricultural linkages and multipliers. In a study completed in 1989, the farm/non-farm linkages between the irrigation areas and the regional economy of the south-western Free State were estimated. The output multiplier for irrigation agriculture is 1.7012 which means that, for every R1 of output in irrigation agriculture (which is the largest consumer of electricity), an additional output of 70.12 cents is generated in the intermediate sectors and households within the region.

Table 7. Flow of capital into other economic sectors

Item				**(1)**	**(2)**	**%**
	2001/02	**2002/03**	**2003/04**	**2004/05**	**2005/06**	**(2)/(1)**
Fuel	3 654	3 894	3 487	4 371	5 174	18.37%
Repair and maintenance	3 097	3 659	4 036	4 195	4 473	6.62%
Fertilizer	3 111	3 678	3 142	3 524	3 056	-13.28%
Dips and sprays	2 665	2 886	2 832	2 839	2 981	5.00%
Feed	9 302	11 175	11 249	11 504	12 049	4.74%
Packaging	2 294	2 387	2 507	2 582	2 652	2.71%
Total intermediate	*32 659*	*37 514*	*37 930*	*40 409*	*42 591*	5.40%
Labour	8 201	8 781	9 175	9 542	9 923	4.00%
Interest	4 231	4 465	4 210	3 859	3 898	1.00%
Gross investment: vehicle, machinery and implements	2 923	4 281	4 253	4 044	3 815	-5.64%

Source: National Department of Agriculture, 2000

Table 7 shows that agriculture's linkages with manufacturing and animal feed are the largest. Approximately 58 percent of the value of agricultural products is delivered to processing plants. These agro-businesses add significantly to the value added by the manufacturing, total fixed capital investment and to employment in the economy. Linkages to farm input manufacturing and mechanization are also substantial.

The Agro Food Task Group of the former National Economic

Forum estimated that the so-called South African Manufacturing Agricultural Complex employs approximately 402 000 workers, *i.e.* 28 percent of total employment in the manufacturing sector. Agriculture also supplies 23 percent of all processed exports and uses only 9 percent of imported inputs from the manufacturing sector.

The impact of changes in the agricultural sector on the economy as a whole can also be calculated by using sectoral multipliers. According to the 1996 production structure, agriculture has one of the largest employment production multipliers of all the economic sectors. This means that an increase in agricultural production will result in the creation of relatively more job opportunities throughout the economy than other industries.

Figure 4 is based on the results of a Social Accounting Matrix compiled by Conningarth Economists (2000), using a sector impact analysis (based on the South African SAM for 1998 released by Stats SA). Fig. 2 presents the cross sectoral impact of R1 billion investment on employment. The agricultural sector can potentially create the most jobs with 16 043 jobs followed by tourism with 12 850. This is high compared to mining (511 jobs) and communication (3 417 jobs).

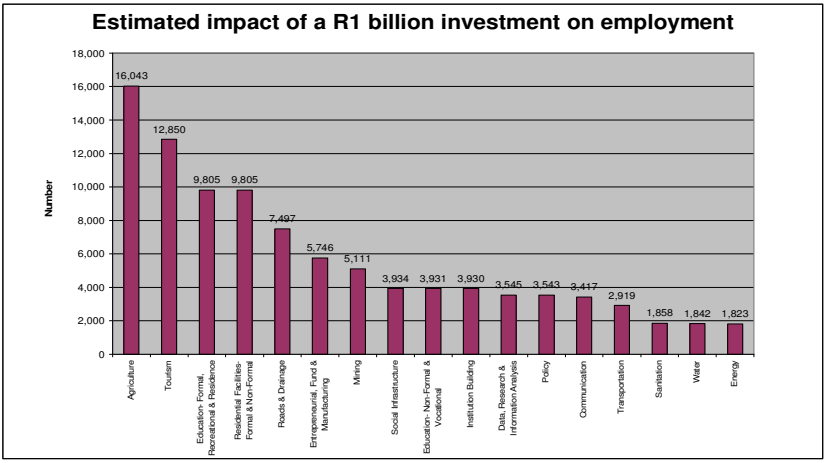


Figure 4. Estimated impact of a R1 billion investment on employment

According to Pollin *et al.* (2006), it is important to recognize that activities that will produce the biggest overall boost in jobs are not

necessarily the activities that utilize the most labour-intensive production methods. This is because some activities may be relatively capital intensive in their production techniques, but they may purchase products from other sectors in the South African economy that are highly labour intensive.

