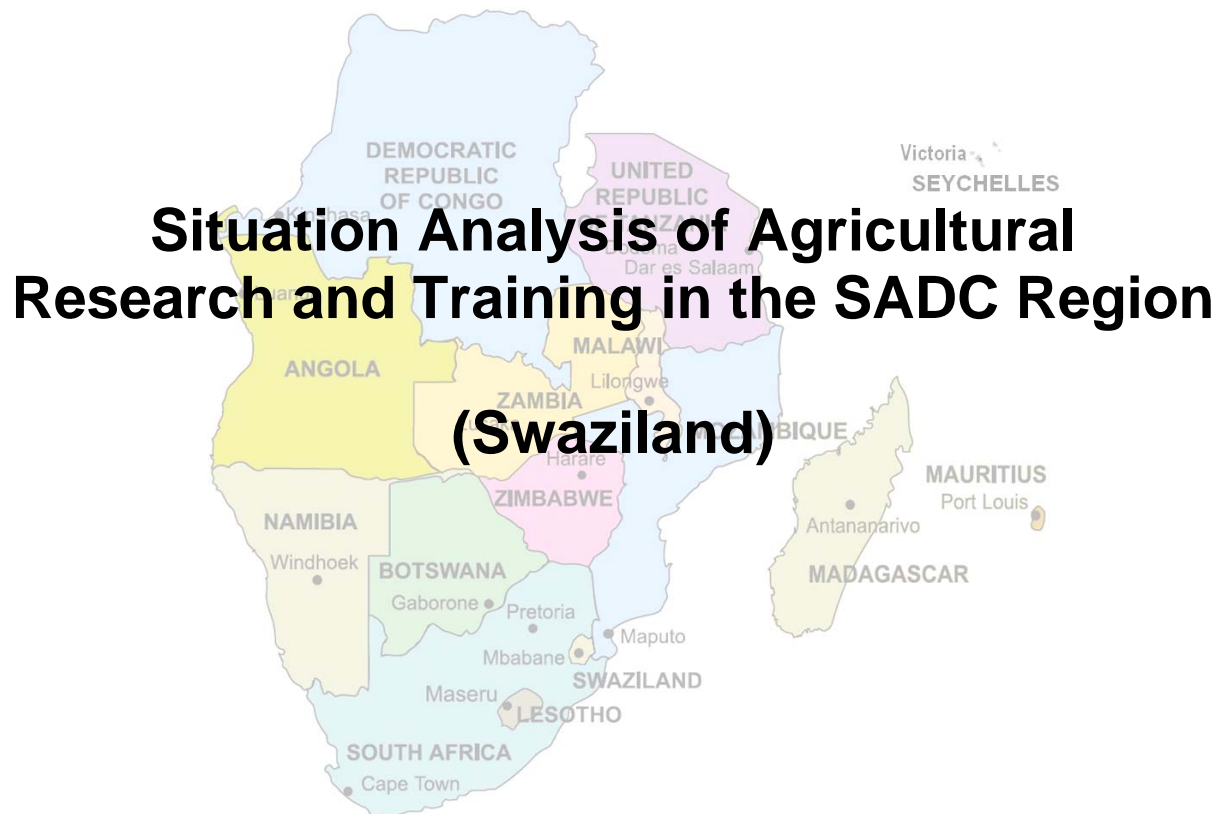




# IMPLEMENTATION AND COORDINATION OF AGRICULTURAL RESEARCH AND TRAINING (ICART) IN THE SADC REGION



***FANR Directorate  
SADC Secretariat  
July 2008***

*“The authors accept sole responsibility for this report drawn up on behalf of the Regional Authorising Officer of SADC Secretariat. The report does not necessarily reflect the views of the SADC Secretariat, nor of the European Commission”*

**SWAZILAND SITUATIONAL ANALYSIS ON AGRICULTURAL RESEARCH  
AND TRAINING**

**FINAL REPORT**

**BY**

**UNISWA CONSULTANCY AND TRAINING CENTRE (CTC)**

**SUBMITTED TO**

**ICART-SADC**

**FEBRUARY 2008**

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## **ACRONYMS**

FAO	:	Food and Agriculture Organization
FoA	:	Faculty of Agriculture
GDP	:	Gross Domestic Product
NARS:		National Agricultural Research Systems
MoAC	:	Ministry of Agriculture and Cooperatives
NASTIC	:	Nhlangano Agricultural Skills Training Centre
NDS	:	National Development Plan
NGO	:	Non-governmental Organization
SADC	:	Southern African Development Community
ARD		Agricultural Research Division
URC		Uniswa Research Centre
CTC		Uniswa Consultancy and Training Centre
SIRMIP		Swaziland Institute for Research in Traditional Medicine, Medicinal and Indigenous Food Plants
SSA		Swaziland Sugar Association
SNL	:	Swazi Nation Land
SWADE	:	Swaziland Agricultural Development Enterprise
TDL	:	Title Deed Land
UNISWA	:	University of Swaziland

## **ACKNOWLEDGEMENTS**

We wish to acknowledge several individuals, institutions and individuals who assisted in providing information for the situation analysis of research and training Swaziland. Special thanks go to the Focal Point person, Mr. Paul D. Mkhathshwa, Ministry of Agriculture and Cooperatives, Staff at the University of Swaziland Faculty of Agriculture, parastatals and non governmental organizations

## **EXECUTIVE SUMMARY**

The purpose of the third phase of the situation analysis on agricultural research and training was to gather information to supplement the Phase 2 of information gathering process that was conducted by a regional consultant.

In order to capture the objectives of the situation analysis, a combination of methods were used to gather the required information. Literature review of pertinent and key government documents and non-governmental organizations (NGOs). Consultative meetings with key experts and personal interviews were also conducted.

The analysis revealed that research on agriculture is conducted by government institutions, parastatals, and private companies.

Training in agriculture is conducted by the Ministry of Agriculture and Cooperatives through the Mpisi Farm training Centre, the Ministry of Education through Ngwane Teacher Training College and the University of Swaziland, Faculty of Agriculture.

## **TERMS OF REFERENCE**

### **Framework and coordination of the NARS**

- Assessing with the relevant Ministries the policies for research and training in agriculture
- Identify relevant private sector organizations and their research needs
- Establish the list of registered institutions/ organizations delivering agricultural research
- Establish the list of registered Institutions/organizations delivering high level training and in service professional training in agriculture

- Assess with the Ministries the formal existence of NARS and the monitoring mechanisms, the contribution of research stakeholders
- Provide charts indicating institutional structures
- Documenting the working methodologies for research / the NARS
- Identify actual and potential demand for cooperative relationships between research & training institutions and the farmers' organizations & private sector
- Document and appraise in-country research alliances

### **Networking for Agricultural training, research and development**

- Document & Appraise in country research alliances
- Describe & contextualise research alliances (& the programmes they address) across the SADC region
- Describe & contextualise cooperation with foreign/ international research institutions
- Identify the needs for research alliances and networks

# 1 INTRODUCTION AND BACKGROUND

## 1.1 Location

The Kingdom of Swaziland, with an area of 17 370 square kilometres, lies between 150 and 1 800 metres above sea level, and is situated between latitudes 25°43' and 27°19' S and longitudes 30°47' and 32°08' in south-eastern Africa. It is a landlocked country surrounded to the north, west and south by the Republic of South Africa and to the east by the Republic of Mozambique (Fig. 1).



Figure 1: Location of Swaziland

## **1.2 Physiography**

The country is divided into six physiographic zones based on elevation, landforms, geology, soils and vegetation (Van Waveren and Nhlengetfwa, 1992; and Remmelzwaal, 1993) as shown in Fig 2. The main characteristics of the physiographic zones are summarized in Table 1.

The Highveld, which occupies 33 % of the land area, runs along the western border of the country. It is the upper part of an overall escarpment, consisting of a complex of steep slopes between low and high levels, dissected plateaus, plateau remnants, and associated hills, valleys and basins.

The Upper Middleveld occupies 14 % of the land area and runs to the east of the Highveld. It consists of strongly eroded plateau remnants and hills at an intermediate level of the overall escarpment. It also contains structurally defined basins in relatively protected positions, which are only weakly eroded.

