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SWAZILAND

AGRICULTURAL SECTOR UPDATE

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Eastern and Southern Africa Projects
Southern Agriculture Division

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CURRENCY EQUIVALENTS

Currency Unit = The Emalangeni (singular, lilangeni), at par with the Rand and circulating jointly with it.

US$ 1.00 = E. 2.01
E 1.00 = US$ 0.49
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ABBREVIATIONS

AACS - Agricultural Advisory Credit Scheme
BMC - Botswana Meat Commission
CCU - Central Cooperative Union
DEPS - Department of Economic Planning and Statistics
GMDA - Grazing Management and Demonstration Area
MLPS - Ministry of Labor and Public Service
MOAC - Ministry of Agriculture and Cooperatives
MOF - Ministry of Finance
MNRLUE - Ministry of Natural Resources, Land Utilization and Energy
RDAP - Rural Development Areas Program
RMA - Rand Monetary Area
RSA - Republic of South Africa
SACU - South African Customs Union
SCAP - Swaziland Cropping System Research Project
SDB - Swazi Dairy Board
SDSB - Swaziland Development and Savings Bank
SLC - Swaziland Livestock Commission
SMC - Swazi Meat Corporation
SMC - Swazi Milling Company
SNL - Swazi Nation Land
TDL - Title Deed Land
SWAZILAND
AGRICULTURAL SECTOR UPDATE

TABLE OF CONTENTS

I. INTRODUCTION ................................................................. 1
   A. Purpose and Focus of the Review................................. 1
   B. Macroeconomic Setting............................................. 2
   C. Role of Agriculture and Recent Performance............... 3
   D. Government Involvement in the Sector.......................... 3

II. CHARACTERISTICS OF THE AGRICULTURAL SECTOR ................... 4
   A. Land and Climatic Resources..................................... 4
   B. Production and Farming Systems................................. 6
   C. Support Services.................................................... 6
   D. Socioeconomic Characteristics................................. 7

III. CROP POTENTIAL AND CONSTRAINTS.................................... 9
   A. Export Crops.......................................................... 9
   B. Food Crops............................................................ 12

IV. LIVESTOCK DEVELOPMENT POTENTIAL.................................. 15
   A. The Beef Cattle Industry.......................................... 15
   B. Dairy Development.................................................. 18
   C. Ongoing and Proposed Programs................................. 19

V. INSTITUTIONAL CAPACITY AND SUPPORT SERVICES..................... 21
   A. Institutional Capacity.............................................. 21
   B. Support Services................................................... 24

VI. PROPOSED DEVELOPMENT STRATEGY.................................... 27
   A. The Setting.......................................................... 27
   B. The Agricultural Dilemma......................................... 28
   C. The General Strategy.............................................. 29
   D. Elements of a Strategy............................................ 30
   E. External Assistance................................................. 35

Tables
1. Crop Production, 1968-1986
2. Volume of Sugar Sales, 1984/85-1985/86
3. Estimated Sales of Citrus, 1984-86
4. Seed Cotton Production, 1981-86
5. Cattle Herd, 1971-1984
7. Smallholder (SNL) Crop Budgets

Annexes
1. Summary of Main Reports Cited in the Review
SWAZILAND
AGRICULTURAL SECTOR UPDATE

I. INTRODUCTION

A. Purpose and Focus of the Review

1.01 Swaziland's economy is dominated by agriculture, and the agricultural sector by the sugarcane industry. In recent years, the Government of Swaziland has had to face an increasingly difficult economic environment characterized by reduced sugar export receipts and world-wide recession that has seriously weakened its most important trading partner, South Africa. These strains have revealed a very vulnerable domestic economic structure. In addition, low productivity in smallholder agriculture and relatively high wages in the modern sector have acted as a disincentive to smallholder production on Swazi Nation Land (SNL). Rural households have tended to apply surplus labor to wage employment rather than to cash cropping. The prospect of off-farm employment has accelerated rural-urban migration, raised the level of disguised or actual urban unemployment, created problems of urban congestion and put a strain on public services. These problems are exacerbated by a rapidly expanding population growing at an estimated 3.6% per annum. Moreover, it is estimated that by the year 2000, the number of adults requiring work either in paid employment or subsistence farming will grow from 382,000 to a minimum of 650,000. Industrialization and urban job creation, while continuing to expand, will not be able to keep pace with the growth in population and the labor force. Employment opportunities in South Africa are also declining as the South African Government gives preference to its own rapidly growing labor force. Agriculture in the SNL, therefore, will need to provide most of the country's rural employment opportunities. For this reason, development of the sector is assigned high priority in national development plans and the Government's policy statements.

1.02 This sector review is intended to contribute to the Government's own assessment of prospects and priorities in agriculture. An impressive body of recent work already exists on various aspects of the agricultural sector. What is lacking is the framework or strategy which provides the basis for synthesizing this information and selecting priorities. The present review is intended to provide this framework in the form of a short-to-medium-term (3-5 year) development strategy that is based on an analysis of the sector's major constraints and available development options. This review also identifies possible areas of external donor assistance and gaps in data and knowledge requiring further study and analysis. The review incorporates data extracted from official Government publications, unofficial documents, and information obtained in discussions with the Government and members of the donor and business community. It also draws on the findings of World Bank operational work, including project appraisal and supervision reports (Rural Development Areas project; Ln. 1375-SW), and the previous agricultural sector review published in 1980.

1.03 Chapter I provides an overview of Swaziland's economy and highlights problems associated with the slowdown of economic growth during the last three years. It argues that agriculture could contribute to the
recovery of the economy, and in this regard the performance of the smallholder sector is seen as playing an important role. Chapters II - V describe the major characteristics of the sector and analyze the development potential and major constraints affecting crop and livestock production. They show that while there is still considerable potential, further development is presently hampered by a number of political, social, economic and technical constraints. Chapter VI proposes development options for addressing the major constraints within the framework of a 3-5 year agricultural sector strategy.

B. Macroeconomic Setting 1/

1.04 Swaziland's economy has been shaped by the complexity of its geopolitical environment. The country is small (about 17,000 km$^2$), and has fewer than 800,000 people. Except for a short stretch along its eastern edge which borders Mozambique, Swaziland is surrounded by the Republic of South Africa (RSA). Swaziland is heavily dependent upon the RSA for imports, transport routes, Government revenues (through the customs union), and for monetary arrangements (through membership in the Rand Monetary Area [RMA]). Swaziland's participation in the RMA and the Southern Africa Customs Union (SACU) establishes a very close link with the South African economy. As a result of this economic interdependence and the free flow of trade between the two countries, Swaziland's money supply, prices, and interest rates are largely externally determined.

1.05 Since Independence in 1968, economic growth in Swaziland has been characterized by wide fluctuations with an impressive 9% real growth rate until 1973, dropping thereafter to as low as 0.2% in 1979 and rising again to 7.9% in 1981. This growth resulted in a relatively high (by Sub-Saharan Africa standards) per capita income of almost US$1000 in 1981. Economic growth during the last three years, however, has been negligible largely because of external factors such as the general world-wide recession (including, most importantly, in South Africa), low export prices, the devastating effects of regional drought and, more recently, the cyclone "Domoina".

1.06 Swaziland's balance of payments reflects the openness of its economy and its membership in the RMA and SACU. Combined imports and exports account for more than 150% of GDP. Swaziland depends on the RSA for up to 85% of its imports. Although Swaziland is a net agricultural exporter (owing to the importance of sugar), it is dependent on imports of food grain (maize).

1.07 By African standards, Swaziland's exports are relatively well diversified. Sugar is the main export, accounting for about 40% of total export earnings, followed by woodpulp (13-14%) and fresh and canned citrus and pineapple (11-17%). Exports of meat and meat products are small (less than 2% of the total) and are declining. Total export earnings declined from US$418 million in 1980 to US$360 million in 1984, largely due to a fall in export prices, particularly for sugar.

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1/ For more detailed discussion, see Economic Memorandum on Swaziland, November 1, 1983, Report No. 5660-SW.
C. Role of Agriculture and Recent Performance

1.08 The importance of agriculture, including forestry, in Swaziland's economy hardly needs to be stressed. In 1983, the production and processing of agricultural and forestry products contributed 40% of GDP, supplied approximately 73% of total exports, accounted for 29% of formal sector paid employment and provided a living for about 75% of the rural population.

1.09 The agricultural sector is highly dualistic in terms of ownership, production and the tenurial system under which land is cultivated. The modern commercial subsector, operating on leasehold land and largely foreign-owned and managed, generates about 60% of the country's agricultural production. The commercial farmers have 800 Title Deed Farms, 24 of which occupy 20% of the country's total land area. The smallholder subsector, which accounts for the remaining 40% of agricultural output, is characterized by semi-subsistence production, communal grazing and traditional tenure on the SNL. Maize is the principal smallholder crop and occupies 53% of the total crop area. Smallholder farmers are concentrated on the land designated SNL which comprises about 50% of the country's total land area.

1.10 Agricultural commodity imports make up a relatively small proportion of total imports. Imports of food, tobacco, and vegetable oils constitute about 10% of the value of all imports. Imports of fertilizers, tractors and machinery make up only about 5% of imports.

1.11 Cereals (mainly maize) are the largest component of food imports. Cereal imports have increased rather rapidly (150% between 1978 and 1982), but still represent only 2-3% of total imports. Imports of maize and maize products have increased from 20,000 tons in the early 1970s to 50,000 tons in 1983, a per capita equivalent of about 65 kilograms.

1.12 In the livestock industry, cattle bring in foreign exchange through beef exports to the EEC market under the Lome quota. However, commercial slaughter for export has declined rapidly from a peak of 4,000 tons in 1979 to less than half that figure in each of the years from 1981 to 1984. Meat and meat product exports currently make up less than 2% of Swaziland's total exports. Liquid milk production has increased rapidly, principally from the TDL, up to the present level of demand for liquid unhomogenized milk. The availability of crop by-products provides for an increased livestock output without the need for increased imports of concentrate feed.

D. Government Involvement in the Sector

1.13 The general goals of the Ministry of Agriculture and Cooperatives (MOAC) regarding agricultural development are relatively clear and uncontroversial. They include: (a) advancing the productivity and income-generating capacity of the agricultural sector; (b) promoting and encouraging increased crop production and diversification; (c) making farm services, including credit and marketing, more available to farmers and owners; (d) strengthening the crop, livestock and extension services; and
(e) conserving and enhancing the quality of the natural environment. Strategies for achieving these goals, however, change frequently or are lacking and, as a result, it is difficult to translate stated agricultural objectives into supporting programs and investments. Priorities are not well-defined or are frequently changing and resources are often diverted to peripheral programs. This problem is one of the major constraints on efficiency within MDAC.

1.14 The Government has focused its investment in traditional agriculture through the Rural Development Areas Program (RDAP), now covering about 51% of the SNL. RDAP has received Government support and donor funding from ODA, USAID, EDF, AFDB and the World Bank. The program is based on the assumption that the major constraint to increasing uptake or expansion of cash crops in the rural areas is lack of technical knowledge, inputs and infrastructure. RDAP aimed to provide these missing elements and has, since its inception in 1970, put in place rural infrastructure with complementary staffing and provided farmers with inputs, agricultural credit, improved communications, specialist advice and greater extension coverage. RDAP has trebled the number of extension staff and has greatly increased MOAC's stock of houses, offices and vehicles.

1.15 These investments in SNL agriculture, although achieving certain infrastructural goals (provision of piped domestic water supplies, improved access roads, etc.), have not increased agricultural output. Furthermore, despite the widespread adoption of hybrid maize varieties, the long-term trend has been one of slow decline, primarily due to decreases in acreage planted. Although cotton production has increased significantly, this has been largely in areas outside the RDAP. The reasons for RDAP's lack of production impact are well-known and have been extensively documented. Agricultural production in the rural areas in Swaziland is constrained not only by the lack of technical inputs and infrastructure, but also by more attractive off-farm employment opportunities. The widespread adoption of hybrid maize under RDAP meant that household consumption requirements could be met with less labor and that labor released could be absorbed into the wage sector at higher rates of remuneration.

1.16 With the completion of RDAP I and II, external finance has been considerably reduced. The Government is now faced with the problem of sustaining the program from its own limited budgetary resources and is already experiencing problems in this regard.

II. MAJOR CHARACTERISTICS OF THE AGRICULTURAL SECTOR

A. Land and Climatic Resources

2.01 Although Swaziland is a relatively small country (17,364 km2), its four distinct agro-ecological zones provide considerable natural diversity and therefore the potential for a wide range of crops and for effective stratification of livestock production. The Highveld (5,029 km2), lying in the west of the country at an average elevation of 1,300 m asl, has highly weathered acid and very erodible soils and is generally unsuitable for arable agriculture. Mean annual rainfall ranges
from 1,000 mm in the south to over 1,500 mm in the northwest. Most of the area is under commercial forestry, mainly for pulpwood. Maize is the principal crop grown (89% of cropped area) with small areas of tobacco. The Middleveld (4,597 km²) has the highest proportion of SNL and the greatest area of fair to good arable soils (20% of the national total) with less acidity than the Highveld. The altitude varies from 500 to 1,100 m asl with the relief characterized by hills and large valleys. The rainfall varies from 800 to 1,100 mm. The principal crops grown in the Middleveld on the SNL are maize, sorghum, pulses (groundnuts and beans), vegetables, cotton and tobacco. Pineapples and citrus predominate on the TDL. Livestock production is a key part of the farming system in the Middleveld on both the SNL and TDL lands.