As such, domestic jobs in agriculture will expand as an outgrowth of expansion in agro-processing. This relationship between the domestic agricultural and agro-processing industries - where agro-processing purchases products from agriculture - is termed an 'upstream linkage'. Correspondingly, a 'downstream linkage' refers to a relationship in which, for example, agro-processing firms sell products to other South African firms, such as breweries.

When using the method of Pollin *et al.* (2006) to calculate employment multipliers, an even rosier picture emerges. Pollin calculates the employment multipliers for each industry. It is the total number of formal jobs generated in South Africa when the industry produces R1 million worth of goods or services. When calculating employment creation per R1 million addition to final demand, Pollin finds that agriculture remains first in the rankings, generating a total of 27.9 jobs in South Africa for every additional R1 million of final demand. Agro-processing advances to third on the list, creating 18.0 domestic jobs per R1 million in final demand.

Table 8 shows that agriculture employs 17.1 percent of all formal workers in South Africa but produces only 3.3 percent of all output. According to Pollin *et al.* (2006), these figures clearly suggest the substantial gains that could accrue to South Africa through measures such as the public works programmes targeted at rural infrastructure investment.

Table 8. High employment growth industries as share of South Africa's output and employment

	Industry output as share of total output (%)	Employment as industry share of total employment (%)
Agriculture	3.3	17.1
Agro-processing	4.2	2.7
Wood/paper/furniture	2.6	2.9
Accommodation/transportation	7.1	4.4
Social/community services	4.9	7.7
Total	22.1	34.8

Source: Pollin *et al.*, (2006)

Agriculture creates one out of every seven jobs in South Africa. Although agriculture, as a rule, is not the leading sector in employment-creating economic development, it is an important source of employment because of the large number of benefiting dependants per farm worker.

On the basis of the 1996 Census, employment in the labour force by the ten major sectors of the economy was 8.9 million, of whom 887 880 (13.2 percent) worked in the agriculture, hunting, forestry and fishing sector (Table 9). In 2005, the number of employed people in the economy increased to 11.5 million of which 741 570 (6.4 percent) was employed in the agricultural sector.

Table 9. Formal employment by province, 1996 & 2005

Province	Total 1996	Agriculture 1996	%of Total	Total 2005	Agriculture 2005	%of Total
Eastern Cape	718 791	76 561	10.7	921 025	64 246	7.0
Free State	680 287	118 235	17.4	686 303	97 193	14.2
Gauteng	2 816 772	43 560	1.5	3 815 638	36 085	0.9
KwaZulu-Natal	1 341 757	116 370	8.7	1 804 768	99 379	5.5
Limpopo	523 284	92 406	17.7	735 618	77 046	10.5
Mpumalanga	614 947	112 389	18.3	818 640	99 279	12.1
Northern Cape	199 635	52 854	26.5	232 956	43 440	18.6
North West	649 073	85 766	13.2	810 092	70 606	8.7
Western Cape	1 441 581	189 740	13.2	1 759 838	154 296	8.8
South Africa	**8 986 127**	**887 880**	**9.9**	**11 584 880**	**741 570**	**6.4**

Source: DBSA, 2007

On average, the agricultural sector uses more workers for every R1 million value added than any other sector in the formal sector of the South African economy.

AGRICULTURE AS EARNER OF FOREIGN EXCHANGE

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). Exports of agricultural products can play an important, positive and equilibrating, if not a leading role, by acting as counterbalance to net foreign currency outflows by other sectors of the economy.

In South Africa, more than R22 billion in foreign currency earnings are currently generated by agriculture. If trends in exports

as a whole are taken into account, one reaches the conclusion, like Brand (1969) that agricultural exports have played an essential, equilibrating role that cannot be ignored. Brand (1969) states that if agricultural exports cannot claim to have been South Africa's 'engine of growth' during the twentieth century, it at least helped to provide the lubrication without which the engine may have grounded to a halt.