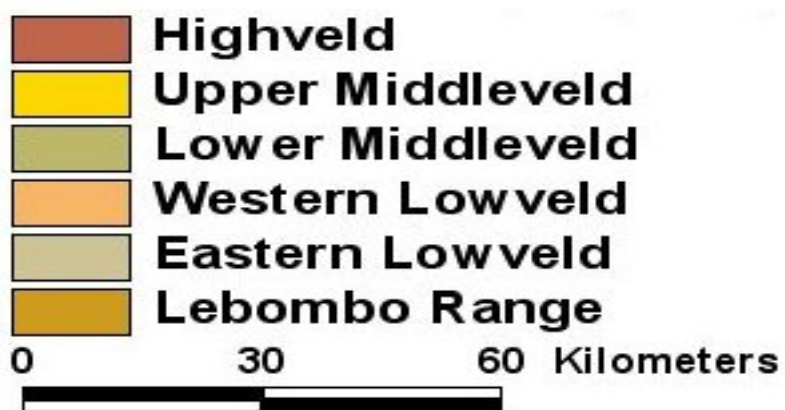
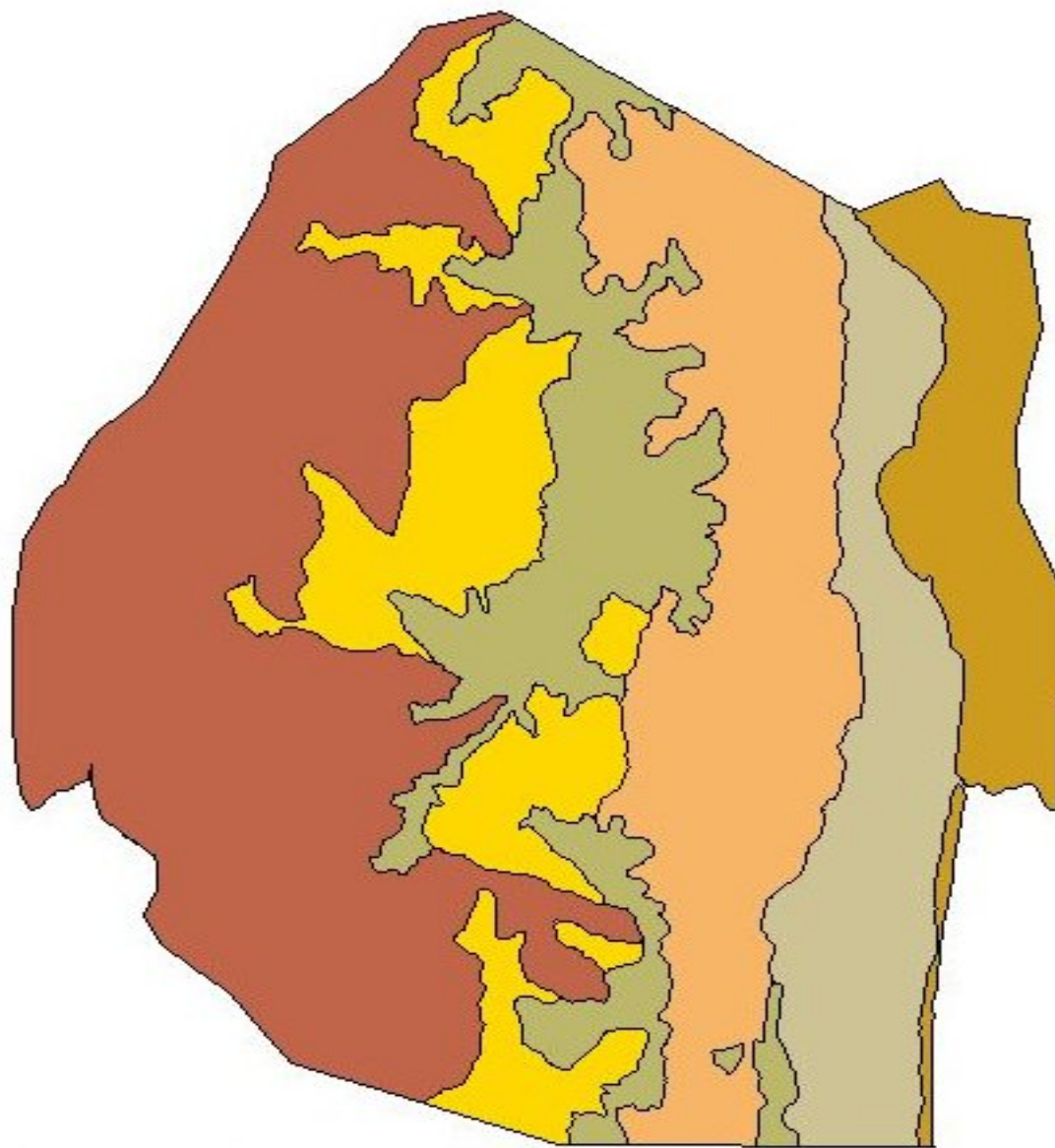


Figure 2: Major physiographic zones of Swaziland

The Lower Middleveld also covers 14 % of the land area. It is basically the piedmont zone of the escarpment, characterized by generally strongly eroded foot slopes. It has moderate slopes. Igneous and metamorphic rocks underlie the Highveld and Middleveld zones. The Lowveld plain consists of sedimentary and volcanic Karro beds and is subdivided into two. The higher Western Lowveld, which covers 20 % of the land area, is underlain by sandstone or claystone. The lower Eastern Lowveld lies on basalt and covers 11 % of the land area.

**Table 1: Physiographic zones and major landforms of the first level**

Physiographic zone (area in km <sup>2</sup> )	Altitude (m) (min-max)	Landform	Topography	Geology	Slope (%)
Highveld (5 680)	900–1 400 (600-1 850) upper medium	Medium hills: associated high hills and plateaux	Steeply dissected: escarpment, transitions to undulating plateaux	Granite: gneiss, quartzite, lava	18
Upper Middleveld (2 420)	600–800 (400-1 000) lower medium	Medium hills: associated low hills and basins	Hilly: plateau remnants and undulating basins	Granodiorite, Granite: gneiss, shale	12
Lower Middleveld (2 240)	400–600 (250-800) low	Plain: associated low hills	Rolling: piedmont, undulating basins, isolated hills	Gneiss: granite, granodiorite	12
Western Lowveld (3 410)	250–400 (200-500) very low	Plain	Undulating: part rolling	Sandstone/cl aystone: dolerite intrusions, granite/grano diorite	5
Eastern Lowveld (1 960)	200–300 (200-300) low	Plain	Gently undulating: part rolling	Basalt	3
Lubombo Range (1 480)	250–600 (100-750) low	Plateau: dissected	Undulating: cuesta, partly hilly and steeply dissected	Ignimbrite	5

Source: *Remmelzwaal (1993)*

The Lubombo Range covers 8 % of the land area. It is a cuesta, a titled plateau with a steep escarpment bordering the Eastern Lowveld and a gradual dipslope of about 5 percent descending east. It is a plateau with a strong degree of dissection.

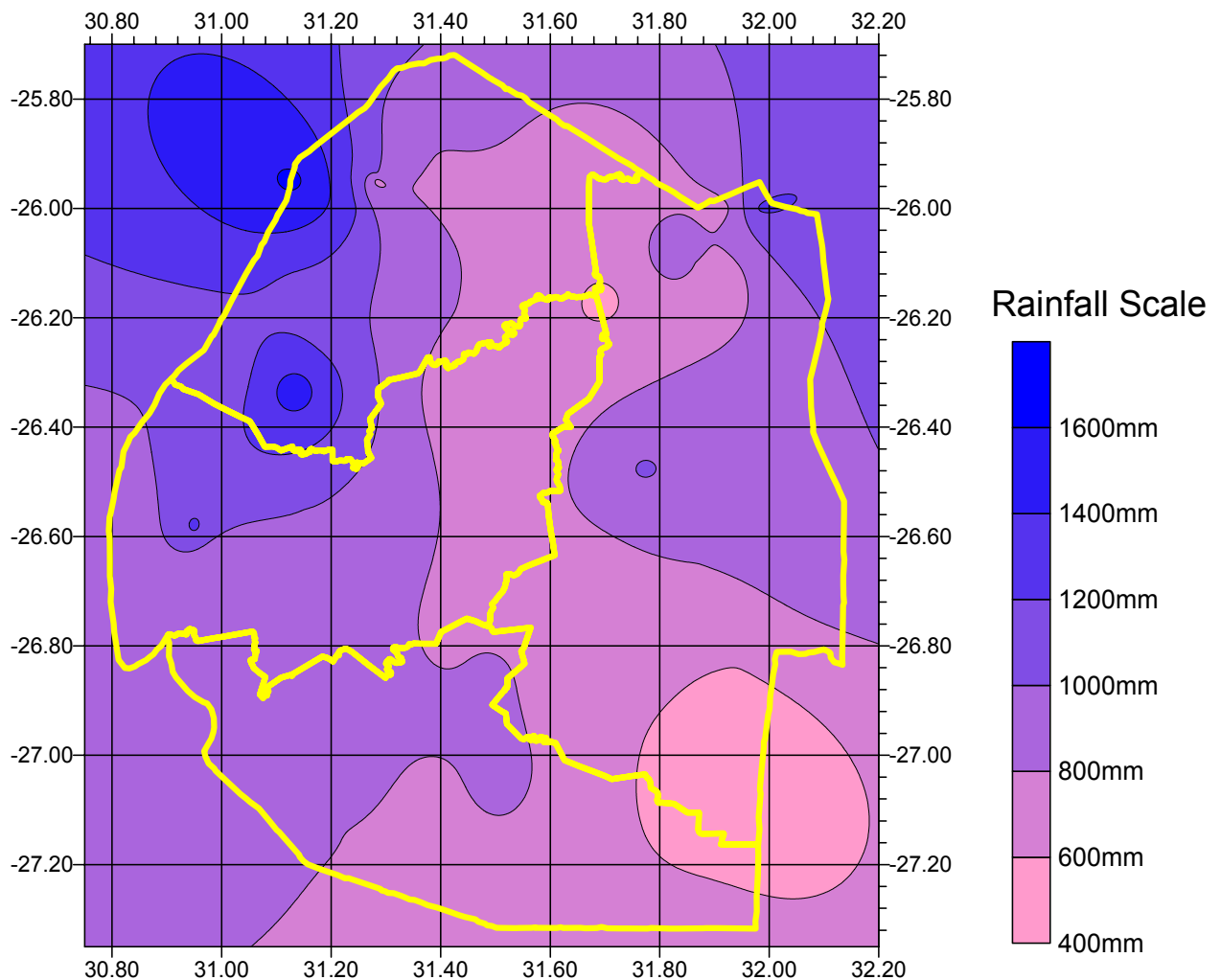
### **1.3 Climate**

#### ***1.3.1 Rainfall***

The country lies at the transition of major climatic zones, as it is influenced by air masses from different origins: equatorial convergence zone mass; subtropical eastern continental moist maritime masses (with occasional cyclones); and dry continental tropical and marine western Mediterranean masses (which bring winter rains with occasional snow).