2.02 The Lowveld (6,416 km²) has an average elevation of only 200 m asl and, although its soils are mostly fair to good arable and suitable for crop production, the likelihood of drought is high, making crop production without irrigation risky. In favorable years, reasonable yields of rainfed cotton, sorghum and groundnuts are possible. Generally, however, yields have been low, particularly in the early 1980s as a result of consecutive droughts. About 20,000 ha are under irrigation, principally for the production of sugar, citrus, rice and cotton. Only a very small proportion of this irrigated land is managed by small-scale producers, most of whom grow rainfed maize, pulses, sorghum and cotton. The rainfall is variable between 500 and 900 mm; rainfall reliability data indicate that for dryland maize there will be a crop failure in four out of five years and for cotton, one year in five. The Lubombo Plateau (1,321 km), which lies on the eastern side of Swaziland, has a climate similar to that of the Middleveld. The average altitude is 600 m asl and, while much of the area is dissected by steep slopes and valleys, it also contains small areas of deep cultivable soils on which maize and beans are cultivated on both the SNL and TDL and cattle are raised commercially on the TDL. Increased agricultural production (largely through increased yields) is almost certainly feasible on the Lubombo Plateau.

2.03 Swaziland's climate, as would be expected from the topographical range, varies from near-temperate with occasional winter frosts to sub-tropical and semi-arid. The more favorable weather and soils are probably the principal reasons for the Middleveld being the most densely populated area of Swaziland. Four principal rivers, the Komati, Usutsu, Mbuluzi and Ngwavuma, cross the four regions and their extraction rights have to be shared with South Africa. While it has been estimated that more than 200,000 ha of land have potential for irrigated cropping, there is only sufficient water for 90,000 ha without additional storage capacity. The actual magnitude of the latter figure does, however, depend on the cropping pattern, irrigation system, water storage capacity, and international agreements, as well as the domestic industrial and power demand for water. There are presently an estimated 42,000 ha under irrigation, of which less than 1,000 ha are on the SNL. Water for irrigation is only feasible from surface flow either through direct diversion of river flows or via storage; studies indicate that there is very little groundwater for irrigation. Evidence shows that with supplementary irrigation, there is definite potential for increased productivity for traditional field crops, such as maize and cotton, particularly in the Lowveld.
2.04 The soils of Swaziland are complex, the distribution of the major types being related to relief and geological structure. In general, they have developed in place from weathering parent rock, although alluvial soils are found in some areas. The soils were mapped in the 1960s at a scale of 1:125,000 and this provides sufficient detail for assessment of cropping and production potential, particularly in the Lowveld where the soils are most uniform. However, in the Highveld and Middleveld, this scale does not provide sufficient detail to allow development of a much needed National Land Use Plan or more location-specific extension advice.

2.05 Land is divided by tenure into (a) Swazi Nation Land (SNL), which is allocated by the chiefs according to traditional customs, and (b) freehold or concession lease. The SNL covers 965,000 ha of which, in 1984, 81,000 ha (8%) were identified as being under crops, 12,354 ha (1%) as land in fallow, 865,300 ha (90%) as grazing lands and 6,500 ha (0.7%) as homesteads/village centers. Of the land under crops in 1981/82, 21% was in the Highveld, 46% in the Middleveld, 26% in the Lowveld and 7% on the Lubombo Plateau. The SNL includes the Rural Development Areas (RDAs). The bulk of the 755,000 ha under freehold or concession lease is Title Deed Land but also includes 180,000 ha held under royal trusts or by the Government. In addition to the above tenured land, 11,000 ha are urban or village areas under the control of Town Councils.

3. Production and Farming Systems

2.06 Crop agriculture in Swaziland is significantly dualistic, with a sharp contrast between the management, output and productivity of much of the title deed lands (TDLs) as compared to those of the SNL where the majority of smallholders farm. The TDL farms are primarily involved in the production of crops for export (sugar, citrus, pineapples, cotton and recently beans), while the SNL farms are essentially subsistence-based (maize, pulses, vegetables and sorghum), with some cash crop production (cotton, tobacco and horticulture). In 1984 (the most recent year for which data are available), more than half (53%) of the agricultural contribution to GDP was derived from the TDL, 26% from agro-industries, and only a modest 21% from the SNL. This pattern is not markedly different in 1986.

2.07 Cattle are of central importance in the national and rural economy and are an integral part of the Swazi farming system. Cattle and meat and meat products account for about five percent of total exports. The majority of cattle (about 80%) belong to Swazi farmers on the SNL and are managed under the traditional system characterized by communal grazing. The other 20% are held on TDL under a commercial system of management. Cattle, in addition to being a source of milk, manure and draft power, account for more than 30% of total homestead income.

C. Support Services

2.08 The dualism of the agricultural sector is reflected in the delivery of agricultural services and the marketing system for crops. The TDL sub-sector relies for its services and support almost entirely on the private sector, the only notable exception being Government provision of cotton research with financial contributions from cotton producers. In
contrast, the SNL farmers are heavily dependent on servicing by Government institutions, although certain services, such as input supplies and tractor hire services, are also available through the private sector. The majority of Swaziland's crop exports are marketed through arrangements with the relevant RSA Statutory board, and are well-organized through locally established marketing units. In contrast, the infrastructure and internal marketing arrangements for foodcrops and fresh fruit and vegetable crops are ineffective and producers face uncertain sales prospects and market information.

D. Socioeconomic Characteristics

2.09 The 1983/84 national survey of SNL homesteads (Central Statistics Office) shows 32,755 homesteads within the 18 existing RDAP areas with an average household size of 10.3 people and 17,411 homesteads outside of the RDAP areas with an average household size of 10.1 people. The estimated area of cropland available per household in 1984 was 1.16 ha for the RDAP areas and 2.46 ha for the rest of the SNL. The higher density of the RDAP areas is probably due not only to their more favorable agro-ecology, but also to the provision of infrastructure and services financed under RDAP I and II.

2.10 Based on the 1976 Population Census and an annual population growth rate of 3.6% per annum, Swaziland's population in mid-1985 is estimated to have been 750,000, with approximately half the population under 15 years of age. The largest numerical increase and fastest growth rate in the population is occurring among the youngest age group. This implies large numbers of entrants into the labor force in the future (an additional 200,000 adults seeking work over the next 15 years). Because neither commercial agriculture nor the modern sector is capable of absorbing large numbers of people, smallholder agriculture will need to provide most of the additional employment.

2.11 Off-Farm Employment Opportunities. It has been recognized for some time that the issue of modern sector employment is critical to an understanding of farm household behavior. Returns to labor in SNL agriculture are low and relatively high wages in the public and private sectors have drawn labor out of agriculture and acted as a disincentive to smallholder production. It is estimated that between 80 and 90% of all homesteads derive some income from formal sector employment, which accounts for an average of 1.74 jobs per household for all families in Swaziland. Unskilled agricultural laborers constitute the largest group of laborers in Swaziland; although they receive the lowest wages of those in regular paid employment, their wage levels are sufficient to provide an annual income of about E1300.

2.12 Future growth in formal sector employment is estimated at 1.7% per annum against a 3.6% increase in population, indicating that a growing

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3/ De Vletter in his study (1983) of Swazi rural homesteads estimated average annual cash income per homestead at around E1100 of which about half was generated from wage employment.
proportion of the labor force will need to find employment in the
non-formal and farm economy.

2.13 Since it is traditional for young males to be engaged in wage
employment normally until the age of about 30, this age group accounts for
most of the outmigration. With the decline in employment opportunities,
the retention of labor in the rural areas may begin to influence
traditional attitudes toward farming. Socioeconomic factors, of course,
will continue to be important in influencing household decisions,
particularly concerns for security, i.e., usufruct rights to land and
membership in a chiefdom. However, as economic conditions change,
traditional views of agriculture may evolve to take greater account of
market factors. The progressive use of hybrid seed and other land and/or
labor-saving technologies over the last decade does demonstrate that
homesteads will respond to incentives, provided they are attractive enough
vis-a-vis other options. The challenge is to make agriculture more
attractive as an income-generating occupation than it is at present.
Although the differential between returns to labor in the formal sector and
in the SNL is likely to continue for the foreseeable future, there is scope
for narrowing the gap by making small-scale agriculture more productive.

2.14 The Role of Women in the Sector. Women predominate in
agricultural and household support activities. Men have primary
responsibility for cash crop production, whereas food crop production is
largely the domain of women, and decisions on maize activities are
generally a female prerogative. Overall, it is estimated that women
account for approximately 70% of all agricultural labor, including
planting, weeding and harvesting. The sale of produce, handicrafts and
beer brewing is also female-dominated.

2.15 There are a number of factors which limit the potential of
women's contribution to the development of the sector. Women farmers
generally have less access to cash resources than men and, as a result, are
less able to purchase agricultural inputs and equipment or to hire labor.
\*\* The prequalifications for institutional credit (ownership of cattle to
pledge as collateral for loans) also limits women's access to credit
sources. In addition, women are excluded from receiving the full benefits
of agricultural extension and training. Most agricultural extension agents
are male (87%) and, according to local custom, it is considered
inappropriate for male strangers to visit women on the homestead.
Moreover, female extension workers usually focus on home economics, rather
than on agriculture. To date, the constraints facing women farmers have
not received adequate attention in Government programs. This has a direct
bearing on the success of Government efforts to achieve maize
self-sufficiency since women are primarily responsible for homestead based
agriculture and, in particular, maize production.

\*\* De Vletter (1983) and Low (1979) found that homesteads headed (or
supervised) by females or young men (less than 35 years of age) were
less inclined to spend money on agricultural inputs, were unlikely to
be members of cooperatives, and had smaller cattle holdings than
homesteads headed by older men.
2.16 Training and Education. Vocational training is a weak area in Swaziland's educational system. The lack of technically trained and skilled personnel (for management and maintenance of farm machinery and equipment and for in-service training of agricultural extension staff) is a significant constraint on the development and dissemination of technological improvements.

2.17 In terms of basic education, Swaziland has made considerable progress. In 1980, total primary school enrollment was 100% for 6-12 year olds, 46% for junior secondary enrollment (13-15 year olds), and 20% for senior secondary (16-17 year olds). About 60-70% of the adult population (16 years and older) are thought to be literate. Education has recently become one of the top expenditure priorities of the homestead, and there appears to be no tendency to give educational priority to one gender or the other.

III. CROP POTENTIAL AND CONSTRAINTS

A. Export Crops

3.01 Sugar. Sugar is Swaziland's most valuable export, and production has increased steadily over the past 10 years from 198,000 mt (1976) to its present level of 375,000 mt (1986)(see Table 1). Swaziland is able to produce very high yields of cane with high sucrose content, and is considered one of the lowest cost global cane sugar producers. Swaziland has sugar quotas from both the EEC and the U.S. at prices currently four times above those on the world market. It has regularly fulfilled both of these quotas without delivery delays. The volume of sugar sales by export market is summarized in Table 2. Domestic consumption is approximately 20,000 mt per annum.

3.02 The sugar industry in Swaziland is currently facing two principal problems, viz., low world market prices and increasing difficulties of transport through Mozambique. The low world market prices over the past two years have been partly offset by the depreciation of the rand/emalangeni against the U.S. dollar and the sterling. The southern export route through South Africa is too costly for profitable export at current market prices and thus the cyclone damage to one of the bridges on this route is not critical for sugar. However, the damage to the track and rolling stock on the Mozambique section of the northern route, caused by poor management and sabotage and the increasingly inefficient management of the Maputo Sugar Terminal, is making this route increasingly unreliable.

3.03 Sugarcane production in Swaziland is fairly capital intensive, although substitution of labor for some of the mechanical harvesters might marginally increase the numbers employed in the industry. However, given the pressure from low international market prices and high transport costs, the viability of the industry depends critically on low overall costs of production. Further expansion of the area under cane is constrained by both the market and the unavailability of additional water for irrigation, without the construction of major, and therefore costly, earthworks. The use of cane for ethanol production, as a substitute for high cost South African produced petrol, needs the earliest evaluation, particularly since there are already firm expressions of interest from potential private investors.
3.04 **Citrus.** Commercial citrus production is restricted entirely to the TDL, and most of the estimated 2,200 ha are grown under irrigation in the Lowveld. The Lowveld provides an ideal climate and soil for the production of high quality fruit, and in 1985 an estimated 3 million cartons of grapefruit and oranges were exported fresh and 11,000 mt processed (segments and juice) by Swazican, a private commercial company. In 1983, the crop was worth an estimated E14.9 million. Although production has been relatively stable over the past five years, exports might have been greater had it not been for the drought and the 1984 cyclone. Citrus fruit production is shown in Table 1.

3.05 Market demand preferences have resulted in a slow shift from grapefruit to oranges, with the citrus crop in 1985 about equally divided between the two fruits. The estimated sales of grapefruits and oranges (1984-86) by major market are given in Table 3. The crop is grown by four large and three smaller estates, and is marketed by the Swaziland Citrus Board through the South African Citrus Exchange, which ships from South African ports. Most of the grapefruit is still exported to Europe, with the potential Japanese market constrained by pre-shipment refrigeration requirements that have proved difficult to undertake at the ports suitable for shipment. Most of the oranges are successfully marketed in the Middle East. Some relief from the depressed European prices has been provided to producers by the depreciation of the rand/emalangeni and by increasing exports to the Middle East. The introduction of trickle irrigation and integrated pest management has also enabled some estates to reduce their costs.

3.06 The limited size of the market constrains any further expansion of the citrus industry in the short-term. It is, however, important that Swaziland continue to explore methods of satisfying Japanese export requirements. Also, while it is important for Swaziland to regain its present connection with the South African Citrus Exchange, principally for the technical support it provides, it is important that the "Swaziland Gold" label be reintroduced to establish an independent reputation in the event of future restrictions on exports through South Africa.

3.07 In 1984/85, 45,000 mt of pineapples were processed by a private company, Swazican, from fruit grown in the Malkerns Valley. The fruit was processed into a number of canned pineapple products, most of which were exported; together with 11,000 mt of citrus segments and juice, a total of E25 million in foreign exchange was realized. 15 to 20% of the pineapples processed were grown by smallholders close to the factory. Production of canned pineapples could be expanded by 25% without the need to build an additional plant, but an additional 500 ha of suitable land is required close to the plant in order to increase production significantly.