Export earnings by agriculture increased over the last number of years, as shown in Table 10. The value of agricultural products exported as a percentage of the total value of South African exports increased from 6.5 percent in 1985 to 7.6 percent in 2004.

Table 10. Total agricultural imports and exports, 1985 - 2004

	R million				
Years	**Agricultural imports**	**Agricultural exports**	**Total exports**	**Percentage**	**Ratio Exports to Imports**
1985	1 298	2 382	36410	6.5	1.84
1990	1 936	4 625	60770	7.6	2.39
1995	6 834	8 142	102417	7.9	1.19
2000	9 644	15 819	210022	7.5	1.64
2001	10 704	20 074	245447	8.2	1.88
2002	14 939	25 460	314927	8.1	1.70
2003	13 841	22 793	273126	8.3	1.65
2004	16 430	22 074	292078	7.6	1.34

Source: Abstract, 2006

Despite relatively poor production conditions in agriculture (during the eighties and early nineties) and persistent recessionary conditions in the economy as a whole in the early nineties, agriculture has made an enormous contribution to foreign exchange earnings which, in turn, has helped the country to meet its foreign debt obligations, often under difficult circumstances.

Trends in the structure of exports show that during the 1960's, wool, mohair and skins constituted about 50 percent of the total value of agricultural exports. This situation has since changed in that intensive industries – such as deciduous fruit, citrus and wine – now contribute more to the value of exports than wool, mohair, hides and skins and other extensive industries.

SACU import and export values for agricultural products during 2004 are listed in Table 11, to give an idea of the relative distribution

of the demand and supply of the various categories of agricultural products within the customs union.

Table 11. SACU Import and Export value of agricultural products, 2004

Imports			**Exports**	
Other	6 117 396		Other	4 679 290
Rice	1 323 509		Wine	3 345 106
Wheat	1 271 734		Citrus fruit	2 912 042
Soya-bean oilcake	1 064 881		Grapes	2 034 661
Alcoholic beverages	917 067		Apples, pears and quinces	1 678 925
Palm oil	788 986		Sugar	1 422 889
Cotton	752 211		Preserved fruit and nuts	1 221 761
Tobacco	738 366		Maize	725 700
Meat and edible offal of poultry	727 095		Fruit and vegetables	613 243
Bread mixtures Jellie powders	484 060		Wool	576 766
Maize	472 146		Undenatured ethyl alcohol	428 966
Sunflower - and cotton-seed oil	395 576		Raw skins of sheep and lambs	374 433
Preparations used in animal feeding	277 458		Apricots, cherries, peaches, plums fresh	339 371
Dried leguminous vegetables	180 960		Cigars, cheroots, cigarillos and cigarettes	274 455
Malt	177 414		Tobacco	269 006
Coffee	170 398		Food preparations	234 075
Hide and skins of bovine	149 485		Dates, pineapples, avo's, figs, guavas and mangoes	221 829
Peptones	138 465		Undenatured ethyl alcohol	204 819
Meat of sheep or goats	87 421		Raw hides and skins of bovine	178 776
Barley	67 013		Other meat and edible meat offal	178 747
Milk and cream	38 180		Sugar confectionary	69 485
Total	16 340 791		Total	22 074 345

Source: Abstract, 2006 (as adapted)

INVESTMENT IN AGRICULTURE

The main aim of this section is to investigate investment in rural and agricultural infrastructure and the rationale behind sufficient levels of infrastructure investment. In the first subsection that follows, a brief count-down of fixed investment in the South African agricultural sector is given.

Investment expenditure

Gross domestic fixed investment in agriculture in constant 1970 prices decreased from R 6 847 million in 1970 to R 5 125 million in 2006. Total fixed investment as well as fixed investment in agriculture reached their peak in 1981 at R 146 781 million and R 11 478 million respectively.