The country's average annual precipitation is approximately 1200 mm in the west and 400 mm in the east. Total mean annual precipitation equals approximately 14 km<sup>3</sup>, of which an estimated 12 per cent is runoff.

All the ecological zones receive distinct seasonal rainfall, most of which falls in summer (September to March), whilst little or no rain is expected over the other months. Mean annual rainfall ranges from about 1 500 mm in the Highveld to a little less than 500 mm in the southern Lowveld. Figure 3 give the distribution of mean annual rainfall within the country and Table 2 gives climatic characteristics of the main physiographic zones.



**Figure 3: Mean annual rainfall distribution**

The Highveld climate is characterised by wet summers and dry winters, and annual rainfall averaging 1 500 mm. Temperatures vary between a maximum of 33°C in mid-summer and 0°C at night in mid-winter. The Lowveld, on the other hand, experiences a sub-tropical climate. This zone receives the lowest annual rainfall of about 400 mm. The Lowveld has a large diurnal temperature range with maximum temperatures reaching the upper 30's. Between 75 % and 83 % of the annual rainfall comes in summer (October till March).

The country is prone to occurrences of natural extreme climatic conditions, such as cyclones on one end and droughts on the other. The latest and longest drought occurred during the period of 1989-1994, while the most recent devastating cyclone (Domonia) hit the country in 1984.

**Table 2: Climatic characteristics of the main physiographic zones of Swaziland**

Physiographic zone	Mean temperature (°C)	Rainfall (mm)		Moisture zone	Temperature zone
		Mean annual	Dependable (80%)		
Highveld	17	800-400	700-1200	Humid to sub-humid	Cool to moderately cool
Upper Middleveld	20	800-000	650-850	Sub-humid to moist semiarid	Moderately warm
Lower Middleveld	21	650-800	500-700	Sub-humid to moist semiarid	Moderately warm
Western Lowveld	22	625-725	425-550	Moist semiarid to dry semiarid	Moderately warm to warm
Eastern Lowveld	22	550-625	400-500	Moist semiarid to dry semiarid	Moderately warm to warm
Lubombo Range	21	700-825	500-750	Moist semi-arid	Moderately warm

Source: Van Waveren and Nhlengetfwa (1992)

### **1.3.2 Drought hazards**

Swaziland experiences prolonged periods of drought during the winter months when there is little or no rainfall. Even in the summer rainy months, consistent rainfall cannot be expected. Thus, many parts of the country often do not receive sufficiently persistent rainfall to accumulate enough moisture in the soil for growing crops.

The annual rainfall required to grow maize without irrigation in Swaziland is about 630 mm, and many areas frequently do not receive this amount as shown in the rainfall distribution map above (Fig 3). For much of the Lowveld, it is likely that in six summers out of ten (i.e. 60%) rainfall will be less than 508 mm, and eight summers out of ten (80%) will receive less than 725mm. For the Middleveld and Highveld, the chances of drought are 20% and less than 1%, respectively.

### 1.3.3 Aridity

Aridity is basically a lack of water, so that an arid area is characterised by small amounts of precipitation, occurring infrequently, unreliably, and often in the form of heavy downpours. Consequently, arid areas can be linked with the occurrence of deserts since the conventional definition of a desert is an area receiving less than 250 mm of rainfall per year.

A more precise definition of deserts and arid areas can be produced through measuring water balance. This is based on the relationship between; input of water as precipitation (P), output of moisture resulting from potential evapotranspiration (PET), and changes in water held in the ground. In arid areas there is high potential Evapotranspiration since the volume of water that could be lost through evaporation and transpiration is greater than the volume of water which is actually available. The relationship between precipitation and potential evapotranspiration (P/PET) is used to produce an aridity index (AI). Drylands are, by definition, areas where the index of aridity is less than 0.65 (Middleton and Thomas, 1997).

Drylands are classified into four climatic zones on the basis of aridity index (AI) values (Chikamai and Kigomo, 2003). According to Middleton and Thomas (1997), the categories of aridity using the AI index are as follows:

Hyper-arid	<0.05
Arid	0.05-0.20
Semi-arid	0.20-0.50
Dry sub-humid	0.50-0.65

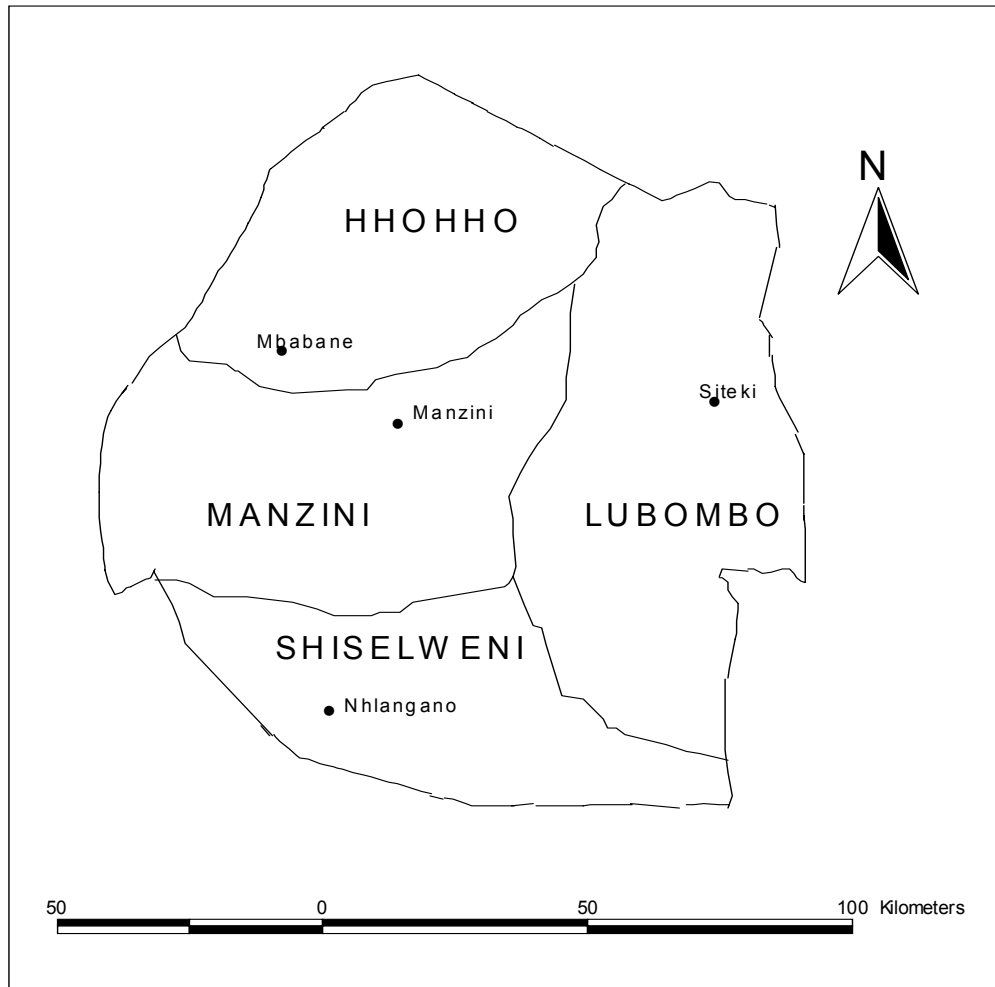
Table 3 shows the aridity indices for the physiographic zones in Swaziland. The Lowveld is semi-arid, while the Lower Middleveld is dry sub-humid. Thus, the Lower Middleveld and the entire Lowveld are categorised as drylands (with AI < 0.65) where lack of sufficient water constraints most of the socio-economic activities.

**Table 3: Aridity indices (AI) for the different physiographic zones in Swaziland**

<b>Physiographic zone</b>	<b>AI</b>
Highveld	1.06
Upper Middleveld	0.96
Lower Middleveld	0.53
Western Lowveld	0.49
Eastern Lowveld	0.50
Lubombo	0.80

#### **1.4 Administrative regions**

The Kingdom is divided into four administrative regions (also known as administrative districts), headed by a Regional Administrator. The four regions are Hhohho in the north; Manzini in the centre; Shiselweni in the south; and Lubombo in the east (Fig. 4). Each administrative region has regional constituencies called *Tinkhundla*, traditional meeting places where matters of local concern are discussed. In modern Swaziland, the “*Tinkhundla*”, have evolved into economic growth points and local government administration centres. Each *Inkhundla* is made up of about 10 chiefdoms (*Imiphakatsi*).