3.08 **Cotton.** Cotton has been grown in Swaziland for 60 years, since the climate and soils of much of the Lowveld and frost-free parts of the Middleveld are ideal for its cultivation. Swaziland cotton has a reputation for good quality and is classified as Strict Middling. The crop is grown by both TDL and SNL farmers, smallholder production having increased from 13% of the 7,265 mt seed cotton harvested in 1969/70 to 55% of the 17,900 mt harvested in 1983/84. However, the National Development Plan target of 35,000 mt for 1985 has not been met for various reasons, including drought and inadequate Government support for research and
extension. The recent significant expansion of production has been achieved largely through the stimulus of the private sector, particularly the sugar estates. Seed cotton production shown in Table 1. The breakdown between large and small-scale growers for the last several years is shown in Table 4. The financial returns to labor for cotton are low. Pest control accounts for 62% of all cash costs and current price ratios do not provide an incentive for farmers to undertake recommended control measures. Low smallholder yields, the steadily declining quality of the lint, and the adulteration of harvested cotton through the use of inappropriate containers, suggest the need for greater commitment on the part of the Government to support services, particularly research and extension.

3.09 Given the present economic relationships between crop values and factors of production, the potential area suitable for cotton production lies in the range of 36,000 ha to 60,000 ha, of which an estimated 26,000 ha were harvested in 1984. However, this area would still permit a large expansion of production and would enable both the Big Bend and Matsapha ginneries to operate at economic levels. A total of 34,000 mt of seed cotton is required for each ginnery to break even. At present, the crop is too small for operation of the Big Bend ginnery and much of the crop is therefore exported unginned to South Africa. To achieve the increased output required for full utilization of the existing ginning capacity and for the potential further vertical expansion of the industry through oil milling, spinning and textile manufacture, the following steps will need to be taken: (i) some expansion of cotton production under irrigated cultivation; (ii) reintroduction of strong research and extension programs; (iii) resolution of credit constraints now affecting the smallholder; (iv) application of improved husbandry practices; and (v) introduction of grades. It is important that the Government recognize these needs and assist in the provision of improved services to the sub-sector. The private sector should also be encouraged and permitted to manage the processing and marketing of cotton.

3.10 Tobacco. Both air-cured and dark fire-cured tobacco are now grown in Swaziland, mainly in the Shiselweni District. In 1983/84, 210 ha of air-cured tobacco were grown by approximately 2,000 farmers, with 140-150 mt being handled and marketed by the Swaziland Tobacco Cooperative Company Limited. Air-cured tobacco production over the last several years is shown in Table 1. The Cooperative supplies inputs on credit to registered farmers with recovery at time of sale of the air-cured tobacco. Market demand, which is entirely from South Africa through the South African Tobacco Board, is 300 mt per annum. However, with returns to labor inferior to those of maize under even medium use of inputs, and lack of production interest from either Tibiyo or the TDL, it seems unlikely that the potential market demand will be met. The introduction in the last two years of dark fire-cured tobacco by a private South African company,

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5/ On August 19, 1958, the King and the Swazi National Council (SNC) created the Tibiyo Taka Ngwane by Royal Charter. Tibiyo is a royal trust charged with the preservation of custom and traditional institutions and with assisting the Government's efforts to further the interests of the people of Swaziland. Tibiyo is also an important force in the commercial sector of Swaziland.
Casalee, has provided an additional crop for diversification of the sector, but the need for firewood for curing and the greater complexities of curing may limit its potential expansion. In 1985/86, 150 ha were being grown by Tibiyo and Casalee. The expected crop for 1986 is 180,000 kgs but the demand is estimated at up to 1 million kg and Casalee is encouraging the cultivation of the crop in other districts. There are clearly potential market outlets for increased air and fire-cured tobacco.

B. Food Crops

3.11 Maize. Maize, the main staple food in Swaziland, is the most important rainfed crop and occupies 65,000 ha, of which only 2,000 ha are grown commercially under fully or semi-mechanized cultivation on the TDL. Within the SNL, maize is planted annually on 80% of the cropped area. Commercial cultivation on the TDL produces reasonable yields of 4-5 tonnes per ha, comparable to the maize variety trial site mean yields attained over the last few years. On the other hand, average yields on the SNL have shown little change and have averaged only 1.4 mt/ha. Total national production of maize has fluctuated widely, partly due to the drought in the last few years. Production in 1984 reached 110,000 mt (Table 1).

3.12 Future development of the maize industry in Swaziland is dependent on a number of factors. The essential characteristics, potential, and main constraints of the industry, which are discussed below, are drawn heavily from the 1984 GOZ-FAO study entitled Review of the Maize Industry. (See Annex I for a summary of the report's main findings.)

3.13 Maize marketing in South Africa is handled by the South African Maize Board (SAMB). For trading purposes, Swaziland is considered a domestic purchaser by SAMB and sales to Swaziland are not recorded as exports. This practice is advantageous to Swaziland as it ensures domestic maize supplies, even if South Africa (in drought years) must import. In addition, Swaziland can purchase maize at prices which are fixed for one year and are exclusive of storage costs. With maize in sufficient quantities assured and storage costs subsidized, Swaziland has little incentive to diversify its sources of supply from the RSA or to maintain a strategic reserve. Politically, however, it is considered undesirable to be totally dependent on a single source for the major staple. This is the main explanation for the Government's long-standing support of maize development programs and its aspirations for attaining maize self-sufficiency.

3.14 Maize imports have increased steadily since 1972 from 18,500 tons to more than 50,000 tons in 1983, representing 43% of domestic consumption requirements. However, despite the intensive extension of the Rural Development Area Program (RDAP) and the increasing use of hybrid seed and fertilizer, maize self-sufficiency has not been achieved.

3.15 Maize imports for the present population could be reduced by an estimated 63% by raising the average yield on the SNL to 2 mt/ha, a target that is readily attainable through improved weed control, either by hand or by chemical. Research undertaken in the 1970s on the yield effects of eight husbandry factors showed that weed control and the use of quality
hybrid seed were the most critical factors. Fertilizer application and high plant populations became more important as the other aspects were improved, but recommended fertilizer application in the average management situation led to financial loss. Response to lime application and insect control were less than expected. The use of the unmodified ox-planter reduced yields in all trials. It is important for the Government and its agricultural extension service to be aware of the interactive effects of the different husbandry factors; campaigns based on greater hybrid seed and fertilizer use are unlikely to be successful in increasing production without commensurate attention to improvement of critical husbandry operations.

3.16 Post-harvest grain losses are high in Swaziland, but the causes are known and can be remedied at relatively low costs. In 1981, total losses were estimated at over 15%, due to ineffective storage methods and the widespread growing of a soft grained hybrid which is more vulnerable to insect and fungus damage.

3.17 Domestic Resource Cost (DRC) analysis confirms that greater resource efficiency is achieved by producing maize in the Highveld and Middleveld using improved and high input techniques (Table 7). Returns to labor under these more advanced production systems are competitive with the official hired wage of E 4.0 per day. However, under traditional production conditions, financial returns to labor for rainfed maize are less than the official daily wage in all agro-ecological zones. In fact, it is estimated that to achieve a minimum return of E 4.0 per working day under the traditional system in the Middleveld, which has the highest proportion of SNL, the returns to labor would have to increase by about 46%. Moreover, 11 ha would be required to produce a gross margin equal to the E 1,300 annually earned by the average unskilled agricultural laborer. With mechanized cultivation and improved crop husbandry and input application in the Middleveld, it is estimated that 4.9 ha would be required to generate a gross margin of E 1,300 from maize production. As the average homestead has less than 2 ha available for cultivation, maize production under current technical packages is obviously not an attractive alternative to wage labor.

3.18 The majority of homesteads grow maize with the twin objectives of establishing usufruct rights, for which productivity is unimportant, and producing subsistence food, for which the women have primary responsibility. Consistent production of maize as a cash crop, as opposed to occasional sales of surpluses, is practiced by only about 10% of the homesteads, according to a Swaziland Cropping Systems Research Project (SCAP) Survey. A positive correlation was found between male heads of household and the regular sale of maize. The women, who have many other responsibilities, still provide about 70% of the labor used in maize production and much of the remainder is done by the children. A survey carried out by the SCAP has found that, with the high level of school enrollment, the weeding of the maize crop is delayed until the December holidays. By that time, weed growth has generally depressed yields. Thus, for the majority of homesteads, availability of labor is the main constraint. Other constraints for female farmers are, as already mentioned, the difficulties in obtaining extension advice and credit.
3.19 Total maize production and yields per hectare are still considerably below potential, even though some improvements in technology have been widely adopted. The rapid uptake of hybrid maize and fertilizer under RDAP has been principally for their capacity to increase maize yields with the use of less labor rather than for increased production per se. This has most commonly resulted in land and labor being released from production rather than being employed to produce either more maize or alternative cash crops. This explains, in part, why the total area under maize on SNL has been falling over the last decade from 100,000 ha in 1969/70 to under 50,000 ha in 1982/83. Wages, which contribute 68% to household cash income nationwide (de Vletter 1983), provide the means to meet household food deficits. Even in high rainfall years, a quarter of all rural households purchase maize to supplement home production.

3.20 The 1984 GOS/FAO Review of the Maize Industry made recommendations which, if implemented, could lead to the achievement of maize production targets. These recommendations could increase production on the SNL fourfold, enough to close the import gap, while using only 50% of the land now planted to maize. These technical recommendations are still valid in 1986, and worthy of the Government's most careful consideration.

3.21 Sorghum. Sorghum is drought tolerant and can be grown in marginal areas where low and/or poorly distributed rainfall patterns preclude production of other cereals. The climate and soils of the Lowveld and parts of the Middleveld and Lubombo are well-suited to sorghum production, and potential returns to labor from well-managed sorghum are comparable to those for cotton and tobacco. Yields of up to 3.5t/ha can be obtained on well-managed farms, although the national average on the 1,124 ha grown in the SNL in 1982/83 was less than 500 kg/ha. Production is principally for local brewing purposes and sales to the Swazi Milling Company (SMC) have been negligible. The Matsapha brewery has an annual requirement of 5,000 mt of malt, and sorghum for this is currently being imported from South Africa. The Ministry of Agriculture should examine the potential for increased domestic production of varieties acceptable to the brewing industry.

3.22 A range of grain legumes (jugo beans, phaseolus beans, groundnuts and cowpeas) is grown by SNL farmers, but on less than 5,000 ha (1982/83 SNL Survey), and the 1,500 mt per annum harvested is used mainly for subsistence. Sorghum production figures for the last several years are given in Table 1. The potential for greatly increased production is considered low except for the possibility of expanding commercial phaseolus bean production under irrigation on the TDL; phaseolus beans are already being introduced onto sugar estates for diversification. Intercropping of maize with grain legumes has important nutritional advantages and could well receive greater focus from research.

3.23 Rice. A number of small rice schemes with smallholders cultivating less than one ha are being managed by the Agricultural Mission of Taiwan and are receiving full Government support. Yields are very satisfactory and the estimated returns to labor are better than for all crops with the exception of the best-managed maize (Table 7). The sugar estates also produce irrigated rice. However, the domestic market demand is limited and it is unlikely that production for export would be economical.
Vegetables. Vegetable production has improved significantly following the banning of imports from South Africa for disease (cholera) reasons. Climate and soil conditions are suitable for a wide range of vegetable and fruit crops and there is domestic potential for Swaziland to be self-sufficient in both fruit and vegetables throughout the year. Commercial production of a wide range of vegetables is principally from smallholders, farming the irrigation schemes developed within the RDAP. However, full exploitation of these irrigated areas is constrained by the lack of effective marketing arrangements, including the lack of market information, uncertain sales prospects, poor access to markets, and competition from South Africa. The recruitment of a Horticultural Marketing Officer could provide assistance to RDA extension staff in the establishment of appropriate marketing structures and market contacts for the existing irrigated production areas. It is considered that such assistance for horticulture might be more effective than the provision of costly centralized marketing facilities. Some of the most serious constraints on the marketing system are being addressed in the IFAD-financed Smallholder Credit and Marketing Project.

IV. LIVESTOCK POTENTIAL AND CONSTRAINTS

4.01 Cattle are an important source of wealth, income and status in Swaziland. The majority of cattle (about 80%) belong to Swazi farmers on the SNL where almost 63% of rural homesteads own cattle at an average herd size of 19 head. The average stocking rate on the SNL is estimated at 0.52 animals per hectare and is among the highest in Africa. The nutritional status of the SNL herds is generally poor and production indices are low. Livestock development has been identified by the Government as a priority objective but communal grazing and traditional attitudes toward cattle ownership hamper commercialization of the industry. The realization of the sub-sector's potential is currently hindered by three critical interrelated problems: (i) serious degradation of the range through overgrazing; (ii) insufficient slaughter offers for the market; and (iii) rapid deterioration of the export abattoir's condition. Since cattle are predominant in the livestock subsector, detailed consideration is only given to beef and dairy cattle in this report. The national cattle herd on the SNL and TDL (1971-1984) and the total commercial offtake are shown in Table 5. The total livestock population, including small stock as well (1981-86), is shown in Table 6.

A. The Beef Cattle Industry

4.02 The National Cattle Herd. The present herd of around 600,000 head of hardy, well-adapted, largely disease-free and potentially productive cattle is a major resource for beef production. The local Nguni breed, similar in type to local breeds in Botswana and Kenya, is an efficient converter of grazing and feed into beef. The herd in the TDL areas, consisting principally of crossbreeds especially with Brahmin, is equally robust. Most types of cattle in Swaziland, from Nguni to pure exotic stock, have been profitably fattened at the Swaziland Meat Corporation's (SMC) feedlot. With adequate nutrition and management of the national herd, the requirements of grades for both the export and domestic beef market could be realized.
4.03 Feed Resource Base. With the current livestock population and standard production parameters for SNL and TDL holdings, the calculated total digestible nutrient (TDN) requirement was 727,000 mt in 1984. In normal years, it is estimated that crop residues provide about 15% of the feed supply for cattle and other ruminants (sheep and goats); improved pastures, forages, by-products of agro-industry and concentrate rations provide only 2%; and the range provides the balance of 83%. In 1981/82 and 1983/84, the estimated national shortfalls in TDN supply were 25% and 21% respectively, largely as a result of the drought.