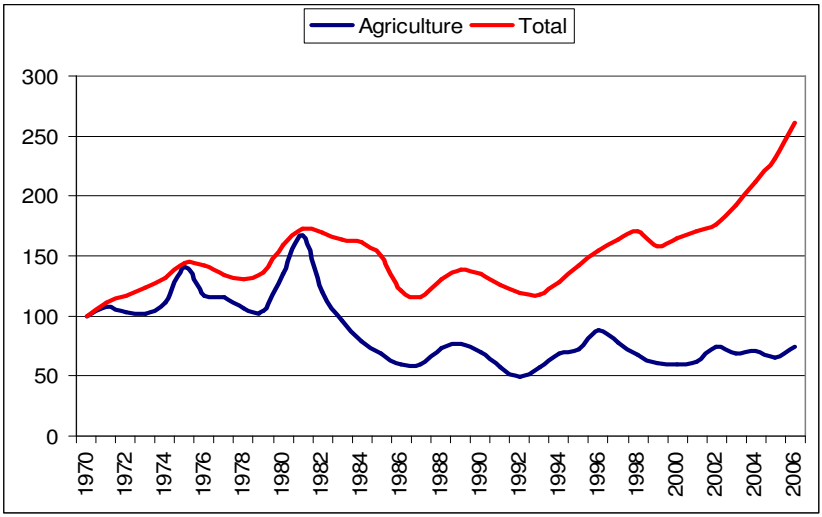


Figure 4. Real Gross Domestic fixed investment (indices 1970=100)
Source: SA Reserve Bank, 2006

Between 1981 and 1994, there was a continuous decline in total fixed investment in the economy. After 1994 it started increasing steadily to reach R 221 583 million in 2006. In contrast, fixed investment in the agricultural sector showed a continuous declining trend (see Fig. 4).

Total real *net* fixed investment declined since 1981, but remained positive after 1994 (see Fig. 5). Real net fixed investment in the agricultural sector declined significantly since 1981 and has been negative (depreciation exceeding investment) since 1983, resulting in a reduction in the fixed capital stock in agriculture (see Fig. 6). This means that the production capacity in agriculture has been declining for nearly twenty years in a row. It also means that due to a combination of factors, resources in the economy had over this period been redirected away from agriculture (and the rural sector) to

other sectors of the economy.

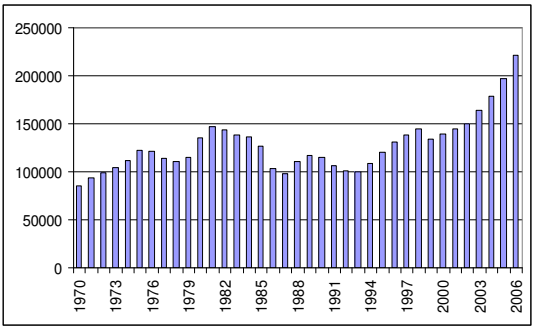


Figure 5. Total real net fixed investment 1970-2006

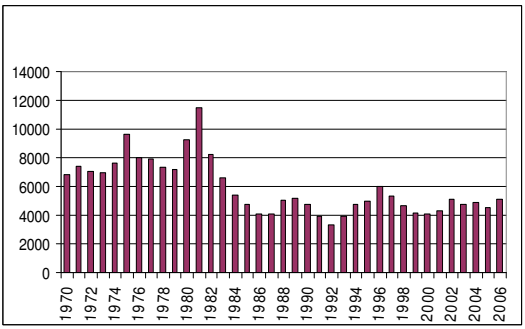


Figure 6. Real net fixed investment investment in agriculture, 1970 – 2006
Source: SA Reserve Bank, 2006

Foreign investment in farming dropped to R20m in 1997, from R30m the year before. This compared with the local investment which came down to R 2bn in 1997 from R 2.3 bn in 1996.

According to Vink (2007), sustainability in agriculture cannot be maintained without investment. Many possible reasons might be cited for the poor investment performance in agriculture. However, the fact that fixed direct investment in other sectors of the economy performed relatively well over the same period, points to the fact that investors, after having weighed risk and reward of investment in agriculture versus other economic sectors, found agriculture less rewarding.

One should then question government's policy stance over the relative importance of rural and agricultural development and their

view of long run food security. It is after all government that is responsible for creating an institutional framework and environment conducive to investment, especially so in sectors of strategic importance. Momentarily, the authors shall not argue this point any further. In the subsection that follows, we briefly consider the state of infrastructure investment in the rural and agricultural sector in search of evidence to support our view that rural and agricultural infrastructure investment should be accelerated as part of a successful macro-economic policy.