**Figure 4: Administrative regions of Swaziland**

### **1.5 Population of Swaziland**

The population of Swaziland is estimated at about 1.1million people (Central Statistical Office, 1999 and Swaziland Business Year Book, 2004). This gives an estimated average population density of between 58 and 70 people per km. Table 4 gives a historic distribution of population among the four administrative regions while Table 5 gives historic, present and projected demographic trends in Swaziland.

**Table 4: Population distribution among the administrative regions of Swaziland**

Region	Area (km <sup>2</sup> )	1966		1976		1986		1996	
		P*	PD (p/km <sup>2</sup> )	P	PD (p/km <sup>2</sup> )	P	PD (p/km <sup>2</sup> )	P	PD (p/km <sup>2</sup> )
Hhohho	3,569	95,759	26.8	133,493	37.4	178,936	50.1	246,458	69.1
Manzini	4,068	101,277	24.9	139,538	34.3	192,596	47.3	264,991	65.1
Shiselweni	3,779	95,735	25.3	117,172	31.0	155,569	41.2	214,814	56.8
Lubombo	5,947	81,801	13.8	104,331	17.5	153,958	25.9	211,484	35.6
Total	17,363	374,571	21.6	494,534	28.5	681,059	39.2	937,747	56.7

\* P = population; PD = population density; p/km<sup>2</sup> = persons per kilometre

Source: SSO, (2005)

**Table 5: Historic, current and future demographic trends in Swaziland**

<b>Demography</b>	<b>1985</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
Total population (000s)	649	744	857	984	1,121	1,263	1,405
Sex composition (male/100 females)	89.5	90.8	91.9	92.9	93.7	94.3	94.5
Population: Age 0-14 (%)	47.6	45.2	43.0	41.4	40.1	38.1	35.7
Population: Age 65 + (%)	3.4	3.0	2.7	2.8	3.0	3.3	3.6
Urban population (000s)	142	196	266	351	449	555	663
Rural population (000s)	508	548	590	632	672	708	742
Urbanization level (%)	21.8	26.4	31.1	35.7	40.1	43.9	47.2
Household total number (000s)		127	145	163	183	206	231
Household average size		5.87	5.91	6.00	6.10	6.09	6.03
		<b>1985-90</b>	<b>1990-95</b>	<b>1995-00</b>	<b>2000-05</b>	<b>2005-10</b>	<b>2010-15</b>
Life expectancy at birth: Male (yrs)		52.7	55.2	57.7	60.2	62.5	64.5
Life expectancy at birth: Female(yrs)		57.3	59.8	62.3	64.8	67.3	69.6
Total population growth rate (%)		2.73	2.81	2.77	2.61	2.38	2.14
Urban population growth rate (%)		6.53	6.10	5.55	4.91	4.23	3.56
Rural population growth rate (%)		1.53	1.49	1.37	1.21	1.05	0.94
Household number growth rate (%)			2.69	2.37	2.34	2.40	2.32
Household 5-year increment			18	18	20	23	25

(Source: UN Habitat, 1999)

Prior to the 1997 census, the population growth rate was 3.6 percent. However, the 1997 census report indicates a small reduction in the population growth rate. Currently the country's natural increase is estimated about 2.9 percent. A further decline in natural increase is anticipated as the HIV/AIDS pandemic enters its "curve of death". The projected figures take into account the impact of the HIV/AIDS pandemic

## **2. SOCIO-ECONOMIC CONTEXT**

### **2.1 Overview**

Swaziland is classified as a lower middle-income country with a per capita gross national product of US\$1,360 in 1999 and a human development index of 0.577. The socioeconomic indicators show pervasive poverty and wide disparities in the distribution of wealth. A few industries and individuals (10%) control the 40% of the country's wealth and 66% live below poverty line (GOS, 2002). The economy is small, open and export-oriented and is mainly agro-based. The economy is reasonably well diversified although vulnerable to exogenous external economic shocks and influence. Economic performance is highly dependent on developments in the world economy. The geographic location of the country also reinforces its vulnerability to factors outside its control, in particular those emanating from the Republic of South Africa.

Swaziland is in both the South African Customs Union (SACU) and the Common Monetary Area (CMA) with South Africa. As a result, the Swazi economy is highly integrated into that of the Republic of South Africa. Over 85% of the country's imports come from or through South Africa and nearly 70% of Swaziland's exports go to South Africa. Being in the CMA and SACU with a partner who has a much bigger economy seriously curtails the ability of the Swazi authorities to ensure a monetary and fiscal policy that is strictly in line with national interest.

The country's impressive economic growth of the 1980s led to an upsurge in domestic and external reserves as well as significant investment in social and economic infrastructure. However, this favourable trend also translated into a

decline in fiscal discipline. The favourable economic conditions of the 1990s have since changed. Since the early 1990s, Swaziland has experienced a consistently deteriorating fiscal situation, with GDP growth declining from a mean of 7% in the 1980s to only 3% in the 1990s. Latest figures from the Swaziland Central Bank (for 2001) have GDP declining further to 1.5% from 2.2% and 3.7% in 2000 and 1999 respectively. With an estimated population growth rate of 2.7%, this decline represents a major deterioration in living standards for the Swazi people. The serious socio-economic challenge inherent in the current setting is reinforced by the unclear dynamics of regional environment; uncertain revenue prospects vis-à-vis rising public expenditure; unsustainable population growth and increasing unemployment; and the major impact of the worsening HIV/AIDS situation.

As one of the responses to the foregoing challenges, Swaziland has developed a National Development Strategy, in which the country's long-term socio-economic development vision is embodied. The emerging framework – based on the National Long-Term Perspective Study (NLTPS) approach supported by the UNDP – broadly defines the strategic direction for all sectors and sets the context within which three-year national development plans will be designed. To complement the National Development Strategy vision, the Government of Swaziland also launched a short-to-medium term implementation programme – the Economic and Social Reform Agenda (ESRA) in 1997, to kick-start the economy by creating an enabling environment in which the private sector will be the driving force in increasing both economic growth and individual living standards. This programme is in its third phase, now known as the Millennium Action Programme (MAP).

Swaziland's current position is 125 (from the 2002 HDI Report) putting it in the 71<sup>st</sup> position out of 83 countries in this group, i.e., in the lowest 25% of that group. Within the context of SADC, Swaziland is ranked fourth out of the 14 states. Poverty reduction is the overall objective of all government development strategies with the NDS dedicating one its eight themes to Human and Social Development. Approximately 43% of the rural population are classified as poor (Table 6) and according to a World Bank report (Jan 2000) the depth and severity

of poverty are worse in rural Swaziland – which is where the majority of Swazis (75% of the population) live.

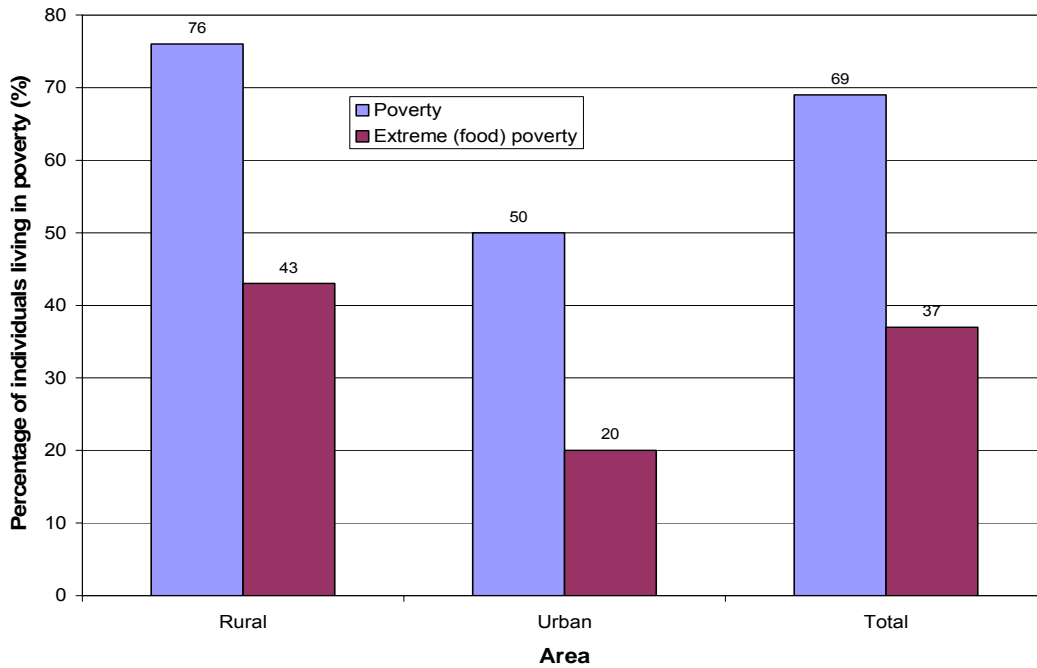
**Table 6: Poverty indices in Swaziland (2000)**

Region	Population share (%)	Core Poor		Poor		
		Share of core Poor (%)	Prevalence (%)	Prevalence (%)	Depth (gap)	Severity
Urban	21.0	18.1	17.2	29.7	12.4	6.8
Rural	79.0	81.9	20.8	42.8	15.5	8.0
National	100	100	20.0	40.0	15.1	7.8

Source (GOS, 2002)

The onset of HIV/AIDS has compounded the poverty concerns that Swaziland now faces. One dimension of the AIDS pandemic is the increased number of orphans and uncared-for elderly since most of the affected age group is the economically productive. AIDS does not only have a devastating impact on health, but it also undermines other human development gains and the economic strength of the household, leading to poverty.