4.04 Rangeland accounts for 90% of the SNL; it is predominantly unimproved and unfenced and is communally grazed. The dominance of the communal grazing conditions is significant, because the range is under stress from overstocking and recent drought. Every beast barely surviving under these conditions is consuming feed that could be put to productive use by a growing, lactating or in-calf beast. Consequently, the performance of the potentially productive animals is being pulled down towards the survival level. Moreover, the sward has deteriorated in some areas to a point where the soil is no longer protected from erosion and the emergence of plant species unpalatable to cattle is leading to significant increases in goat numbers. (As range deterioration proceeds, goats with their browsing habit usually survive better than cattle.) The situation is not yet irreversible, but is critical in many areas and, to the extent possible, greater use should be made of non-grazing feed resources complemented by increased offtake for slaughter.

4.05 Three local feed resources deserve attention: molasses, cotton seed meal or cake, and hominy chop (bran and germ meal residue from maize milling). Molasses is a major potential ruminant feed. However, of the annual production of 140,000 mt, less than 2% is used locally; the remainder is exported. Since molasses is relatively inexpensive, easily transportable and has good feeding value when combined with urea and vitamin and mineral supplements, up to 120,000 mt could be utilized each year for ruminant feeding. It is technically feasible for a molasses/urea/mineral liquid supplement feed to be distributed nationally, and there are other African examples of this having been done successfully on a commercial scale.6/4

4.06 At present, cotton seed meal or cake has to be reimported from RSA after oil extraction. Local supplies of oil cakes from cotton and other oil seed crops could be available eventually, if agro-industrial developments presently under consideration materialize. Meanwhile, whole cotton seed from the local ginnery could be used for dairy animals, if the export parity price were paid. It is a valuable source of energy and protein for livestock.

4.07 About 50% of the hominy chop produced by SMC is used for locally compounded rations by dairy farmers and by the SMC Feedlot. The lack of other domestic demand, even in drought years, results in the balance of

5/ This kind of national distribution scheme has been pioneered on a pilot scale by FAO/UNDP in Kenya and Egypt, and similar distribution networks have been set up in Lesotho and Tanzania.
2,000-5,000 mt being exported to South Africa. Hominy chop could be used in the fattening ranches and smallholder dairy groups.

4.08 Livestock Infrastructure. Swaziland's compact size, well-developed transport system and established veterinary and trading institutions provide major advantages for the development of a fully integrated and specialized cattle industry. Although these advantages provide significant opportunities for investment, they are not yet being optimally combined or developed.

4.09 Under the dual system of land tenure, SNL and TDL areas are adjacent within the different ecological zones. This minimizes the difficulties of movement of cattle between what would ideally be breeding systems in the SNL and growing out or finishing systems in the TDL. SNL farmers require cattle for milk, manure and draft power. Young growing stock would best be sold for fattening within the grazing conditions of the TDL. Breeding cows do not require a high level of nutrition throughout the year and could prosper under the grazing conditions of the SNL, with improved calving rates possible if competition for the limited grazing resource from young stock and oxen were reduced. The availability of more effective tractor hire services for SNL farmers would reduce their need to retain excessive numbers of oxen.

4.10 Distances in Swaziland are relatively short and the quality of internal road and rail links is reasonable. Investment in more suitable specialized trucks and wagons might be justified to improve the utilization of the national feed resource if greater movement of cattle became possible. The absence of serious disease problems also permits the ready movement of cattle within Swaziland; movement is restricted only in the quarantine area along the western edge of the Lubombo Plateau and beyond the control fences along the border with Mozambique. It is most important that Swaziland maintain its near disease-free status, if a more efficient and specialized system of production is to be developed and beef export markets are to be retained. Effective veterinary control must be maintained and recurrence of foot and mouth disease prevented.

4.11 A practical solution to the problems of the Matsapha SMC abattoir is the setting up of a Swaziland Livestock Commission to buy it out or take it over. How this should be arranged is described in some detail in the 1983 Huntings Report on the Livestock Industry. The situation as regards SMC has deteriorated further in the two years since the Huntings study was completed and a solution is, therefore, increasingly urgent. If one is not found soon, SMC may cease to operate. It would then be extremely difficult to restart the operation, as the plant itself would deteriorate rapidly if left idle and would soon be beyond repair. In the time taken to restart operations, markets may be lost and cattle supply channels disrupted with very serious repercussions for the livestock industry.

4.12 Market Opportunities. The marketing of beef cattle is relatively well-developed and ranges from simple homestead butchery under a tree, through commercial urban butcheries, to an export abattoir with preferential access to the EEC with its associated strict slaughtering standards. Currently, more cattle are being sold through informal channels
than through the auction system at Government ranches. Beef cattle prices are set by free competition, from the larger South African market as well, without any formal price controls. Quota sales to the EEC obtain very high prices unrelated to either neighboring or world price levels. Although market opportunities for livestock producers are numerous and varied, commercial slaughter for export has declined dramatically since the peak of over 4000 tons in 1979. This decline in domestic supply is attributable to a number of factors, including the recent drought and reduced national herd, particularly on the Lubombo Plateau and in the TNL. Between 1981 and 1984, beef exports fell to less than half of the 1979 figure despite a steady increase in price as exports became more concentrated on the EEC market. The fall in beef exports is particularly significant in relation to the EEC quota of 3086 tons per annum between 1975 and 1979, 3363 tons between 1980 and 1983, and 2007 tons between 1983 and 1985.

4.13 The recent collapse of the Rand/Emalangeni currency has effectively doubled the local currency value of EEC prices and it is critical that this quota be met as closely as possible. However, without increases in the current low delivery levels, the future of the EEC export outlet would appear doubtful.

B. Dairy Development

4.14 Dairy production is a specialized area of the cattle industry and has been given priority in Government policy. In marked contrast to beef production, dairying has developed significantly though unevenly since 1980, from a very small base. Steadily increasing production from large scale units in the public and private sectors within the TDL, in response to the incentive producer price paid by the Swaziland Dairy Board (SDB) for well-cooled milk, can be contrasted with insignificant development of specialist smallholder dairying, despite heavy emphasis and subsidization within the RDAP. Also, the traditional cream and milk collection centers in the Lowveld have declined steadily, with the last center closing in 1984. In the RDAP, the introduction of high-grade exotic animals, mainly Friesians, into smaller dairy units has generally not been successful. In common with experiences elsewhere in Africa, levels of animal nutrition and management in the RDAP have not been sufficiently high to achieve satisfactory milk yields. In addition, relatively low producer prices (25 c/liter) paid for warm milk of medium quality do not provide sufficient return to smallholders for the high levels of investment, operational costs and high risks involved in milk production, nor are the financial returns to labor competitive with alternative on and off-farm employment opportunities.

4.15 On the other hand, the very attractive incentives for TDL producers (46.5 c/liter for cooled, high quality milk) have jeopardized the viability of the SDB's operation. SDB, using an increasing proportion of high cost fresh milk to cheaper imported milk powder, has had to raise the retail price of its liquid milk sales significantly above alternative commercial powdered milk. The SDB may thus have to reduce producer prices

7/ It is understood that these reductions in quota are temporary arrangements and that the full quota could be regained if supplies were available to fill it.
or impose production quotas to remain in business. Not surprisingly, SDB has not been overly concerned about the closing of its two cooling centers in the SNL.

4.16 Until the current marketing problem facing SDB is solved, major development of smallholder dairying is unlikely and unnecessary. If the present producer price can be maintained, large scale TDL producers are likely to expand production fast enough to keep up with SDB sales. Thus, in the short-term, priority should be given to solving SDB's problems, probably involving divesting it of its own milk production operations. The SDB could then concentrate on its present main function, the processing and marketing of fresh milk. When this function is operating efficiently, consideration should be given to transferring it to the private sector, leaving the SDB to concentrate on the regulatory functions for which it was originally established. These issues are fully covered in the Carl Brothers Dairy Study (1984) and the conclusions of this study are generally supported.

4.17 Smallholder dairy production will ultimately be desirable and necessary on a much larger scale than the present token operation. The Carl Bros. recommendation that it should be based on a more gradual upgrading of local cows to cross-bred dairy heifers is strongly supported. This will require the provision of additional feed inputs, especially molasses mixtures and vegetable protein cakes, into the SNL, to supplement range grazing. When these low-cost feed inputs are readily available in the SNL, specialized dairy units with higher grade crossbred cows might constitute a feasible development of smallholder milk production.

C. Ongoing and Proposed Programs

4.18 Both the beef and dairy industries have been reviewed recently in the Huntings Livestock Industry Development Report (1983) and the Carl Bros. Dairy Industry Study (1984) (see Annex I for a summary of the report's main findings). Only the main issues and recommendations meriting priority attention are discussed here.

4.19 Fattening Ranches. The three existing Government fattening ranches have a capacity of 17,000 head per annum when fully stocked with short-stay (six months maximum) animals. Such production would require improved management, since existing management has averaged only 4,500 head per annum. Furthermore, despite recent increases, ranch fees are still only 60% of cost. The ranches should, with good management and suitable animals, be capable of producing added values of E11/month as compared to present operational costs of E5/month. The fattening ranch is a most desirable first stage in the stratification of cattle production. Cattle should be accepted only from the SNL and the fattening ranches should be sited on the TDL. The Huntings Report has proposed that the ranches be managed by a parastatal Ranch Company, since lack of commercial incentive and financial flexibility limit the Government's ability to manage such an operation effectively. However, the private sector in the TDL may also show interest in operating the ranches. The potential benefits to Swaziland of an efficient operation, in terms of both the availability of additional beef carcasses and reduced pressure on the SNL range, are considerable.
4.20 **Sisa Ranches.** This is a controversial program. The "Sisa" ranch takes in up to ten head of female stock from individual SNL owners and breeds them with improved bulls under fenced ranching conditions. A monthly fee is charged. The effectiveness of the Sisa Ranch for upgrading the quality of SNL cattle has not been proven. Review of available data indicates that the present ranch is not achieving commercial standards and that fees charged are far below costs, causing a heavy drain on the Veterinary Department's budget. It is therefore recommended that the Sisa Ranch program not be expanded for the time being.

4.21 **Breeding Ranches.** The consultants' recommendation that three of the existing Government breeding ranches should be converted into parastatal production ranches deserves serious consideration. However, the establishment of up to five new parastatal production ranches on TDL farms should await successful operation of the initial three. Moreover, it would be valuable if the private sector could be encouraged to invest in such production ranches.

4.22 **Grazing Management Demonstration Area (GMDA).** GMDA is the main livestock component of the proposed RDA III Project. It aims to demonstrate that a traditional authority, if suitably supported, can be effective in controlling stocking rates on a voluntary basis. It is expected that in the long-term, the 500 ha of fenced demonstration area in each new RDA sub-area will be so effective that the principle will eventually be applied throughout the SNL. The performance of one of the GMDAs within the RDAP is sufficiently encouraging to merit further support and evaluation. However, this program is likely to be successful only if it is replicated on a large scale so that encroachment from non-members or from members reverting to communal grazing outside is no longer possible. Also, funds would be required for the initial fencing, kraals, weigh scales, dip tanks and water supply installation (about USS20,000 per 500 ha demonstration unit). Credit schemes would be needed for this purpose. Finally, the success of the program depends on well-trained and experienced range management extension officers and staff, who are in very short supply.

4.23 There would be benefits to be gained from the creation of a **Swaziland Livestock Commission (SLC)** which could, *inter alia*, take over responsibility for operating the SMC abattoir. As an export abattoir, it would be working in the interests of the producers and would be able to advise them of movements in the meat market and of grades and prices which the market can accept. The beneficial effects of the establishment of the Botswana Meat Commission (BMC) have been significant in the development of Botswana's cattle industry and are well-documented. The case for a similar Swaziland Commission is persuasively argued in the Huntings Report and is strongly supported. The widespread dissatisfaction with SMC that has arisen among producers in recent years, and its uncompetitive prices, have contributed to its reduced throughput and financial difficulties. Because of these deficiencies, its published floor prices have become uncompetitive with those offered by local butchers and have further reduced its throughput, in a vicious circle.

4.24 The critical issue now is whether an investor can be found to take over and rescue the abattoir operation. The political dimension, with
potential investors possibly unwilling to be involved in buying out South African interests, may also be a relevant factor, aggravating the situation further. The two-year delay since the Huntings Report can only be a source of further concern. The situation is in fact tragically familiar: without an efficient abattoir, processing and export marketing operation, the prospects for development of the livestock industry are poor. Conversely, without solid prospects for increasing the availability of slaughter stock, investment in a sophisticated export abattoir cannot be justified. The best approach, therefore, to improving the efficiency of the livestock industry would involve the coordinated management of cattle according to the recommendations made by the Huntings Report and the Carl Bros. Study.

V. INSTITUTIONAL CAPACITY AND SUPPORT SERVICES

A. Institutional Capacity

5.01 Other parts of this review have shown that improvements in crop and livestock production and marketing are dependent, among other things, on the efficiencies of various organizations or private enterprises, in both the design and the implementation of agricultural programs.

5.02 The Ministry of Agriculture and Cooperatives (MOAC) is the central institution responsible for implementing agricultural sector policy and providing agricultural services to farmers on the SNL. The Ministry of Natural Resources, Land Utilization and Energy (MNRLUE), established in 1983/84, is responsible for energy and land use planning. The Prime Minister's Office, together with the Cabinet and the Parliament, have overall decision-making authority on key policy matters. The Government Budget Committee, comprising the Ministries of Finance (MF), Labor and Public Service (MLPS), and the Department of Economic Planning and Statistics (DEPS), is responsible for macroeconomic and sectoral investment planning at the national and local levels. The support of individual chiefs is also very important and is often critical to the successful implementation of Government-issued directives.

5.03 The most pressing problems facing MOAC are the absence of a clear strategy to implement sectoral objectives, redundancies in the organizational structure, lack of technical direction for the extension and research program, the imbalance in recurrent expenditures toward wages, and the shortage of more experienced professional staff with strong management skills. These problems have seriously constrained the overall performance of MOAC.