The economic rationale for rural infrastructure development

This section assesses the importance of the provision of infrastructure and related services in rural areas by defining rural infrastructure and assessing the role of rural infrastructure in development. Furthermore, the need and level of investment in rural infrastructure is analyzed. We begin our discussion with a definition of rural infrastructure.

Definition of rural infrastructure

According to Stilwell *et al.* (1998), there are three ways in which infrastructure may be classified, *viz.* economic ('hard') infrastructures, such as roads, electrification, bridges and railways; social ('soft') infrastructures, such as health and education; and 'institutional' infrastructure such as farmers' cooperatives and agricultural institutions.

Economic infrastructure is the part of an economy's capital stock that produces services that facilitate economic production or serve as inputs in production. Equally important, however, are institutional and 'soft' or social infrastructure. Social infrastructure is the capital formation that aims to provide services in agriculture, health, education and recreation, and has both direct and indirect impacts on quality of life. Government (national, provincial and local), parastatals and the private sector are all stakeholders in the delivery, upkeep and productive use of infrastructure.

In most cases, the type of infrastructure that we refer to, can essentially be classified as public goods and services, *i.e.* they are characterized by non-excludability and non-rival consumption. Where there is market failure to provide this kind of infrastructure, government has the obligation to provide such goods and services.

Should government fail to provide essential infrastructure, this may cause market failure in the market for private goods and services and cause collapse of marginal local economies in rural, agricultural and urban peripheral areas.

The rationale for any government policy of economic development lies in the welfare of society. Therefore, before exploring the different areas where we identify and justify arguments in mitigation of government investment in rural infrastructure, we assess the level and distribution of poverty in South Africa and in the section proceeding, we briefly explore our main concerns with certain infrastructure backlogs.

Socio-economic status of the rural population

The provision of infrastructure as part of a local economic development plan could assist in the elimination of rural poverty. Using the Household Subsistence Level,[4] May (1997) calculated the share and depth of poverty in urban and rural areas (Table 12). The poverty rate is a measure of the number of the population that falls below a set poverty line, while the poverty share indicates the proportion of the poor that live in a particular area (e.g. rural). Table 12 shows that the majority of rural dwellers (69 percent) are poor and that most poor people (74 percent) live in rural areas.

Most of the world's poor are rurally based as with South Africa. Even if they are not engaged in agriculture, they rely on non-farm employment and income that depends in some way or another on agriculture (Pinstrup-Anderson and Pandya-Lorch, 1995). The challenge for agricultural growth and development is not only to produce more food, but also to create income and employment for poor people inside and outside agriculture.

[4] The Household Subsistence Level, calculated by the Institute of Development Planning Research at the University of Port Elizabeth, is a "poverty line" which, for analytical purposes, serves to separate the poor from the non-poor, and is based on the expenditure required to obtain a minimum standard of nutrition and other basic needs. While the level of the line is often a matter of dispute, its main value lies in providing a measure to assess change over time in the level and depth of poverty (May, 1997).

Table 12. Distribution of poor individuals by rural/urban classification*

	Population share (percent)	**Poverty share (percent)**	**Poverty rate (percent)**
Rural	51	74	69
Urban	49	26	27
All	100	100	48

* Note: The definitions of urban and rural (strictly speaking, non-urban) used here are slightly different from those released with the PSLSD data-set.
Source: May, 1997

Poverty affects millions of people, with the majority of them being women and children living in rural areas. Of the 17 million poor people in South Africa, at least 11 million live in rural areas. The rural economy is inextricably linked to agricultural production.
International research done by Stilwell *et al.* (1998), on the socio-economic impact of rural infrastructure and services, revealed the following results:

- In India, better infrastructure led to significantly higher poverty reduction rates;
- China experienced remarkable growth over the last two decades. It was found that support programmes had a significant impact on the living standards in the targeted areas;
- In Bangladesh it was found that infrastructure directly affects agricultural production through diffusion of technology, use of inputs and its effect on prices. It caused household incomes to rise and indirectly encourages savings through its positive effect on income.
- Agricultural multipliers and, consequently, growth were found to be lower in Africa than in Asia owing to a lack of a number of factors, including infrastructure; and
- Locally, a DBSA survey on migration patterns on the eastern seaboard shows that the majority of rural dwellers were spatially more mobile and those who decided to migrate chose to move to the urban periphery where there was security of land and better infrastructure.