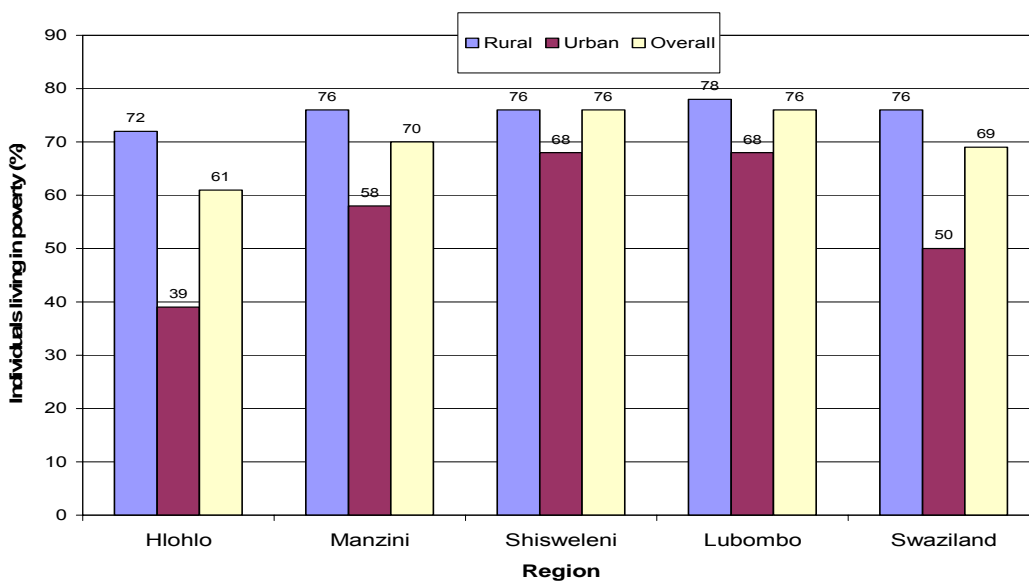
A study (CSO, 2005) has shown that poverty stands at 69% for the whole country, while rural areas have higher incidence of poverty, at 75% and in urban areas 49% of the population is poor (Fig. 5). Extreme poverty in rural Swaziland at 42% is more than double the figure in cities, which is around 20%.



**Figure 5: Poverty and extreme poverty headcount in rural and urban areas, and the whole Swaziland country**

**Source: GOS, 2005**

A regionally disaggregated view comparing poverty levels in rural and urban areas within the four administrative regions is presented in Fig. 6. The figure shows that rural poverty is consistently high at over 70% in all administrative regions, while in urban areas Hhohho region is the most well off.



**Figure 6: Poverty headcount by administrative regions and totals**

**Source: GOS, 2005**

Manzini urban portion has the highest comparative poverty incidence within urban administrative regions of 58%, while Lubombo rural areas have the largest percentage of poor for any rural portion of an administrative region. Extreme poverty is also higher than 40% in rural Swaziland.

## **2.2 Economic and social challenges**

Swaziland is faced with growth challenges that have seen the economic growth weakening over the past decade. More recently, real GDP growth decelerated to 2.1% in 2004, rising slightly to 2.4% in 2005 and again to an estimated 2.8% in 2006. Drought, HIV/AIDS, the end of the multi-fibre agreement, lower levels of foreign direct investment and increasing unemployment are all contributory causes. The economy now faces a number of further challenges. First, with the change to the European Union sugar regime, starting in 2006, the price Swaziland receives for its sugar exports to the European Union, the major market, will decline adversely, thereby affecting Swaziland's export earnings. Second, government revenues from the Southern African Customs Union, which accounts for more than 50% of government revenue, will continue to stagnate as tariffs are reduced in line with World Trade Organization and other multilateral commitments on trade liberalization.

Another challenge facing the country is that of high poverty levels, as the economic activity in a given year has remained lower than the population growth. The rate of poverty has worsened from 65% in 1995 to 69%, and although the GDP per capita is high enough for the country to be ranked as a middle-income country, there are serious income inequalities, which result in a large proportion of the population being highly marginalized. According to the Swaziland Household Income and Expenditure Survey (SHIES) of 2001, the latest data, the richest 20% consumed 56.4% of the national income compared to 4.3% for the poorest 20%. The corresponding Gini index, a measure of inequality, was high (0.51) but inequality in urban areas was greater than in rural areas. The income per head of the poorest 60% of the population is around US\$556, i.e. less than the average GDP per capita for sub-Saharan Africa. Data from the survey in 1995 showed that

paid and self-employment accounted for 75% of the income of the rural poor compared with farming, at 12%.

Like all developing countries, Swaziland's labour market is characterized by the formal sector and a large informal sector. The informal sector is dominated by agriculture employment or subsistence farming and street vending, which has gained prominence in recent years. The labour force has been growing at an average of 5.2% per annum since 1991 compared to an average growth of 1.03% of formal employment. Driving formal sector employment has been the civil service, which has been increasing at an average of 1.65% per annum. The residual nature of the informal sector has resulted to excess labour within this sector, whilst on the contrary, the formal sector is moving towards capital intensity in an attempt to remain competitive. The imbalance in the labour market remains a formidable challenge to the economy. The labour force continues to grow faster than the rate of employment creation. As a result, the unemployment rate has increased to 29% and even higher at 40% for the youth.

Swaziland last recorded a balance of payments surplus between 2000 and 2001, and has been incurring deficits until 2005. However, the deficit has been decreasing during recent years due to improved balances in the current account. The country has also experienced severe capital outflow in recent years and low levels of foreign direct investment. Recent figures show that net foreign direct investment inflows fell from E665 million in 2000 to E56 million in 2006. Swaziland's reserve position is also a cause for concern as it has remained below the recommended three months import cover since 2003. The reserve position in 2005 was equivalent to 1.9 months of imports. It, however, improved to 2.9 months in 2006 and will be at 4.2 months of import cover with the allocation of E705 million in 2007/08.

Other indicators also point to a high and increasing level of poverty. With a United Nations Development Programme (UNDP) human development index of 0.498, Swaziland ranked 147th out of 177 countries in 2003, compared with 117th in 1994, and is now classified as a low human development country. Swaziland's human development index ranking is now 47 places lower than its ranking (by

UNDP) in terms of GDP, lower than in 1975 and lower than the average for sub-Saharan Africa. Following rapid economic and social development in Swaziland in the 1970s and 1980s, the country's human development index rose steadily from 0.530 in 1975 before peaking at 0.624 in 1990, but declining rapidly thereafter. In terms of the human poverty index, Swaziland, with a value of 52.9%, ranks 97th out of 103 developing countries for which the index has been calculated.

The present economic situation compels Government to embark on a recovery plan that focuses on a strategy for accelerated, shared and sustainable growth, as enshrined in the National Development Strategy and the Poverty Reduction and Action Programme (PRSAP).

### **2.3 Importance of agriculture to the economy**

Agriculture is the largest source of employment for rural households, thus 70% of the population relies on this sector as a means of income. The diverse agricultural activities that occur in the country include sugar cane production, citrus fruit, maize and other cereal crops, cotton, forestry and livestock (Business Year Book, 2007). A major proportion of the GDP is comes from agriculture, since a significant part of the manufacturing sector is value-added through the processing of agricultural products, such as sugar and timber. During 2004/5, this sector grew by an estimated 2.1% with a GDP share of 8.6%. However, continued drought has significantly reduced the output from this sector. Another adverse factor is the impact of HIV/AIDS, while globalisation is also a threat due to the potential removal or reduction of tariffs.

The agricultural sector is divided into the two sub-sectors, the formal and informal/traditional.

#### **2.3.1 Subsistence Farming**

Traditional farming constitutes the Swazi Nation Land (SNL), which is acquired in terms of traditional law and customs. While agricultural activities in these areas

are often carried out by subsistence farmers, increased efforts are being made to encourage these farmers to engage in commercial farming.

The livestock sub-sector is also becoming increasingly more commercial with assistance and advice from the Swaziland Meat Industries, supported by government. However, performance on SNL reduced by 13.9% in 2005 due to the adverse conditions such as draught, because access to irrigation is limited, hence SNL farmers rely heavily on rainfall. The Ministry of Agriculture and Cooperatives is involved in developing water resources for small-scale irrigation. For example, the Maguga Dam project in northern Swaziland, is expected to benefit about 25,000 people through sugarcane production on 7,400 ha of irrigated land. The lower Usuthu Smallholder Development Project is also addressing the problem and by the end of the first phase (2002/10) will provide irrigation on 6,500 ha of land. This sector is also adversely impacted by the HIV/AIDS. This sector is vulnerable both in terms of time off and by the strain on resources, which are diverted from inputs to care of the sick.

### **2.3.2 Commercial Agriculture**

This category includes the large sugar and citrus estates, forestry and other undertakings on individual tenure farms (ITFs), which generate foreign exchange earnings. Swazican exports most of the pineapples and citrus it processes, while sugar and wood pulp are also major export products. Formal agriculture also covers meat and poultry production, dairy farming, and fruit and vegetable growing for mostly local consumption but with an increasing export market, particularly of baby vegetables (NAMBOARD, 2006).