5.04 The Government assigns high priority to the development of SNL agriculture. Broad objectives have been articulated most recently under the Ekhaya campaign coordinated by the Ministry of Agriculture and Cooperatives and include goals such as diversification of agricultural production and achievement of greater food self-sufficiency. While the objectives have tended to remain the same, the strategy for achieving them has changed considerably over time. This has presented significant operational problems for MOAC as it attempts to adjust its organizational
structure and mobilize staff and resources to accommodate new tasks. In addition, new responsibilities have been assigned to MOAC by the Government, frequently in connection with donor-supported projects. This has resulted in a proliferation of units and sub-units generally reflecting a narrow single function purpose and has created various anomalies and redundancies in MOAC's organizational structure.

5.05 For example, within the past two years, agricultural research has been transferred to the newly created Research and Planning Department and complementary technical direction of research and extension has suffered. Program objectives and household targets are not well-defined despite considerable amassing of survey data during RDAP I and II. The relevance, quality and focus of MOAC's research program have also been reduced. These deficiencies have been caused by a lack of technical direction and inadequate recurrent financing. The primary purpose of research is to generate relevant technical recommendations for use by farmers through the advice of the extension service; the importance of reinforcing the link between the extension and research systems is thus apparent.

5.06 GOS has entered a period of relative fiscal tightening, and consequently, MOAC's budget shows only modest real increases over the medium-term. At present, the Ministry has no mechanism for ensuring that its scarce funds are rationed according to the relative priorities of contending programs. Expenditures on personnel account for about 75% of MOAC's total recurrent budget, leaving little for essential support services such as vehicle operation and maintenance, building repairs, field demonstration plots and overnight allowances. This situation has seriously weakened the effectiveness of the extension service. A shortage of funds to purchase spare parts, for example, has contributed to the long delay in vehicle repairs. Lack of petrol has immobilized frontline extension workers and limited regular contact with farmers. Lack of funds for on-farm research trials has reduced the generation of relevant extension messages, particularly in maize production.

5.07 Another issue is that neither the Government nor the donor community has given adequate attention to post-investment recurrent cost obligations of individual donor-supported projects. External finance has been considerably reduced with the completion of RDAP I and II. The Government is now faced with sustaining the program from its own limited budgetary resources and is already experiencing problems. The lack of an adequate planning capacity is also evident in the fact that MOAC is unable to provide timely follow-up to various donor assistance proposals, many of which are in response to requests originating in the Ministry. This has been a source of both concern and frustration within the donor community and has contributed to long delays in program/project processing and implementation.

8/ RDAP has trebled the number of extension staff. The present staffing ratio of extension workers to farm families is 1:74. In addition to permanent staff, there are hundreds of temporary employees (artisans, skilled crafts persons and laborers) who were recruited during the RDAP implementation phase. A number of these "temporary" staff are still employed, in some cases, after more than a decade.
5.08 It is clear that MOAC needs to take action to control and minimize the level of its recurrent expenditures on salaries and wages. It is equally important, however, to know to what levels expenditures should be reduced and by what means. What criteria, for instance, should a department director use when forced to choose among competing claims for scarce resources? Do revenue-generating projects have priority over projects which, although non-income generating, extend the coverage of important socioeconomic programs? The Budget and Planning Committee will need to be closely involved in the formulation of any strategy to reduce recurrent expenditures in MOAC. The donor community will also have a role to play in minimizing incremental recurrent cost at the project design stage. The Committee must have a clear understanding of MOAC priorities in the agricultural sector, to minimize arbitrary budget cuts to key agricultural programs.

5.09 MOAC does not appear to have a comprehensive training plan. The T&V system has received considerable training attention recently, but unfortunately, as a single, isolated undertaking rather than as part of a total training initiative. There are four separate training units in MOAC with 25 budgeted staff members, but there seems to be no overall training philosophy. To strengthen the technical and managerial capability of MOAC staff, there is a need to (i) consolidate ongoing training activities, (ii) establish procedures and criteria for determining overall training needs, and (iii) prepare criteria for selecting candidates.

5.10 Land Tenure. Traditional land tenure patterns which, in theory, assure every household access to arable land to meet subsistence needs, apparently continue to fulfill both security and social welfare functions. Pressures on land have been disguised, however, by the availability of off-farm employment. Increasingly, these pressures would begin to be more explicit with the growth of employable labor and diminishing off-farm employment opportunities. These pressures would be felt most keenly first in the areas which have been developed under RDAP I and II.

5.11 There is also the need to reexamine whether current patterns of traditional tenure are an obstacle to the growth of commercial farming since the right of access is confined only to cultivation for subsistence. The production of a surplus would imply land beyond the needs of a household and permit traditional authorities to reduce the land granted. Land transactions, beyond the bounds of both traditional and formal law, are reported to occur along the main highway artery that links the country with RSA and Mozambique. Unless these transactions are carefully monitored, the inequities that could result may be insurmountable in the future. In effect, it would be advisable for the Government to examine the need for monitoring land transactions with the increasing value of land and for determining whether formalization and acceptance of these transactions is desirable.

5.12 The traditional system has been dynamic and adapted to many of the changes brought about by growing populations, new crops and new incentives. The requirement that young males seek off-farm employment till the age of 30 (para. 2.13) is apparently an adjustment to land shortages. Again, the system of land "loans" under which lands are "borrowed" from others who are not making, or cannot make, full use of their allotted lands has been recognized under traditional rules. It is said that these transactions do not involve any consideration payable in cash or kind. The
danger, however, is that with the lapse of time the transaction may result in the loss of land by the original allottee. Another adjustment that the traditional system has made concerns compensation for houses. These are now far more substantial structures than previously and the householder is compensated for the structures when the family migrates or gives up possession of the land.

5.13 While the problems relating to land shortages for cultivation may be resolved, by far the more intractable problems relate to the management and use of rangeland. The principle of common access combined with the absence of an obligation to control and manage rangeland has led to overstocking and serious land degradation. Solutions to this problem are not easy since cattle holding is closely bound up with both economic and social value systems. An attempt has been made in the Grazing Management Demonstration Area to deal with the problem by effectively modifying the system (para. 4.22). The success of this program needs close monitoring.

5.14 In addition, USAID has financed a two-year land tenure study, under the auspices of the University of Wisconsin Land Tenure Center, which is expected to be completed by mid-1987. The study would, among other matters, examine the efficiency and effectiveness of the indigenous tenure system in fostering economic growth and raising smallholder productivity. While not desiring to foreclose the options in the study just referred to, it would also be advisable for the study to consider: (a) the impact of population growth on access to land, the consequent "hardening" of land appropriations by those who already have access, and the increase in apparent landlessness; (b) the need for recognition of informal land transactions which have already commenced; (c) the nature of land loans and whether these ripen into exclusion of original land allottees; (d) the type of system (whether it be the introduction of individual/family/group title with registration and/or recording of land use, occupation and entitlement at the initial stages) which would best achieve equities of distribution while promoting economic growth; and (e) the administrative requirements (including training) that would be needed to efficiently implement any system proposed. These are matters which the Government should also examine if the challenges of the next two decades are to be met.

B. Support Services

5.15 Support services for agriculture are provided by both the public and the private sectors. The majority of services for the TDL are provided by the private sector with some research, veterinary and commodity coordination functions supplied by the public sector. Marketing channels for exported commodities, handled through South African Commodity Boards, are well-defined and effectively managed. Extension, research, cooperative management and veterinary services for the SNL are provided by the public sector, while input supplies and equipment services are supplied by both the public and the private sectors.

5.16 Extension. Most agricultural extension services are provided to SNL farmers by MOAC, with the focus primarily on farmers within the RDAs. SNL farmers also receive advisory services for certain cash crops (especially tobacco, pineapples and cotton) from the private sector. No extension services are provided to TDL farmers by MOAC.
5.17 MDAC's extension organization appears to involve unnecessary duplication of field management (district extension officers and RDA managers) and an overstaffing of field extension positions. Since the number of commercial farmers is limited by alternative employment options, the number of extension staff could be greatly reduced and the reduced staff made much more effective by streamlining and prioritizing the messages. Research information already published (and now being broadened and strengthened by the Farming Systems Research group) does provide sufficient identification of key husbandry operations for the major crops. The selection of priority extension messages would require good technical management, and could be effective with the newly introduced Training and Visit System, provided the contact farmers and/or groups and priority messages are carefully selected. The excess extension staffing in MOAC also limits the availability of non-salary operating funds, thus rendering staff largely ineffective. It is important that the Government review the costs and work program of the extension service, particularly with regard to this imbalance between salary and operating costs. It is recommended that District agricultural extension activities be managed by the Four District Extension Officers and that the RDA Project manager posts be relinquished. This would remove the present confusion over field staff responsibilities and reduce the complexity and cost of the extension system.

5.18 Research. Agricultural research in Swaziland is conducted by the Research Division of MOAC, the University of Swaziland and some private companies for their own use. MOAC's Chief Research Officer is responsible to the Director of Research and Planning in the Ministry. The work is undertaken principally at the Malkerns Research Station, with farming systems research carried out at the sub-stations in the Lowveld and Nhlangano and by the recently established (1982) Swaziland Cropping Systems Research Project (SCAP) team. It is critical that the recent introduction of farming systems research be continued through a second phase of SCAP. These programs should focus initially on those factors already identified as most critical for yields.

5.19 While Swaziland has the agro-ecological potential to produce a diversity of crops, it is important that the limited national research resources be focussed on those activities with the greatest economic potential for the SNL, e.g., maize, cotton, pulses, range pasture grasses and legumes, and vegetables (Chapter III). The Government should also consider whether it would be economically justifiable to engage a private agency or the University to carry out field research on the principal export crops (sugarcane, citrus, pineapples and cotton).

5.20 Credit. Agricultural credit is provided by the Swazi Development and Savings Bank (SDSB) and three commercial banks. For the small farmer, SDSB is the only source of institutional financing. Under a supervised credit scheme known as the Agricultural Advisory Credit Scheme (AACS), only SNL farmers requiring loans of less than E 1000 are entitled to the "concessionary" small farmer terms (13.5% per annum). SNL farmers with large credit needs are required to borrow on the same terms as freehold farmers (22% per annum).
5.21 The small farmer credit scheme currently provides a substantial subsidy to the recipients. It is unclear, however, whether this subsidized agricultural credit scheme is actually available to those most in need and whether the availability of subsidized credit has resulted in more input use and greater production.

5.22 Cattle are the only acceptable collateral for subsidized loans. The actual borrower need not own cattle but the loan must be secured against someone's cattle. This suggests that the poorest of the Swazi farmers who have few or no cattle are excluded from the subsidized sources, as the farmer with cattle - or access to cattle - is already among the wealthier farmers.

5.23 Input Distribution. An adequate supply of farm inputs is readily available to both TDL and SNL farmers through Private commercial traders, the Central Cooperative Union (CCU), and the Government. Private commercial outlets are limited in the rural areas, possibly due both to insufficient market demand and to subsidized competition provided by the CCU and government outlets within the SNL. There is evidence, however, of increasing private sector interest in servicing the rural areas with farm inputs and it is recommended that the Government review these interests to ascertain whether a satisfactory service would be provided to SNL farmers by this kind of private involvement. It might be cost-effective for the Government to consider the leasing of some of its facilities at RDA centers to private traders, given satisfactory guarantees of a timely and adequate availability of inputs.

5.24 Tractor Hire and Oxen Cultivation. Primary cultivation of all croplands is by both oxen and tractor. Tractor services are operated by both the public and private sectors. Ploughing by oxen can usually only be undertaken after the first rains, and even then large numbers of animals are required to compensate for their weakened condition at the end of the dry season. The retention of excess unproductive cattle for this purpose is contributing to the problem of overstocking and the declining productivity of the livestock sub-sector. It is important that the Government provide the environment in which a vigorous tractor hire service can supply primary cultivation resources to the majority of SNL farmers. To provide more feed for the oxen during the dry winter months, interplanting of legumes with maize and better use of the fodder could be encouraged.

5.25 The demand for tractor hire is strong, as evidenced by the RDA waiting list for Government ploughing services prepaid at the increased rate. It was unnecessary for Government to reduce the new rates, since the demand far outstrips the supply. It is important that the Government gradually increase the rates, at least to ensure adequate maintenance of the service. The continuation of highly subsidized Government tractor hire services provides unfair competition for the private sector and unnecessarily suppresses the supply of these services. The persistence of the heavy losses within the Government Pool will eventually lead to its discontinuation. The institution of cost recovery rates, which could be lower if the present government controls on wages, bonuses and working hours were eased, might justify retaining the Government tractor hire service. However, it is recommended that the Government consider a phased program for leasing the present workshop and garage facilities to the private sector, since gradual replacement of the public service should lead
to considerable cost savings as well as greater efficiency. There are possibly 1,000 private tractors now operating within the SNL, but their poor state and generally small size limit their potential effectiveness. Provision of credit to private operators, following the elimination of subsidies to the competition, should be considered and might lead to gradual improvement in the tractor fleet.

5.26 Irrigation. Exploitation of the full potential for irrigation is currently constrained by inadequate water storage and by the need for formal sanctioning of Swaziland's water rights vis-a-vis South Africa and Mozambique. Water for irrigation will come mostly from surface flow as studies indicate that there is very little groundwater for irrigation. Although more than 200,000 ha of land could be irrigated, there are only sufficient water resources for 90,000 ha, of which 42,000 ha are already irrigated. The increased cultivation of crops with high water requirements, such as sugarcane and rice, would decrease the potential area that could be irrigated, while fruit trees or supplementary irrigation of field crops would increase the area. The expansion of sugarcane and rice cultivation is, in any case, constrained by the market. Further development of smallholder fruit and/or TDL and SNL cultivation of pulse and oilseed crops might warrant study. Supplementary irrigation of cotton in the Lowveld could also greatly increase yields and returns to labor.