Backlogs in rural infrastructure investment

Adequate infrastructure investment is important in the diversification of trade and industry and allows the country to benefit more from globalization (DBSA, 1997). Infrastructure is a key to sustainable

economic growth and is vital to meeting basic needs for water, electricity, transport and telecommunication. Table 13 presents the large disparities between urban and rural infrastructure backlogs in service provision in South Africa in 1995.

Table 13. Major backlogs in service provision, 1995

Sector	**Percentage of population without access to**		
	Electricity	**Water**	**Sanitation**
Urban	23.50	20.00	20.00
Rural	79.40	65.00	95.00
Total	49.60	39.70	52.80

Source: The National Electricity Regulator and the National Infrastructure Investment Framework, 1995

Without improved infrastructure, living standards and South Africa's ability to compete on international markets will remain under threat. These services have different effects on improving the quality of life. Access to clean water and sanitation can reduce mortality and access to transport provides access to markets, employment opportunities and social services such as health and education. Access to communication networks can result in an improved level of education and literacy.

According to the World Competitiveness Report (1995), South Africa was ranked nineteenth overall in the world in terms of the extent and quality of its infrastructure. More recent competitiveness reports place South Africa third last among 200 countries. Whichever report one decides to follow, they all seem to show South Africa's relative competitive position worsening, chiefly because of weakening infrastructure.

Role of rural infrastructure in economic development

Rural infrastructure serves many economic and social purposes. For instance, it creates an array of livelihood choices in commercial and small-scale farming. Many micro socio-economic studies have pointed to the economic development outcomes achieved with small-scale infrastructure interventions in rural and agricultural contexts. Most of these studies confirm that livelihood choices are broadened in these communities. A good example is that of small-scale information and communication technology infrastructure

commissioned by the Agricultural Research Council in a small irrigation farming community at Thabina in the Limpopo Province. Many development outcomes were recorded, among them improved farming practices, better yields and human development through improved access to education (Breitenbach, *et al.* 2006).

Selected rural and agricultural infrastructure that require intervention

Most agricultural industries are bound to their locality, e.g. mills and cotton gins, dairies and fruit warehouses. A lack of infrastructure discourages complementary investment by the private sector in setting up these labour-intensive value-adding industries.

Resources: Water and Energy. Irrigation farming is currently one of the major consumers of electricity in agriculture. Approximately 50 percent of the country's current water use is utilized to irrigate approximately 1.3 million hectares of land. In the commercial farming areas, 30 percent is planted to intensive crops, 50 percent to extensive crops (*i.e.* crops that are also grown under dry-land conditions) and 16 percent to pastures. Limited information is available on cropping patterns in the former homeland areas, which covers an area of 100 000 ha. The major constraints to new irrigation development, estimated at 178 000 ha in South Africa, are limited water resources and the high cost of schemes. The high cost of creating infrastructure emphasizes the importance of upgrading existing facilities and schemes where the primary water supply infrastructure is in position. The key to improved irrigation lies in more efficient use of water and the use of more cost-effective technology. Global warming and climate change are increasingly affecting natural rainfall patterns and therefore the available stock of water.

The competitive uses of water resources between a growing industrial sector, irrigation farming and forestry and residential use of a growing population, is increasing total demand for the resource.

Supply of the resource is estimated by scientists to diminish. The challenge for government is thus indeed a large one. Estimates by Wakeford (2007) on the rate at which traditional energy sources are being depleted, poses a similar challenge; the demand for the resource is growing whilst the supply thereof is finite. According to

Wakeford, 90 percent of South Africa's energy sources are non-renewable. This has two major disadvantages: first, it continues to contribute to global warming and climate change and secondly, our GDP growth depends on an infinite supply of resources, meaning that at some point, the economy is set to stop growing as fossil fuels and other non-renewable sources of energy become depleted.