#### **Dalcrue Agricultural Holdings**

Dalcrue Agricultural Holding (Pty) Ltd. (DAH) was founded in 2000 with the purpose of engaging in agricultural activities. It is one of the companies owned by Tibiyo Taka Ngwane. Activities entail dairy, live beef production, sugarcane, milling and legumes production. The head office of DAH is at Malkerns, where

maize milling, sugarcane and dairy operations are also carried out. Cattle ranches are located at different areas in the lowveld.

In 2000 DAH embarked on milk processing, among other activities, with the objective of distributing to contract customers. Emasi production began in 2004 and a pilot study for Emasi Esive, the DAH emasi brand name, took place early 2007. DAH sells 60,000 litres of fresh milk to Parmalat each month.

Live beef production was reinforced in 2002. The company is now a major producer of the Drakensburger breed and it is expected that sales will increase over the years. Local cattle breeds are also fattened and sold to individuals, butcheries and feedlots.

The milling operation concentrates on maize meal production under the brand name Lijaha Sisu, a special, high quality sifted meal that is distributed to local retailers. Demand for this product has increased significantly over recent years. DAH has also intensified sales of other product lines and in 2004, the Sihlabane brand of rice and sugar beans was launched. These are sold to retailers, ration dealers and are also available at the farm gate shop.

The sugarcane operations began in 1999 with the first harvest in 2000. All the cane, totalling 273 hectares, is milled at the Royal Swaziland Sugar Corporation at Simunye. The greatest challenge remains the adoption of a cost-effective production strategy in view of increasing transport costs and declining global sugar prices (Masuku, 2003).

### **The Sugar Industry**

The Swaziland's sugar industry was established in the mid-1950s, and today comprises more than half of the country's agricultural output, contributing 18% of national output, 16% of private sector wage employment and 11% of national wage employment (SSA, 2006).

Dry weather at the start of the season impacted negatively on output and during 2004/5, sugar production declined to 597,563 MT from 628,191 MT. This

reduction was in line with predictions. However, export volumes for the year were up to 295,393 MT compared with 279.590 MT the year before. This was due to 6,000 MT being shipped to Slovenia. After meeting its quota obligations to the EU, the US and satisfying the regional demand within the SACU market, the sector sold further quantities to COMSA and the world market. Sugar continued to be exported via the port of Maputo which, through a 2004 Memorandum of Agreement, is now a regional sugar terminal facility.

Export receipts from sugar showed a slight decrease to E758.4 from E762.2 due to the strong currency. However, there was a small increase in world sugar prices due to a shift in the market structure and a decrease in the world supply. Domestic sales were down by to 311,310 MT. Most of this is refined sugar, which is used by the food processing industries that export the value-added products they produce, with the balance consumed by the domestic market.

Apart from market prices and exchange rates, the future prospects for the industry depend on the successful negotiations of new sugar agreements between Swaziland and international organisations. The existing EU-ACP Sugar Protocol expires in 2008 and the EU's policy of 'Everything But Arms', which provides free market access for all products but armaments from about 50 least developing countries, will impact negatively on Swaziland. This policy will enable sugar from these countries to enter the EU duty-free from July 2009. Growth in South Africa during recent years has been positive for the local sugar industry, as it has resulted in the expansion of the SACU market.

The SADC Sugar Co-operation Agreement was concluded in July 2000 and has been annexed to the SADC Protocol on Trade. The agreement has two components, market access and areas of co-operation. The long-term objective of this agreement is the reciprocal full liberalisation of the SADC sugar sector, with no barriers of any kind.

### **2.3.2 Private Sector Companies**

#### **The Swaziland Sugar Association**

The Swaziland Sugar Association (SSA) was formed in 1964 and is responsible for performing the services necessary for the general development of the industry and the marketing of Swaziland's sugar in particular, with a view to ensuring optimum returns on investment for existing and future producers. The local sugar industry derives its structure from the Sugar Act of 1967. Millers and growers belong to the Sugar Millers Association respectively, and the Cane Growers Association which are of equal status and represented as such on the Council of the Sugar Association, which is the highest policy making body in the sugar industry.

SSA also provides technical services to assist the industry raise operational efficiency, especially at field level. This includes assisting smallholder cane growers working on Swazi Nation Land through training, extension services and irrigation advice. In July 2001, SSA was audited by the British Standards Institute and recommended for certification under the ISO 9001:2000, a quality management system designed to place operations at a systematic, consistent level. The certification was received in September 2001.

#### **The Sugar Estates**

Swaziland's sugar industry includes several hundred small farmers as well as the major estates, the largest two of which also operate the country's three mills: the Royal Swaziland Sugar Corporation and Ubombo Sugar. These and various other major operations, such as Tambankulu, Crookes and Big Bend, produce most of Swaziland's sugar under irrigated conditions in the lowveld. The large estates, as well as the Sugar Association, are instrumental in developing the industry and assisting smallholder farmers with advice and expertise.

## **The Royal Swaziland Sugar Corporation**

The Royal Swaziland Sugar Corporation (RSSC), which incorporates the Mhlume and Simunye sugar estates in the north-eastern lowveld, is the largest Swazi-owned business group, employing about 2,300 people and controlling over two thirds of the country's sugar production. Listed on the Swaziland Stock Exchange, RSSC is owned by several hundred shareholders, with Tibiyo Taka Ngwane the largest with 50% of the shares, followed by TSB Sugar International who bought the 26% shareholding owned by Actis Capital Partners in 2007. The other owners comprise the Swaziland and Nigerian governments, Coca-Cola, Booker Tate and the public.

Through its two business units of agricultural and manufacturing, the group earns about 50% of the industry's total income. RSSC operates a 20,000 hectare irrigated sugarcane estate, delivering over two million MT of cane each season to the group's two mills. These currently crush cane at a combined throughput of 700 MT an hour, producing over 400,000 MT of quality cane a season. RSSC also operates a refinery at the Mhlume mill, which has capacity to produce 120,000 MT of refined sugar a season.

A distillery adjacent to the Simunye mill produces about 13 million litres of quality potable alcohol a year. This is marketed and sold by Royal Swazi Distillers, a wholly-owned subsidiary of RSSC, near Durban in South Africa. Currently 80% of the alcohol is exported, mostly to the EU and African countries, while the balance is sold into the South African market.

RSSC plays a significant role in the development of rural Swaziland with over 1,400 families involved in sugar cane production as small-scale farmers who deliver to the two mills. Currently, over 2,530 hectares of cane had been developed by farmers in the Komati Basin under the Swaziland Water Agricultural Development Enterprise (SWADE).

RSSC provides and manages housing and related infrastructure for its employees and their dependants and apart from direct employees, a further 25,000 people live on the estates.

The group provides subsidised health care at two clinics run by qualified doctors and nurses and first-class education for 2,500 children is provided at two private primary schools, supported by a further three high and four primary schools.

### **Ubombo Sugar**

Previously known as Ubombo Ranches Limited, the company was the first to produce sugar in Swaziland in 1958. It was initially processed in a small factory on the bank of the Great Usuthu River. In 1960 a new and larger factory was commissioned. The business was a joint venture between Lonrho and Tibiyo TakaNgwane until 1998, when Illovo Sugar bought the Lonrho's 60% shareholding. The name Ubombo Sugar and a new corporate image were then adopted.

The current mill capacity is 405 MT of cane crushed per hour. During the 2004/5 season, the factory processed 1,769,727 MT of cane, of which 715,831 was grown in Ubombo's fields.

As well as managing its own estate, Ubombo is committed to assisting emerging growers and employs two staff members to provide extension services to producers that are current and prospective suppliers of cane to the factory.

The company sold some of its land, known as Poortzicht to create and empower new medium scale sugarcane farmers. The farms range from 30 to 50 hectares and initial indications are that the project is successful and improving the standard of living of the beneficiaries.

The company has also developed and manages some 2,360 hectares of irrigated sugar cane on behalf of Tibiyo Taka Ngwane, a company that holds resources in trust for the nation. Of this land, 483 ha is under a modern centre pivot irrigation system. Historically, Ubombo is a people-oriented company that offers attractive employment conditions, including high standard medical care for employees and their dependents. It was the first company to implement an HIV/IVHHIVAIDS

policy and a comprehensive system of primary health care. The company owns and manager a 40-bed hospital to serve employees and the Big Bend community.

## **Fruit Industry**

### **Citrus Fruits**

In line with the trend of recent years, the area under citrus fruit again reduced, from 1,919.7 ha to 1,875.4 ha. Total production was in excess of 47,000 MT, while exports were down to 23,885 MT. Domestic sales, mostly to the canning factory, were down from 55,008 MT to 28,436 MT. The outlook for citrus in the short term is not positive due to world production presently exceeding demand. However, it is expected that citrus production in Swaziland will increase due to the maturing of new trees that were planted. The interest of citrus growers are looked after by the Swaziland Citrus Board.

### **Pineapples**

Pineapples are extensively grown in Swaziland with the great majority processed at Swazican for export markets and the balance consumed locally. Increased demand for the fruit has resulted in the adoption of a strategy to cultivate additional land and to expand production by 35,000 MT in the medium term.