5.27 Crop production could be increased through greater use of irrigation by putting additional land under cultivation; by increasing yields on presently cultivated land (through supplementary irrigation especially); and, by double and triple cropping. Rainfall is extremely variable in Swaziland. In the Lowveld, there will be a crop failure in four out of five years for maize and one out of five years for cotton. In any given month there is a serious deficiency in rainfall in one out of every ten years. The cost of developing irrigation in Swaziland is high because the terrain requires either long canals or high pumping lifts from the rivers to suitable land. This requires careful planning by Government of utilization of its water resources and of agricultural development for optimum agricultural production.

VI. PROPOSED DEVELOPMENT STRATEGY

A. The Setting

6.01 Although Swaziland's natural resources provide potential for increased output of both cattle and a wide diversity of crops, the country's economy is characterized by several factors which reduce the policy options available to Government to influence the course of economic development. First, the country is dependent on a single commodity (sugar) for over 40% of its export earnings. Second, monetary policy, the exchange rate, interest rates and prices generally are strongly influenced by the country's close economic ties to South Africa. These ties have contributed both to the expansion of the modern sector and to the stability of Government revenues. However, these features also highlight Swaziland's vulnerability to external factors over which the Government has little control. In fact, economic growth during the last three years has been negligible largely because of external factors such as the general worldwide recession (including, most importantly, in South Africa), low export prices, the devastating effects of regional drought and more recently the cyclone "Domoina".
Commercial agriculture, which grew at about 10% per annum during the last five years, is expected to grow at only 3 to 4% per annum over the next decade. The rapid expansion of the last five years is unsustainable because the main factors which led to high growth have weakened. Falling world market prices for the main export - sugar - have sharply reduced export earnings and profits, and further investment in the sugar industry has been deferred. In smallholder agriculture on SNL, production is just beginning to increase, following several consecutive years of drought. Livestock production has also stagnated over the last few years and efforts to increase cattle offtake rates have been largely unsuccessful.

B. The Agricultural Dilemma

It is estimated that the labor force will increase by over 70% during the next 14 years, reaching nearly 650,000 by the year 2000. Part of this labor force will be absorbed by the formal sector, including, inter alia, mine employment in RSA and commercial agriculture, and part will be absorbed, either gainfully or otherwise, by the informal sector including, in particular, agriculture in the SNL. To obtain some estimate of the dimension of the employment problem that is likely to face agriculture in the near future, it is necessary to first estimate non-agricultural growth and related employment.

There are presently about 56,000 workers in the formal sector, including Government, manufacturing and construction, and excluding commercial agriculture. According to World Bank estimates, growth in the manufacturing and construction industries is expected to increase gradually, averaging about 6% per annum over the next 15 years while public sector growth will average about 3% over the same period. Thus, by the year 2000, it is projected that there will be some 82,000 workers in the formal sector (excluding commercial agriculture).

Labor emigration from Swaziland to the mines and farms of South Africa will also absorb a part of the labor force. In the last few years, however, mine recruitment has declined as gold prices have fallen and the growing black South African labor force has begun to replace foreign labor. In 1976, the number of temporary absentees reported to be abroad was 25,650. By 1982, the number had dropped to 12,284. This employment situation is not likely to improve in the foreseeable future; at best, it could be expected that labor emigration would maintain its present low level or decrease.

The foregoing analysis suggests that by the year 2000, about 556,000 workers will be looking for jobs in the agricultural sector, either as paid laborers on commercial farms or as self-employed farmers on SNL. To date, commercial agriculture has functioned as the country's main source of exports and foreign exchange earnings, while providing only minimal employment opportunities due essentially to its capital intensity. For the foreseeable future this role is not likely to change significantly. However, the commercial sector is not expected to grow as fast as it did during the last five years when output grew at about 10% per annum. As mentioned, commercial agricultural output is expected to grow at only about 3 to 4% per annum over the next decade. At these rates of growth, the demand for agricultural laborers should increase from around 25,000 presently to about 40,000 by the year 2000.
6.07 This implies that by the year 2000, about 500,000 persons, most of whom will be living in rural areas, will be looking for on-farm work on the SNL. Based on present average labor-output ratios, it is estimated that total output, comprising both crops and livestock, on the SNL, would have to increase by about 7% per annum to employ this number of people. This is an enormous task. In fact, even based on the most optimistic assumptions, this rate of growth in SNL agriculture is highly improbable, which means that there will be a substantial increase in the numbers who seek but are unable to find employment. The development challenge facing Swaziland in the short-to-medium-term essentially involves coming as close to this rate of growth as possible in order to raise the standard of living and keep unemployment, disguised or otherwise, to a minimum. In the long run, the pool of employable, but unemployed labor could change relative factor prices in TDL and make labor intensive production more attractive and feasible. Further, in SNL, labor availability would result in more intensive agriculture, reduce or even eliminate labor bottlenecks and increase both production per ha and total output. These developments should exert pressure to formally legalize land transactions and provide the incentive to develop labor intensive agroindustries.

6.08 The means of achieving a substantial part, if not all, of this growth in SNL agriculture, as well as attaining even the projected modest growth in commercial agriculture, in the short-to-medium-term are discussed in the next section on strategy.

C. The General Strategy

6.09 To achieve only part of the growth referred to in the previous section will require a concerted effort in view of the size of the task and the fact that the range of available policy and development options is severely limited. The proposed strategy for dealing with these problems is four-pronged:

(a) promote the diversification and labor intensification of export crop production through the expansion of such crops as citrus, cotton and tobacco, while expanding the production of sorghum and vegetables for the domestic market;

(b) take further steps to commercialize the beef cattle industry and increase off-take rates;

(c) provide greater incentives for the private sector to take a lead role in (a) and (b) above; and

(d) streamline MOAC to withdraw from direct production and to specialize in (i) providing essential services; (ii) designing and advising on Government agricultural policy; and (iii) coordinating donor aid.

D. Elements of a Strategy

1. Export Crops

6.10 There is considerable opportunity to increase export crop production through diversification and intensification, particularly in cotton, tobacco and citrus fruits.

6.11 Swaziland has a climate ideally suited to cotton growing and already has developed a reputation for the quality of its cotton. Private sector diversification of sugar estates into cotton has already commenced and should be encouraged. The decline in SNL cotton production and quality can be attributed to low comparative financial returns to labor, the high percentage of pest control costs, poor storage and inadequate Government support services. These are all problems that can be resolved. Further, only 26,000 ha, of a potential of up to 60,000 ha, were grown to cotton in 1984. Thus, the following changes are needed: (a) increased research, principally to improve the genetic quality of cotton; (b) improved extension to assist farmers in better husbandry practices, particularly in more efficient storage methods (a technique for achieving this, even partially, would be to introduce grading combined with price differentials); (c) incentives to grow cotton by raising the purchasing price so that comparative returns to labor as between cotton and other crops are reduced (this would encourage the use of lands best suited to cotton growing for that purpose). Further, increased production would permit the private sector to open the second ginnery in the Lowveld and also to add an adjacent oil milling complex.

6.12 Tobacco is another crop with significant potential. There is considerable unsatisfied demand for both air-cured and dark-fired tobacco. Demand for the latter type is estimated at about 1 million kg whereas only 18% of that demand would be met in 1986. Again, the problems in increasing production are not insurmountable: inadequate skills in curing, the need for fuelwood, and returns to labor which are inferior to those of maize. The solutions lie in insisting that tobacco curers grow their own fuelwood and in raising price levels. The advantage in tobacco production is that it is labor intensive and could reduce unemployment, whether apparent or disguised.

6.13 Citrus fruits offer Swaziland another major export prospect. The Japanese market has not been tapped by producers of citrus fruits in Swaziland. The constraints have been the requirement for pre-shipment refrigeration and the lack of ports for this purpose. Swaziland should continue to explore ways of satisfying Japanese requirements. Further, while there are advantages in linkages with the South African Citrus Exchange, Swaziland should endeavor to develop its own identity. This could be achieved by reintroducing the “Swaziland Gold” label. Moreover, such an identity could allow for continued exports in the event that restrictions were imposed on exports from South Africa. Only the non-availability of suitable land constrains further increases of up to 25% in canned pineapple production.

2. Domestic Crops

6.14 The goal of domestic self-sufficiency in maize production may not be achieved in the near future. Such self-sufficiency may even be
unnecessary if sufficient employment could be generated in both production of export and other crops and in the non-agricultural sectors. Even in the short-term, however, increases in yields are possible with improved husbandry and storage methods. This implies more focussed extension services, particularly directed to women. Yields of up to 2mt/ha are possible and this would reduce the present import deficit by 63%. Further, improved storage would result in the saving of 20% of the harvested crop. It is also possible that with a larger population dependent on agriculture in the future, lands which are presently undercultivated or left fallow would be cultivated more intensively. Increasing pressures on land would normally result in such intensification. The recommendations contained in the 1984 GOS/FAO Review of the Maize Industry, summarized in Annex II, are still valid and should be implemented.

6.15 Another crop, both labor intensive and with asizeable local market, is vegetables. The major constraints here are market access and price information. It is also an area where private initiative in the development of a market should be allowed to expand and where Government should confine itself only to the provision of information which would allow better market access. Increased vegetable production would then reduce the present imports from RSA. However, what is needed is the recruitment of a Horticulture Marketing Officer to assist RDA extension staff in the establishment of market linkages and information channels.

6.16 If the strategy to be followed, as suggested, results in the use of better quality lands for the production of subsistence and export crops while reserving marginal lands for other domestic crops, sorghum cultivation should be expanded. Sorghum is both drought tolerant and cultivable in marginal lands. Further, the demand for 5,000 mt of malt by the Matsapha Brewery is presently met through imports from RSA. Expanded local production would also provide a non-graze livestock feed supplement. Further, returns to labor from well-managed sorghum cultivation compare favorably with those for cotton and tobacco.

3. Development of the Livestock Subsector

6.17 The analysis in Chapter IV indicates that increased beef production in the medium-term is critically dependent on the efficiency of export marketing operations. All other factors (the herd, feed resources, infrastructure) are in place. Further, market opportunities, particularly under the Lome Agreement, offer prospects for greatly increased export sales.

6.18 The major problems facing this subsector are an inefficient abattoir and growing soil erosion through overgrazing. Government should take urgent action to review the management and investment needs of the abattoir in order to establish a facility of adequate size and quality with commercial management. This would enable the payment of a higher price to producers than is presently possible. In this regard, it is recommended that the Government establish a Swaziland Livestock Commission to oversee beef production and the management of the export abattoir.

6.19 Short- to medium-term solutions are also available to reduce the degree of range overgrazing. Currently, range grazing provides 83% of livestock feed, whereas crop residues provide about 15%. There is the opportunity to supplement livestock feed, and thereby reduce pressures on the range through the expansion of cotton cake production, which, if export
parity prices were paid, could be obtained from the local ginnery. Sorghum molasses and hominy chop (of which only 50% of SMC production is presently used) could also be used. In the long run, however, Swaziland would need to reconsider the present system of grazing tenure which provides access without controls or management.

6.20 The opportunities for developing horizontal and vertical linkages between different stages in the production process are considerable. Improvements in the quality of the export herd can be achieved through horizontal integration of breeding operations on the SNL to fattening operations on the TDL which are in proximity with each other. Further, vertical linkages would need coordination between the many Government departments and the private sector. No such coordinating authority exists to improve communications or to implement strategies such as those suggested in the Huntings Report. It is recommended that consideration be given to the recruitment of a Livestock Advisor who would work directly with the Principal Secretary, MOAC, on coordination of initiatives in the livestock industry. The Advisor would be responsible for ensuring that developments in the abattoir feedlot and fattening ranches were properly phased and complementary. A minimum three-year consultancy would be required for this purpose.

4. Agro-Industrial Production and Private Sector Participation

6.21 The advantages of increased linkages mentioned in the above paragraph are not limited to the livestock subsector alone. They exist in the crop subsector and between subsectors. For instance, the expansion of cotton production would facilitate the opening of the second ginnery. Cotton seed produced by the ginneries could be converted into cotton seed cake as a livestock feed supplement. Expanded sorghum production could be used for the production of malt both for beer manufacture and livestock feed. Expanded maize production could increase the amount of maize stover available as a crop residue for livestock.

6.22 Other measures which would promote agro-industrial production are:
- **Design and construction of a new abattoir.** This will require a detailed feasibility study which needs to be commissioned by management of the abattoir. (para 4.11)
- **Investment decision on an ethanol plant.** The potential benefits of establishing an ethanol plant are well known and a number of private investors have expressed interest in financing this development, especially in the light of lower gas and oil prices. The Government needs to determine and approve the location of the plant. (para 3.03)
- **Expansion of the Swazican fruit processing capacity through provision of more land for expansion of production.** (para 3.07)
- **Reopening the second ginnery in the Lowveld.** At present, the cotton crop is too small for operation of the Big Bend ginnery and much of the crop is therefore exported unginned to South Africa. In order to stimulate private sector interest in the marketing and processing of cotton, the
Government will need to take steps (para 6.10) to increase cotton production and improve the quality of cotton lint.

6.23 The private sector can be expected to play a lead role in all these activities. In addition, it is evident that much of the provision of inputs and agricultural services now provided by the Government could be done more efficiently by private entrepreneurs without the need for Government subsidy. Public sector operation of the tractor hire scheme has required heavy subsidy and has recently been unsatisfactory. It is therefore recommended that the Government consider a phased program for renting out the workshop and garage facilities to the private sector. The provision of credit, channeled through the commercial banking sector to private operators, and the elimination of Government subsidies could lead to gradual improvements in the tractor fleet and consequently the hire service.

5. Institutional Strengthening and Reorganization of MOAC

6.24 MOAC's present planning, financial management and organizational problems result from (a) an attempt to provide all services in the agricultural sector; (b) the imbalance in budgetary resources between salaries and other expenses; and (c) the tendency to accept demands for separate units to manage each donor's projects. All this reflects a lack of definition of priorities, a failure to determine what role MOAC can best fulfill in the agricultural sector, and a planning vacuum.

6.25 This review recommends that MOAC define its future role on an objective assessment of a division of labor between MOAC and the private sector based on the principle of comparative advantage. Such an assessment would probably lead to the following conclusions: First, MOAC can serve the needs of the sector best by providing extension information, particularly in regard to markets and prices, and research. The private sector would be far more efficient in providing inputs such as fertilizers and tractor services and manufacturing facilities such as ginneries or curing barns. Second, MOAC should develop overall agricultural policy and serve as the coordinating body between and within subsectors. Third, within the framework of policy and national priorities, MOAC should coordinate donor aid for the sector.