Institutional Infrastructure: Research and Development. Investment in agricultural research and development are crucial to increase agricultural productivity and competitiveness. Less-developed countries are, however, under-investing in agricultural research. South Africa is a case in point. Further reductions in public investment in agricultural research will have severe consequences for global food production by reducing yield growth.

Institutional Infrastructure: Agricultural Support Services. The quality of delivery of rural support services is deteriorating at an alarming rate. There is great concern that the public sector is increasingly unable to deliver support services, which are necessary to maintain agriculture's competitive position at an international level (Willemse, 2000).

The abolition of the Development Corporations in the former homeland areas was a major blow to the provision of agricultural support services to small-scale farming, resulting in a total collapse of farming operations in these areas. The same situation applies as far as institutional aspects are concerned. In the past, better access to research, technology, and co-operatives existed for the commercial farmers than for the small-scale farmers.

Hard Infrastructure: Roads and Railways. The competitiveness of the agricultural sector is to a large extent dependent on how efficient it can transport its products to the markets. Investment in economic infrastructure (roads, bridges, dams, electricity, water *etc.*) has decreased from about 28 percent of total fixed investment in 1987 to less than 23 percent in 1994. South Africa's road and rail density compares favourably to world averages and is far better than the average for Africa. However, poor road conditions and uncompetitive rail transport are currently hampering the functioning of the agricultural sector. In the first quarter of 2007, grain mills

ordered 12 993 railway trucks for the transport of 571 692 tonnes of grain. South African rail operator, Spoornet, could only supply 9 501 railway trucks to transport 418 044 tonnes of grain. The country's road network has its own problems with 72 percent of the road network being older than twenty years (Rapport, 2007).

Institutional Infrastructure: Markets and Periodic Markets. There are also infrastructural and marketing challenges in the attempt to assure food security and international competitiveness. In many remote rural areas, food-marketing costs are extremely high. The implementation of the Marketing of Agricultural Products Act of 1996 resulted in the deregulation of the agricultural sector. Producers were ill prepared for operating under the new deregulated environment. As production volumes increase and new markets continue to develop, the shortage of logistic infrastructure capacity during peak periods, is becoming more and more evident.

When discussing access to food by the poor in an earlier section of this paper, it was mentioned that the food being produced, do not reach the poor. The first most likely reason is that the poor might not be able to afford it. However, markets are not effective in bringing goods to the poor. The alternative in many cases are poor people serving the poor, mainly by hawking and selling bulk-break to other poor people. Reynolds (2004), studied the working of markets, first in rural Zimbabwe, and then in South Africa. He contends that periodic markets are an effective means of serving the poor (bringing food to the poor), but also to provide wealth creating economic activities, able to circulate money in rural local communities, thus increasing local multipliers. The current market structure favours the haves, not the have nots. The development of proper working and wealth creating markets forms part of soft infrastructure provision, and should be integrated with current rural and agricultural extension services, whether it takes the form of periodic markets or not. The development of working markets should furthermore form part of local economic development strategies; markets are after all how it all began, and the reason why today we have modern working economies.

Current government commitment to infrastructure investment

In the current year, 2007/8, budgeted expenditure for the payment

of capital assets by government (total) is R4.6 billion. On the part of infrastructure, government, in its Medium Term Expenditure Framework for the years 2006/7, 2007/8 and 2008/9, allocated R372 billion to capital projects and infrastructure development. This translates to R124 billion a year. If one analyzes this expenditure allocation, one can determine to a large extent what the impact is going to be on different sectors.

Over the three year period, government's commitment to infrastructure development is as follows: The municipality infrastructure grant is R21.5 billion, to provide for basic water infrastructure, sanitation, roads and other infrastructure; the national electrification programme gets R4.4 billion; R2.5 billion for neighbourhood development; R23 billion to housing; R3.1 billion for soccer stadiums, R4.1 billion for hospitals; R15.1 billion in respect of the provincial infrastructure grant, to build clinics, schools and provincial roads; R14.3 for transport infrastructure, of which R1.9 billion goes to the building of new national roads, R1.6 billion goes to passenger rail, and R3.5 billion for public transport infrastructure and systems; R1.2 billion to science and technology and R3.2 billion to the national public works programme.