### **The National Maize Corporation (Pty) Ltd.**

The NMC was established in 1985 with the objective of providing a guaranteed market to local maize farmers at competitive prices and of supplying high quality, affordable maize to the people throughout the year. The Corporation is owned by the Government under the auspices of the Ministry of Agriculture and is solely involved with the purchase, storage and marketing of maize.

Presently with an annual turnover of about E40 million, the NMC is a Category A public enterprise. In the event of a domestic shortfall, it is the only organisation that may import white maize into the country. This ruling protects Swazi farmers by discouraging the importation of foreign-grown maize by private local millers and traders. NMC owns storage facilities are located throughout the country for the convenience of farmers and to reduce their transport costs. They comprise the

central silo complex at Matsapha, which handles 20,000 MT of Maize, the Entfonjeni depot with a capacity of 1,400 MT and the Ngwmpisi, Madulini and KaLanga depots, which each have a capacity of 700 MT.

The NMC has set aside an E2 million credit guarantee fund, which is managed by Fincorp, to assist small scale farmers to obtain credit. Many thousands of farmers have benefited from this. Other farmer assistance schemes include the provision of transport from production areas to the central silos at Mataspha and the issuing of cheques at the depots, which the farmers may cash at the various branches of SwaziBank.

During 2004/5 the corporation purchased over 19,000 MT of maize from local farmers, compared with 17,000 MT the previous year. Commercial imports were down to 5,000 MT from 18,000 MT. However, production fell short by just over 68,000 MT of the national requirement and with the difference again made up through food aid.

### **Maize Production**

Maize is the staple food of the Swazi people and the most important crop to be grown on nation land. It is often produced by small subsistence-farmers with no access to irrigation and production fluctuates depending on climatic conditions. In order to increase self-sufficiency in food, maize production by local farmers is actively encouraged through entities such as the National Maize Competition. During the past five seasons, the sub-sector has been adversely affected by drought, costs and volatile prices. While the Maguga Dam and the Lower Usuthu Basin developments are expected to resolve the drought problem in the long term, the present situation is one of shortages with imported maize used to supplement the locally grown crop. Despite a reduction in the area under maize (from 71,504 to 61,000 hectares) production increased to 71,000 MT from 62,500 MT. Most maize is grown on SNL with only about 857 ha of title deed land given to the commercial production of the crop.

### **Milk Production**

#### **Swaziland Dairy Board**

The Swaziland Dairy Board is a public enterprise wholly owned by the Swaziland Government. It was established in 1971 under the Dairy Act No. 28 of 1968. As provided by the Act, the Board's primary function is to develop and regulate the industry. Its involvement in commercial operations was of a secondary nature and, as such, the Government restructured the Board to enable it to revert back to its original mandate by shedding the commercial enterprises, including the Matsapha dairy plant. The restructured Board is referred to as the Swaziland Dairy Development Board (SDDB) and its core business is to provide developmental and regulatory services to the dairy industry from a neutral position. The SDDB compliments the Government's efforts through the provision of a supportive socio-economic environment for the development of the dairy industry.

The Board is based at its newly constructed head office, known as Enguleni House, on Mahleka Street in Manzini, a significant investment which has other organisations as tenants.

The development of the dairy industry is aimed at promoting local milk production, processing and distribution, especially by small holder dairy farmers; investment in all phases of the industry; market access and the general improvement of the sub-sector's commercial climate for the benefit of producers and consumers. The Board encourages investment in order to achieve a sustainable level in the supply of dairy products for self-reliance, and fosters fair competition and easy market access by regulating the import and export of dairy products based on the principle of supply and demand.

The SDDB is expected to co-ordinate, harmonise and, where necessary, regulate the activities of all stakeholders in a cost-effective manner, and ensure efficiency in milk production and the processing and distribution of dairy products in the local market. It also enforces the statutory activities of producers, processors and distributors. The overall objective is to achieve and maintain food security in dairy products. The SDDB protects the interests of consumers by enforcing minimum health and quality standards, and by ensuring that products are correctly labelled for accurate information. The Board also looks after producers through various

support services, such as technical advice to farmers, the provision of credit, project appraisal, milk collection centres and other infrastructure.

The demand for dairy products is estimated at 60 million litres in terms of liquid milk equivalents (LMEs), while commercial milk production from the national herd was estimated at 18 million litres. The deficit of 30 million litres is met through imported dairy products and milk produced by the local dairy herd in the traditional sector.

Future prospects for local milk production are good following the deregulation of dairy product prices, which is expected to be an incentive for local farmers and other key players in the industry and several farmers have expressed an interest in joining this sub-sector. According to the Swaziland Dairy Board Annual Report (2004), there are 562 dairy farmers in the country.

### **Livestock and Poultry**

Under the Livestock Development Policy, the commercialisation of cattle, poultry and pigs in particular, as well as of goats is being promoted in order to create employment in the rural areas. This initiative includes encouraging farmers to extend beyond rearing livestock and move onto the meat processing level.

### **Beef**

Cattle traditionally comprise the largest component of Swaziland's livestock sector and the latest figures available indicate a population of 600,252 animals, following a decline to 593,520 units due to an outbreak of foot and mouth disease in 2001/2.

SNL farmers own about 80% of the national herd and the traditional belief that cattle represent wealth has hampered beef production, as well as causing the serious problems of overgrazing and soil erosion. However, the government policy of commercialising the national herd, supported by Swaziland Meat Industries who run the country's largest abattoir is improving the situation. Farmers are now increasingly selling their animals at the ideal age instead of keeping them long after they have lost their commercial value. The commissioning in 2002 of a E20

million feed lot at Mafutseni Ranch near Manzini, which can accommodate 9,000 head of cattle, together with an SMI partnership project involving communities has had a positive impact. This entails SNL farmers selling their animals at the optimum age to feedlotters for fattening and for sale on to the abattoir.

Exports of beef from the SMI abattoir to the EU abattoir were suspended during in March 2005 pending the addressing of various issues and greater emphasis was subsequently placed on local and regional markets. This suspension was uplifted late 2007.

### **Pork**

The pork abattoir and processing plant at Simunye is owned by SMI and, together with several smaller producers, supplies the bulk of Swaziland's pork requirements. Like beef, pork production is actively encouraged and, in conjunction with Simunye Pork, government has taken significant steps to establish small holder pig production schemes. Farmers are educated and assisted in all aspects of pig farming, including the ideal breeding stock to purchase, and the abattoir purchase pigs for slaughter from these producers. The national pig breeding centre at Mphisi is addressing the shortages created by high demand for pork. Both fresh and processed pork products are widely available in the country, but much of this is imported.

### **Poultry and Eggs**

With encouragement from government and commercial operations, poultry production is one of the fastest growing agricultural sub-sectors, providing income-generating opportunities. There are about 800 producers in the country, from small farmers working in co-operative groups to large concerns supplying around 20,000 chickens a week. Between them they grow 25,000 to 30,000 chickens a day to supply to the processors. The largest abattoir and processor supplies about 60% of the local requirement. Swaziland has become almost entirely self-sufficient in chickens, which is a complete turnabout from a decade ago when the poultry market was almost completely dominated by South African imports.

Legislation protects producers from imported competition and poultry import permits are granted only in special circumstances. This also prevents the dumping of surplus stock from South Africa. However, the majority of eggs for chick production are imported from South Africa, as are day-old chicks if local stocks become depleted.

Egg production also continues to grow and local farmers of all sizes are producing quality eggs at competitive prices.

The Swaziland Poultry Producers Association looks after the interests of this sector, which was affected by an outbreak of avian influenza, as well as by a shortage of day-old chicks last year.

### **Cotton**

The closure in 2002 of Vunisa, the country's only cotton ginnery, which was the buyer and financier for cotton farmers, had a further adverse affect on this sub-sector, which has been declining since 1999. Because of lack of financial assistance, many farmers have since switched to sugarcane.

However, higher prices paid due to increased demand from world markets attracted more farmers and production substantially increased to 3,200 MT from 1,221 MT. This was in spite of a further reduction in the area under the crop and was in line with predictions. The sector has been boosted and more farmers have been encouraged to revert to cotton, which has good drought resistance. The Maguga Dam and LUSIP initiatives are expected to further promote cotton production.

### **Forestry**

The forestry sector and related processing operations make up 15% of the country's GDP and directly employs about 8,000 people. It also provides business for many concerns which supply services such as forest management, fire fighting, transport, harvesting and other non-core activities. .

Several species of non-indigenous trees, particularly various conifers and, to a lesser degree gum, are successfully grown in different parts of Swaziland and about 36% of the country's area is under indigenous or man-made forests. Forestry provides raw materials for many value-added products, which between them account for a significant proportion of Swaziland's export earnings.

The Usuthu Forest, known as SAPPI usuthu, which is under pine, is one of the largest man-made forests in the world and covers 66,000 hectares. These fast-growing trees are used to produce unbleached kraft pulp (UBK) at Sappi Usutu. They mature when they are between 15 and 20 years old, compared with 40 years in the Northern Hemisphere.

UBK comprises the bulk of forestry-related export earnings, although a number of estates grow trees from which different products are made for both local and export markets. These include mining and construction timber, doors and pallets, and coffins. Wooden furniture and shelving units are also manufactured, much of which is exported in "DIY" kit form.