6.26 With respect to new responsibilities for MOAC, at present these are determined to a large extent by donor-supported projects. This has resulted in a proliferation of units and subunits, generally reflecting a narrow single function purpose. There is a need for simplification of MOAC's organizational structure and for greater diversification of tasks within a unit.

6.27 Intensive levels of staffing in MOAC absorb such a high proportion of the available budget that the lack of other operational funds are constraining the effectiveness of the present staff. Therefore, over the short- to medium-term, priority should be given to establishing a more realistic balance between salary and non-salary recurrent expenditures.

6.28 In view of the complexity of the issues involved in this restructuring exercise, it is recommended that consideration be given to the recruitment of an Organization and Financial Management Advisor. This individual would work with the Undersecretary for Administration and would be responsible for streamlining MOAC's organizational structure and for
designing and implementing a more efficient personnel and financial management system. The new system would include (a) a long-term plan for reducing MOAC's expenditures on personnel, (particularly temporary workers) through processes of attrition, redeployment and, if necessary, transfer to other ministries; (b) a procedure for estimating MOAC's capital and recurrent budget requirements for priority programs; and (c) operational guidelines or criteria for measuring the results of annual plans as related to objectives and available budget. A three-year consultancy would be required.

6.29 **Research and Extension.** The final test of the success of agricultural services is their impact on production. If the research effort is to be effectively linked with extension, then both should be administered by the Director of Agriculture. Since there is also a significant overlap and duplication in the work of the District Extension Officer and RDA Project Manager, it is recommended that the RDA Project Manager positions be relinquished.

6.30 It is recommended that the Government consider employing a Research/Extension Management Advisor to assist in the determination of priority research and agricultural extension programs. This Advisor would work with the Director of Agriculture. Ideally, he would be supported by four junior agronomists recruited as technical assistance volunteers and outposted to the regional agricultural offices at Piggs Peak, Steki, Manzini and Nhlangano. These four agronomists could assist the regional agricultural officers in the preparation of the annual technical work program covering both detailed monthly extension campaigns and supporting district trials and farmer demonstrations.

6.31 It is recommended initially that consideration be given to the formation of an Agricultural Sector Coordination Committee to review issues related to MOAC's long-range planning, budget and external assistance. Full-time members of the Committee would include members of the Government Budget and Planning Committee, the Principal Secretary of MOAC and representatives from the major donor agencies. Private sector participation in Committee deliberations might also be necessary on specific questions (i.e., privatization of input supplies and mechanical services). The Chairman of the Budget and Planning Committee could also chair the proposed Committee. The purpose of the Committee would be to develop a strategy for achieving the agricultural objectives defined by MOAC/Government. This would include an assessment of agricultural sector investment priorities, the resources required for implementation, and the recurrent cost obligations. Short-term consultancy services would be required for technical support. The Committee would also function as coordinator of donor programs. In this connection, a major issue that should be reviewed early is the feasibility of negotiating a five-year plan of external assistance linked to agreed policy reforms with objectives and "signposts" clearly identified. Problems related to donor programming are recognized, but a plan of this nature would facilitate implementation of a viable sector strategy, given the limitations of local manpower and recurrent finance. It is recommended that MOAC, as a matter of first priority, reach agreement with the Government Budget and Planning Committee
on a long-term plan to reduce recurrent expenditures on personnel, and agreement on diversion of the resulting savings to priority activities.\textsuperscript{10}

6.32 Another area in which the Government could play a major role is the preparation and maintenance of a National Water Master Plan. Such a plan would allow maximum advantage in the international water rights discussions on the four principal rivers shared with neighboring countries. This Plan would also establish a systematic framework for the optimum development of irrigation. Since funds have been made available for development of this Plan with technical assistance to enhance local expertise, it is recommended that the Government commission the preparation of this Master Plan as soon as possible.

E. \textbf{External Assistance}

6.33 External assistance to the agricultural sector has been provided mainly through the financing of RDAP. The donor community is small and coordination among members is good. Although there is no formalized working group of major donors, meetings are held at regular intervals and agency representatives are well-informed about each other's priorities and investments in the sector. Problems do arise, however, when MOAC circumvents the Budget and Planning Committee in securing donor support for proposed projects. To the extent that individual donors are responsive to these requests, misunderstandings can occur. The proposed Agricultural Sector Coordination Committee would help minimize this problem.

\textsuperscript{10} The recent FAO report on the proposed RDAP III project has recommended that the farm family to extension worker ratio be gradually increased to 1:300 which would result in the reduction of over 100 positions and, in financial terms, a cost savings of E 500,000 per annum. These savings are fungible and could be used for kilometer allowances, spare parts, petrol, oil and lubricants, all of which are now in short supply but essential for the delivery of field extension services. This is one approach among many which could be considered.
### Table 1: Crop Production

<table>
<thead>
<tr>
<th>YEAR</th>
<th>SUGAR EXPORTS (000 mt)</th>
<th>CITRUS FRUIT (000 mt)</th>
<th>SEED COTTON (000 mt)</th>
<th>MAIZE (000 mt)</th>
<th>TOBACCO AIR-CURED (tonnes)</th>
<th>SORGHUM (tonnes)</th>
<th>BEANS (tonnes)</th>
<th>GROUNDNUTS (tonnes)</th>
<th>PINEAPPLES (TDL) (000 mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>135.6</td>
<td>29.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<td>12.54</td>
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<td>22.62</td>
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<td>-</td>
<td>-</td>
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<td>49.5</td>
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<td>1978</td>
<td>216.8</td>
<td>47.1</td>
<td>22.28</td>
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<td>1979</td>
<td>223.6</td>
<td>42.5</td>
<td>16.10</td>
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<td>29.9</td>
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<td>40.0</td>
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<td>105.5</td>
<td>252</td>
<td>1582</td>
<td>522</td>
<td>1271</td>
<td>27.6</td>
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<td>48.2</td>
<td>24.88</td>
<td>97.9</td>
<td>245</td>
<td>1147</td>
<td>883</td>
<td>637</td>
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<td>1982</td>
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<td>51.7</td>
<td>14.26</td>
<td>71.8</td>
<td>150</td>
<td>720</td>
<td>404</td>
<td>481</td>
<td>35.2</td>
</tr>
<tr>
<td>1983</td>
<td>380.2</td>
<td>47.3</td>
<td>9.13</td>
<td>60.1</td>
<td>125</td>
<td>1000 1f</td>
<td>800 1f</td>
<td>1000 1f</td>
<td>37.3</td>
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<tr>
<td>1984</td>
<td>406.2</td>
<td>43.0</td>
<td>17.90</td>
<td>110.0</td>
<td>108</td>
<td>1000 1f</td>
<td>800 1f</td>
<td>1000 1f</td>
<td>40.0 1f</td>
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<tr>
<td>1985</td>
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<td>17.18</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>1986</td>
<td>375.2</td>
<td>18.00</td>
<td>-</td>
<td>-</td>
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</tr>
</tbody>
</table>

1/ Estimate.  
Source: Annual Statistical Bulletin, Central Statistical Office and FAO Estimates
Table 2: Volume of Sugar Sales 1984/85 - 1985/86
(Metric Tons)

<table>
<thead>
<tr>
<th>Destination</th>
<th>1984/85</th>
<th>1985/86</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.E.C.</td>
<td>127,377</td>
<td>125,676</td>
</tr>
<tr>
<td>Portugal</td>
<td>80,859</td>
<td>97,452</td>
</tr>
<tr>
<td>South Africa</td>
<td>57,946</td>
<td>0</td>
</tr>
<tr>
<td>Canada</td>
<td>57,019</td>
<td>69,990</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>49,914</td>
<td>24,941</td>
</tr>
<tr>
<td>Mozambique</td>
<td>6,529</td>
<td>14,595</td>
</tr>
<tr>
<td>Kenya</td>
<td>3,445</td>
<td>0</td>
</tr>
<tr>
<td>U.S.S.R.</td>
<td>0</td>
<td>23,058</td>
</tr>
<tr>
<td>Local Sales</td>
<td>21,656</td>
<td>19,568</td>
</tr>
</tbody>
</table>

Total        | 400,745 | 375,280 |

Source: Swaziland Sugar Association
<table>
<thead>
<tr>
<th>Year</th>
<th>Grapefruit</th>
<th>Oranges</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>1,171.4</td>
<td>1,016.6</td>
<td>1,615.1</td>
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<tr>
<td></td>
<td>86.7</td>
<td>780.3</td>
<td>1,529.7</td>
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<tr>
<td></td>
<td>357.0</td>
<td>356.0</td>
<td>2,152.9</td>
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<tr>
<td>1985</td>
<td>1,238.9</td>
<td>1,020.2</td>
<td>1,529.7</td>
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<tr>
<td></td>
<td>87.8</td>
<td>790.2</td>
<td>2,197.4</td>
</tr>
<tr>
<td></td>
<td>203.0</td>
<td>387.0</td>
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<tr>
<td>1986***</td>
<td>1,100.0</td>
<td>1,100.0</td>
<td>1,656.0</td>
</tr>
<tr>
<td></td>
<td>130.0</td>
<td>1,170.0</td>
<td>2,603.0</td>
</tr>
<tr>
<td></td>
<td>426.0</td>
<td>333.0</td>
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Source: Swaziland Citrus Board

* Fresh Fruit
** Includes rejects at the port
*** Provisional Estimates
Table 4: Seed Cotton Production 1981-1986

<table>
<thead>
<tr>
<th>Crop Year</th>
<th>Large-Scale Growers</th>
<th>Small-Scale Growers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(M.Tons) (%)</td>
<td>(M.Tons) (%)</td>
<td></td>
</tr>
<tr>
<td>1980/81</td>
<td>9,961 (40.0)</td>
<td>14,922 (60.0)</td>
<td>24,883</td>
</tr>
<tr>
<td>1981/82</td>
<td>5,810 (40.8)</td>
<td>8,445 (59.2)</td>
<td>14,255</td>
</tr>
<tr>
<td>1982/83</td>
<td>4,107 (45.0)</td>
<td>5,020 (55.0)</td>
<td>9,127</td>
</tr>
<tr>
<td>1983/84</td>
<td>8,055 (45.0)</td>
<td>9,845 (55.0)</td>
<td>17,900</td>
</tr>
<tr>
<td>1984/85</td>
<td>8,247 (48.0)</td>
<td>8,934 (52.0)</td>
<td>17,181</td>
</tr>
<tr>
<td>1985/86*</td>
<td>n/a</td>
<td>n/a</td>
<td>18,000</td>
</tr>
</tbody>
</table>

Source: Swaziland Cotton Board

* Provisional
<table>
<thead>
<tr>
<th>YEAR</th>
<th>SWAZI NATION LANDS</th>
<th>TITLE DEED LANDS</th>
<th>TOTAL</th>
<th>TOTAL COMMERCIAL SLAUGHTER</th>
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<tbody>
<tr>
<td>1971</td>
<td>482,603</td>
<td>89,182</td>
<td>571,785</td>
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<tr>
<td>1972</td>
<td>480,070</td>
<td>109,150</td>
<td>589,220</td>
<td>34,979</td>
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<tr>
<td>1973</td>
<td>489,930</td>
<td>112,484</td>
<td>602,414</td>
<td>42,136</td>
</tr>
<tr>
<td>1975</td>
<td>-</td>
<td>-</td>
<td>621,721</td>
<td>26,088</td>
</tr>
<tr>
<td>1976</td>
<td>499,892</td>
<td>134,349</td>
<td>634,241</td>
<td>37,860</td>
</tr>
<tr>
<td>1977</td>
<td>-</td>
<td>-</td>
<td>634,090</td>
<td>38,847</td>
</tr>
<tr>
<td>1978</td>
<td>506,565</td>
<td>137,591</td>
<td>644,156</td>
<td>49,062</td>
</tr>
<tr>
<td>1979</td>
<td>513,140</td>
<td>147,365</td>
<td>660,505</td>
<td>55,250</td>
</tr>
<tr>
<td>1980</td>
<td>515,925</td>
<td>141,683</td>
<td>657,608</td>
<td>44,429</td>
</tr>
<tr>
<td>1981</td>
<td>495,711</td>
<td>159,981</td>
<td>655,692</td>
<td>34,728</td>
</tr>
<tr>
<td>1982</td>
<td>502,257</td>
<td>133,779</td>
<td>636,036</td>
<td>37,661</td>
</tr>
<tr>
<td>1983</td>
<td>458,267</td>
<td>155,262</td>
<td>642,447</td>
<td>26,751</td>
</tr>
<tr>
<td>1984</td>
<td>-</td>
<td>-</td>
<td>613,529</td>
<td>-</td>
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</table>

Source: MOAC, Annual Statistical Bulletins and Veterinary Department, SMC
(Number)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>655,697</td>
<td>636,036</td>
<td>642,447*</td>
<td>613,529</td>
<td>648,332</td>
</tr>
<tr>
<td>Goats</td>
<td>308,933</td>
<td>320,398</td>
<td>333,895</td>
<td>298,029</td>
<td>268,422</td>
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<tr>
<td>Sheep</td>
<td>32,924</td>
<td>40,132</td>
<td>38,820</td>
<td>35,125</td>
<td>29,585</td>
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<td>Poultry</td>
<td>720,966</td>
<td>905,925</td>
<td>682,572</td>
<td>704,318</td>
<td>665,239</td>
</tr>
<tr>
<td>Pigs</td>
<td>16,004</td>
<td>16,459</td>
<td>16,420</td>
<td>13,989</td>
<td>16,333</td>
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<tr>
<td>Equines</td>
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<td>16,982</td>
<td>16,718</td>
<td>14,711</td>
<td>14,208</td>
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</table>