No specific allocation for infrastructure development in agriculture is made. It is accepted that some of the infrastructure investment would impact on rural and agricultural economies, but then mainly through the R36.6 billion allocated to provincial and local government for the purpose of building schools, clinics, and provincial and local roads.

CONCLUSIONS

Through its linkages with other sectors of the economy, agriculture's employment generation capacity and potential by far exceeds that of any other sector in the economy, on a sustainable basis. This is especially true for the alleviation of poverty in rural South Africa. Were South Africa endowed with a highly skilled labour force, the argument might easily go the other way. No other economic sector has more potential to assist South Africa to meet its Millennium development goals, halving unemployment by 2014, and feeding its nation, than the rural and agricultural sector. Most other sectors have already reached steady state levels of capital formation

and are facing capacity constraints. Capital formation in agriculture and therefore capacity, is at an all time low from where it can leap-frog into high and sustainable levels of output. What is required of government is to realize this and to initiate action, with direct government support and real tangible monetary participation, in order to regenerate the agricultural sector and again substantially increase the size of the sector's contribution to GDP.

Nowhere is this argument made more explicitly and convincingly than by Kofi Annan, former Secretary General of the United Nations and currently Chairman of The Alliance for the Green Revolution in Africa, at the World Economic Forum (WEF) meeting in Cape Town, South Africa on 14 June 2007, when he pronounced that Africa's road to welfare starts on the crop fields of small farmers. He sees the Green Revolution for Africa as the only sustainable solution for Africa with the underlying motivation of food security for the African continent and the integrity of the small farmer (Sake 24, 2007).

Most developed countries maintain their agricultural sector even at a high cost with the realization of the strategic importance of agriculture. Although government seem to be making the right noises insofar as policy and political announcements are concerned, government is not decisive (aggressive) enough in creating a vibrant agricultural sector. This is mostly evident from the fact that the South African government lags far behind those in the European Union and the United States, when it comes to active participation in, and direct support of its farmers.

The authors contend that a regeneration of the agricultural sector will create the most cost-effective jobs, take care of the hungry poor, and if afforded the opportunity to have enough natural resources left for the next generation, again turn back the hands of time and become a sector that can be relied on to create welfare for its citizens.

On the issue of infrastructure development, the authors are especially critical of the fact that the South African government commits far too little government resources to long run investment in renewable natural resource infrastructure, especially investment in renewable energy resources and long run water security strategies. The authors question the fact that current proactive initiatives in

respect of the creation of renewable natural resources for Africa do not emanate from within Africa. A case in point is the initiative by Eskom, British Columbia Hydro (Canada) and Vattenfall (Sweden), to supply 70 000 people in Lesotho and The Democratic Republic of Congo of hydro electricity (Sake 24, 2007).

Far too little resources (and action) are devoted to critical and competitive transport network infrastructure, institutional infrastructure (systems that move goods faster through customs and border points) and effective working markets (especially those that can help the small farmer getting goods to markets cost efficiently and fast). South Africa's inadequate progress with infrastructure investment was underlined by the WEF Workgroup on Infrastructure on 14 June 2007 (Sake 24, 2007).

The whole world would soon experience the real results of earth's neglect, when not only does global warming and climate change kick in, but finite resources become increasingly scarce and put additional upward pressure on basic life-sustaining food products' prices. At the same time, South Africa would start experiencing pressures from its ailing infrastructure unless policy makers rise to the challenge of unprecedented making good and directing large scale government investment expenditure on much needed infrastructure, especially in rural and agricultural contexts. To this extent it is worth noting that an energy crisis of consequence would debilitate millions travelling to and from work and markets, and prevent business from transporting goods freely, or at reasonable cost, to markets. This would necessitate localization of especially food production and consumption.

Responsible and strategically prioritized infrastructure is required alongside a strong rural and agriculturally viable sector for it to be successful. The world's six billion people, of which nearly 4 billion live in the developing world, increasingly compete for resources all of which are finite. Therefore, what South Africa makes of its resources, infrastructure and opportunities today, will determine the fate of its children tomorrow.

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