Source: Ministry of Agriculture and Cooperatives

* This figure should be treated with caution due to extreme data reported from one district. There may be an overstatement in the vicinity of 30,000 heads.
Table 7: SMALLHOLDER (SNL) CROP BUDGETS
(at Nov. 1985 prices (ES))

<table>
<thead>
<tr>
<th>CROP</th>
<th>YIELD</th>
<th>TOTAL COSTS</th>
<th>TOTAL OUTPUT</th>
<th>MAN DAYS</th>
<th>GROSS MARGIN</th>
<th>RETURN PER</th>
<th>GROSS MARGIN</th>
<th>RETURN/</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>KG/HA</td>
<td>PER HA</td>
<td>VALUE PER HA</td>
<td>PER HA</td>
<td>E/HA FINANCIAL</td>
<td>MAN DAY</td>
<td>E/HA ECONOMIC</td>
<td>MAN DAY</td>
</tr>
<tr>
<td>Maize traditional 3/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highveld</td>
<td>1,275</td>
<td>151</td>
<td>395</td>
<td>68</td>
<td>244</td>
<td>3.6</td>
<td>341</td>
<td>5.0</td>
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<tr>
<td>Middleveld</td>
<td>850</td>
<td>145</td>
<td>264</td>
<td>60</td>
<td>119</td>
<td>2.0</td>
<td>177</td>
<td>3.0</td>
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<tr>
<td>Lowveld</td>
<td>425</td>
<td>81</td>
<td>132</td>
<td>55</td>
<td>51</td>
<td>0.9</td>
<td>44</td>
<td>0.8</td>
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<tr>
<td>Maize intermediate 4/</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highveld</td>
<td>2,550</td>
<td>333</td>
<td>791</td>
<td>78</td>
<td>458</td>
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<td>9.8</td>
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<td>1,770</td>
<td>259</td>
<td>527</td>
<td>65</td>
<td>268</td>
<td>4.1</td>
<td>445</td>
<td>1.9</td>
</tr>
<tr>
<td>Lowveld</td>
<td>850</td>
<td>178</td>
<td>264</td>
<td>60</td>
<td>86</td>
<td>1.4</td>
<td>158</td>
<td>2.6</td>
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<tr>
<td>Maize optimum 5/</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Highveld</td>
<td>4,250</td>
<td>563</td>
<td>1,318</td>
<td>50</td>
<td>755</td>
<td>15.1</td>
<td>1,200</td>
<td>24.0</td>
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<td>Middleveld</td>
<td>2,550</td>
<td>384</td>
<td>791</td>
<td>45</td>
<td>407</td>
<td>9.0</td>
<td>674</td>
<td>15.0</td>
</tr>
<tr>
<td>Lowveld</td>
<td>1,275</td>
<td>270</td>
<td>395</td>
<td>40</td>
<td>125</td>
<td>3.1</td>
<td>240</td>
<td>6.0</td>
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<tr>
<td>Groundnuts shelled</td>
<td>300</td>
<td>207</td>
<td>450</td>
<td>125</td>
<td>243</td>
<td>1.9</td>
<td>384</td>
<td>3.1</td>
</tr>
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<td>Beans</td>
<td>500</td>
<td>343</td>
<td>900</td>
<td>125</td>
<td>557</td>
<td>4.5</td>
<td>252</td>
<td>2.0</td>
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<tr>
<td>Sorghum</td>
<td>1,800</td>
<td>168</td>
<td>373</td>
<td>60</td>
<td>205</td>
<td>3.6</td>
<td>532</td>
<td>8.9</td>
</tr>
<tr>
<td>Cotton</td>
<td>850</td>
<td>714</td>
<td>398</td>
<td>125</td>
<td>316</td>
<td>2.5</td>
<td>888</td>
<td>7.1</td>
</tr>
<tr>
<td>Tobacco air-cured</td>
<td>700</td>
<td>515</td>
<td>910</td>
<td>145</td>
<td>395</td>
<td>2.7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rice Taiwan scheme</td>
<td>6,000</td>
<td>511</td>
<td>2,880</td>
<td>222</td>
<td>2,369</td>
<td>10.7</td>
<td>3,858</td>
<td>15.1</td>
</tr>
<tr>
<td>Irrigated vegetables</td>
<td>various</td>
<td>2,107</td>
<td>5,372</td>
<td>875</td>
<td>3,865</td>
<td>4.4</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
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1/ Gross yield less than 15% for harvest/storage losses.
2/ Including family labor.
3/ Ox-cultivation, open-pollinated seed, low fertilizer, manual weeding and harvesting.
4/ Tractor-ploughing, ox-harvesting and seedling, hybrid seed, medium fertilization, hired assistance for weeding; improved storage, active farmers.
5/ Commercial farmers on SNL (less than 10% of households), tractor cultivation, adequate fertilizer and weeding by herbicide.
SUMMARY OF THE MAIN REPORTS CITED IN THE REVIEW

The Maize Industry of Swaziland. FAO. August 1984

Recommendations of Mission Report

1. Technical. Mission suggestions to improve maize technology and production (which if applied on even 50% of the SNL maize area could close the import gap) are the following:

(a) Further research programs aimed at determining the optimum maize intercrop combination;

(b) Refinement of maize husbandry practices for each zone consistent with the economic environment for maize production, particularly the reassessment of the appropriate nutrient needs and sources for the various zones and sub-zones. Minimum tillage techniques should be included in the program;

(c) Vigorous promotion of a simple and cost-effective crop husbandry package, appropriate to the managerial capability of the farmers;

(d) Increased attention to the efficient management of animal-drawn equipment and the expansion of mechanized cultivation services in the public and private sectors;

(e) Expansion of the Seed Multiplication Unit to produce better yielding hybrids and varieties so that more of the seed requirements could be produced in Swaziland; at the same time increasing the funds for multiplication and research programs;

(f) More vigorous research on technologies for reducing field and storage/drying losses;

(g) Strengthening of links between research and extension through the establishment of a national maize development committee which would provide the policy directives for both research and extension;

(h) Reorientation of the soil laboratory services to ensure that nutrient recommendations are more flexible and take into account target yields and management capability of the farmer client. That is, the test results should allow for individual tailoring by the extension officer; this particularly applies to liming recommendations;

(i) Encouragement of the use by maize farmers of the more concentrated fertilizer types, preferably without potash (unless proven necessary by field trials);
(j) Strengthening of CCU's capability of meeting the input needs of farmers through such measures as applying greater selectivity in grades and quality of seed (including seed size) procured for producers and providing small equipment to its members;

2. Other Recommendations

(a) Additional land potential for maize production should be assessed immediately;

(b) The means by which this land could enter commercial production should be determined, e.g., on a lease basis to existing commercial farmers, either Swazi or expatriate, or to Tibiyo, or managed as cooperative units by keener farmers who are granted sufficient land to motivate them to farm the areas well;

(c) Maize production on the Lowveld should continue to be discouraged and replaced by a more suitable crop (sorghum) or cash crop (cotton);

(d) The University of Swaziland, in collaboration with the MOAC, should continue its efforts to identify the motivational characteristics of farmers; this information should be used to assist the direction and practices of the extension service in promoting appropriate crop husbandry;

(e) Better and more efficient drying and hulling techniques should be investigated as means for reducing losses and increasing maize supplies;

(f) A financial management service should be made available to those farmers who both need and are receptive to such advice to help plan their farm and household activities. This service could be provided by appropriately trained extension workers in conjunction with SDSB credit advisors and with the collaboration of the Chief Agricultural Economist of MOAC;

(g) Efforts to increase the availability of mechanical services to farmers on SNL should be intensified by promotion of both the private sector and rationalization of the management of the tractor hire pool, using aid funds if Government has insufficient revenue for this purpose;
(i) Credit funds to the SDSB should be made more available and on-lending to the small-farm sector should be continued under less stringent conditions than at present but at interest rates set progressively closer to commercial rates.

Cotton Development in Swaziland. FAO. November 1981

Mission Report - Summary of Recommendations

1. Restore research on cotton breeding and cotton entomology by recruiting a cotton breeder and a cotton entomologist from abroad, probably with the help of foreign aid.

2. Strengthen the extension service for cotton growers which, in the immediate term, depends on the restoration of cotton research. Once research is restored, or is undergoing the process of restoration, selected extension officers should be dispatched on training courses in Zimbabwe and/or the United Kingdom, a farmer training center should be established at Big Bend, a group extension system should be created, and donor support should be sought for the creation of a corps of 50 highly-trained cotton extension workers.

3. Establish an irrigated cotton nucleus estate to take advantage of the additional winter water in the Usutu River after 1984.

4. Encourage increased cotton Producer prices by influencing the policy of Swaziland Oil Seed Mills Ltd. to ensure timely construction of their oil seed plant, to seek the best market for oil and meal, and to pass on to farmers some of the benefits of improved oil and meal marketing.

5. Improve seasonal credit supply to and credit worthiness of small-scale farmers, by adopting a number of possible options, including a grower registration scheme, and a crop insurance scheme.

6. Improve certain aspects of grading and ginning facilities such as adopting published and displayed standards for seed cotton, creating a grading appeals procedure, improving seed cotton storage at Swaziland Oil Seed Mills Ltd., promoting timely installation of appropriate cleaning and drying equipment at the same ginnery so that it is equipped for processing mechanically-harvested cotton.

7. Continue the South African Marketing Agreement, but seek to change two aspects of it, namely to have the stabilization levy on Swaziland cotton ginned at Pongola accredited to the Swaziland portion of the Fund, and to seek greater accountability of the stabilization fund.

8. Undertake a feasibility study for the establishment of a spinning and possible weaving industry in Swaziland.

Final Report - Recommendations

The following proposals are put forward for implementation in the near future:

1. The formation of a Government-owned company, the Swaziland Ranching Corporation, to take over the majority of the existing Government ranches and to run them on a commercial basis in such a way as to increase the throughput of cattle from Swazi Nation Land; the Corporation would also seek to establish additional ranches for the same purpose.

2. The establishment of three additional sisa ranches, which would be managed in the first instance by the Ranching Corporation, for the use of Swazi Nation cattle owners.

3. The formal recognition by the Government of Swaziland Livestock Producers Association, which is currently in the process of reorganization, as the national representative body of the livestock producers.

4. The establishment of a Swaziland Livestock Commission, whose main function would be to take over the operation of the export abattoir, and to which would be appointed representatives of the producers, others with interests in the livestock and meat industry, and the Government.

5. The formation of a Livestock Advisory Committee, to which would be appointed producers' representatives and others involved in the livestock industry, whose purpose would be to discuss with the Government the problem and development of the industry.

6. The construction of a redesigned abattoir and cannery up to EEC standards, which would permit the supply of both the export and domestic markets; this would be put in hand after the establishment of the new Livestock Commission and would require a detailed design.

7. The promotion of the hides and skins industry through a program to increase the recovery of hides from the rural areas, and through the construction of a wet blue tannery as a subsidiary of the new Livestock Commission.

8. The introduction of a system of Payment of dipping fees by Swazi National cattle owners, which could be administered by the Government, but which would be better organized by the Livestock Producers Association.

9. The replacement of the existing Control of Slaughter Houses Act by more suitable legislation, and the amendment of the Hides and Skins Act to give administrative responsibility to the Minister of Agriculture and Cooperatives.
Final Report - Summary of Recommendations and Options

1. MOAC. The MOAC should take responsibility for dairy development and should establish a Dairy Section to plan and develop the dairy industry at the milk production level if the SDB does not provide this service.

2. The Future Role of SDB. The long-term plans for the SDB have been, and still are, that it should hand over its commercial divisions to cooperatives and concentrate on the role of being an impartial body, only responsible for regulating the milk market.

The future role of the SDB should be considered against the background of:

(a) the urgency of finding solutions to the present problems; and

(b) the long-term plans to eventually separate the SDB from its present commercial divisions.

Option 1 - Restructure of SDB

Based on already existing plans for separation of SDB from commercial divisions and allowing the private sector to solve the present problems.

(a) The Dairy Division. Establishing a joint venture between Government and a commercial organization. The commercial organization should provide the financial and technical resources needed while the Government should ensure that national interests receive due attention.

(b) Farm Divisions. Transfer or lease out the three SDB farms to the private sector.

(c) Feed Mill Division. Transfer the feed mill to the private sector.

Option 2 - Maintain SDB in its present form

Based on the assumption that it will be in the national interest to allow SDB to operate the commercial divisions until they can be handed over to the cooperatives. Adoption of Option 2 will require a clear policy decision as to whether further developments of the commercial divisions should be paid either (i) directly by the consumers through higher consumer prices for milk and milk products, or (ii) by the Government through special allocations for such developments.
(a) The Dairy Division. The dairy division should receive assistance, as a matter of priority, in the fields of business management/economics, marketing and product development. The possibility of immediate short-term marketing assistance from FAO through its TCP fund should be investigated. Alternatively, external assistance for a market development project could be sought.

(b) The Dairy Farms. The two dairy farms would benefit from a part-time professional farm management consultancy input based on regular technical/management visits linked to the preparation and monitoring of budgets and performance.

(c) The Feed Mill Division. In order to improve the quality of the feeds, the feed mill should either (i) establish its own analytical facilities, or (ii) import full concentrate mixtures to be mixed with prescribed ratios of maize and molasses by the feed mill.

3. Policy Options for Development of Milk Production

The main options for future development of milk production are:

(a) Reliance on the large-scale warm sector to produce milk for processing and sale. The present attractive producer price provides the necessary incentive for TDL farmers to invest in milk production.

(b) An increase in small farm involvement in milk production.

(c) A balanced approach including development of both the large-scale and the small-scale sector.

Development of the large-scale sector would require limited Government support while development of the small-scale sector would require a long-term program and substantial investments of both capital and manpower. A balanced approach including both the large and small-scale sector is recommended.

4. National Smallholder Dairy Development Program

A national smallholder dairy development program is recommended. This long-term program would be planned and coordinated by the proposed Dairy Section in the MOAC and would provide an integrated approach to small farmer dairy development.

The program would include the following components:

(a) Milk cooling units and milk collection schemes
(b) Cross-breeding
(c) Research and development
(d) Manpower training
(e) Technical assistance