Other major forests in Swaziland are Peak Timbers and Swaziland Plantations in Northern Swaziland and Shiselweni Forestry in the southern highveld near Nhlanguano that produces mining timber and eucalyptus oil for export. Wattle is also grown commercially.

### **3. FARMING SYSTEMS, AGRICULTURAL ACTIVITIES AND LIVELIHOOD SYSTEMS IN SWAZILAND**

#### **Land tenure**

The agricultural sector is characterized by its dualistic nature consisting of modern and traditional sectors. About 80% of the total Swazi population lives in rural homesteads on Swazi Nation Land (SNL). This 80% of the population derives its livelihood from subsistence agricultural production in which women are the majority and heads of household.

The land tenure system in Swaziland can be divided into two categories: communal land held in trust by the King, called Swazi National Land (SNL), which amounts to about 74 percent of the area; and Title Deed Land (TDL), accounting for the remaining 26 percent (FAO/MOAC, 1994). About two thirds of SNL is used for non-commercial extensive communal grazing, with subordinate other activities such as community forestry. Less than 7% of all SNL is planted to rainfed crops, with maize being the most important crop, followed by cotton, groundnuts, pumpkins, and sweet potatoes. Irrigated sugarcane is the only important commercial crop on SNL. The TDL area is located mainly in the Highveld and Eastern Lowveld, where it covers 30 and 40 %, respectively. The TDL area is mainly used for commercial forestry and livestock production (ranching), as well as for the cultivation of sugarcane, citrus, pineapple, vegetables and fodder crops. Sugarcane completely dominates the irrigated agriculture sector; in 2002 covering more than 46,000 ha of the approximate total of 50,000 ha of irrigated land.

The country is physically divided into four geographical regions with varying altitudes. The varied ecological conditions found in the different zones ranging from savanna-type areas to temperate have permitted the development of different agro-ecological zones. These are: Highveld, Middleveld, Lowveld and Lubombo.

The higher elevations (Highveld) support extensive pine and eucalyptus forests, and temperate climate crops. The middleveld is characterized by fertile soils and rolling grasslands with insufficient rainfall, but enough streams for extensive irrigation. The third agro-ecological zone, the Lowveld, covers mainly a gently undulating part of the country with poor to fair soils. The Lowveld is generally hot and dry with large annual variability in rainfall, making rainfed agriculture precarious, except for drought-resistant crops. The fourth region, Lubombo, rises into mountains on the east of the country and receives an average rainfall of about 750 to 950 mm per year. The soils in Lubombo are generally poor and only 12% is regarded as fertile for crop production.

## **Land use and suitability of soils**

The main land use in Swaziland is extensive grazing, of which communal extensive grazing covers approximately 50% of the country and commercial ranching 19% (FAO/MOAC, 1994). Grazing takes place on natural grasslands, savannas and woodlands, which areas are also used for community forestry. Small-scale subsistence rainfed agriculture including grass-strips, homesteads and other infrastructure covers about 12 %, whereas large-scale irrigated and rainfed crop production cover approximately 4 and 2 %, respectively. The latter is variable due to increases and decreases in cotton farming. In most years, a considerable part of the total arable land is fallow or temporarily unused. Plantation forestry - including mills, tracks, firebreaks and other infrastructure, covers about 8 %, and the remaining 5 % is made up of national parks and urban areas. Soils suitable for crop production occur in all agro-ecological zones, but distribution and soil types vary strongly, depending on slope and other terrain conditions. Suitable soils in Highveld and Upper Middleveld are found in basins and other relatively level parts. The soils of the Eastern Lowveld are generally more suitable for irrigated crop production than the soils of the Western Lowveld. Crop production in the Lubombo is restricted to the non-eroded plateau remnants.

## **Agricultural Institutions**

Swaziland's major institutions for agricultural development are the Ministry of Agriculture and Cooperatives (MOAC), its parastatals, and a number of non-governmental organisations. Private sector companies largely supply agricultural inputs. The objectives of MOAC are to: i) formulate policy and administer all legislation related to agriculture and organisation and management of cooperative societies; ii) develop and implement plans in pursuit of the agricultural development policy, especially in the areas of rural development and subsistence farming; and iii) provide executive direction and common services for the Ministry, including administration, planning, finance and publicity. MOAC includes the Department of Agriculture and Extension, the Department of Veterinary Services and Livestock Production, the Department of Cooperatives Development, the

Economic Planning and Analysis Section, the Agricultural Research Division, the Forestry Section, the Fisheries Section and the Land Use Planning Section.

Parastatals include:

- National Agricultural Marketing Board (NAMBoard) – responsible for agricultural marketing
- National Maize Corporation (NMC) – responsible for maize marketing
- Swaziland Dairy Development Board (SDDB) – responsible for the development and marketing of dairy products
- Swaziland Citrus Board – responsible for the production and marketing of citrus; and
- Swaziland Cotton Board – responsible for the production and marketing of cotton.

The Swaziland Water and Agricultural Development Enterprise (SWADE) was established in 1999 as a parastatal organization, with the Ministry of Natural Resources and Energy being the 'parent Ministry' (though MOAC is a co-signatory to its founding 'Memorandum of Association'). The original objective was to plan and implement the downstream development of the Komati Basin Project, but its role has been expanded to cover all river basin development in Swaziland. SWADE is currently managing the implementation of the Lower Usuthu Smallholder Irrigation Project (LUSIP). Other major agriculture implementers include several active Non Governmental Organisations (NGOs) such as the Lutheran Development Services (LDS), Swaziland Farmers Development Foundation (SFDF), World Vision, African Cooperative Action Trust (ACAT), and the EU Micro Projects Programme. The United Nations has also established a local office of the Food and Agriculture Organisation (FAO) to provide technical assistance to the Swaziland Government in effecting its mandate under the agricultural sector.

## **4. THE NATIONAL AGRICULTURAL RESEARCH SYSTEM**

### **4.1 Concept of the NARS**

A NARS comprises of various bodies dealing with agricultural research and it involves governmental institutions, universities, private sector, research institutions, and parastatals. The relative importance of public versus private sector components varies from country to country. In most developing countries' NARS, the public sector component is dominant ( Sachdeva, 1990). Therefore, a NARS is an organized system mobilizing the contribution of stakeholders in agriculture such as: research institutions (public, private and professional); universities and Professional Training institutions; extension organizations; farmers' organizations; private companies and their organizations; Non-Governmental Organisations (NGO) and Civil Society Organisations (CSO)

A NARS operates for the development and the use of research by the stakeholders. It is governed by participatory bodies and is funded by governments and stakeholders. A NARS is involved in the planning of research and development programs, evaluating the outputs of those programs as well as supervising the development of international cooperation.

## **5. INSTITUTIONAL FRAMEWORK OF THE NARS**

### **5.1 POLICIES FOR AGRICULTURAL RESEARCH and TRAINING IN SWAZILAND**

Government's responsibility in the Agricultural sector lies primarily with the Ministry of Agriculture and Cooperatives (MOAC). The mission statement of the MOAC is: To ensure household food security and increased sustainable agricultural productivity through diversification and enhancement of commercial agricultural activities, formation of appropriate technologies, and efficient extension services while ensuring stakeholder participation and sustainable development and management of natural resources in Swaziland.

The environment in which our farmers operate has been subjected to major changes over the years. Government has realized that the shift towards commercializing agriculture in the country has brought about numerous challenges, which we need to live up to whilst ensuring sustainability in our farming systems. It is basically for that reason that a number of policies had to be developed in order to provide institutional frameworks that would guide the implementation of national programmes and projects aimed at creating an enabling environment for the local farmer. Through the Ministry of Agriculture and Cooperatives, Government has been able to develop the following policies that have a direct bearing to local agricultural development.

### **5.1.1 National Development Strategy**

The National Development Strategy (NDS) is a long term development initiative crafted by the Government of Swaziland in 1999 to guide strategic socio-economic development of the country over a 25 year period.

#### *Linkages with agricultural research*

Within the pillar of agriculture, land and rural development, Government plans to pursue the following under the research portfolio:

- (a) Encourage the private sector participation in agricultural research and provision of market infrastructure;
- (b) Review NARS (National Agriculture Research System) activities and formulate a research policy;
- (c) Strengthen linkages and networking activities between NARS and regional and international institutions;
- (d) Strengthen linkages between research, extension, NGOs, parastatals and other stakeholders;
- (e) Identify and develop cost-effective production technologies;
- (f) Conduct demand-driven research, identifying and targeting potential and high value crops in the process;

- (g) Document and review socio-economic information to guide research programmes; and
- (h) Review available technical and socio-economic data and advise stakeholders on various agricultural policies.

#### *Linkages with agricultural training*

The national development strategy has no proposal on issues related to agricultural training.

### **5.1.2 Poverty Reduction Strategy and Action Plan**

The Poverty Reduction Strategy and Action Plan (PRSAP) is a policy document whose implementation is highly dependant on the performance of the agriculture sector. It includes policies and action programmes that ensure that growth is participatory and inclusive and takes place through greater and equitable access to productive assets in order to increase the efficiency of individuals. Its overriding goal is to reduce poverty by more than 50% by 2015 and then ultimately eradicate it by 2022, in line with the vision of the NDS. It further seeks to reduce income deprivation, malnutrition, vulnerability to ill-health and preventable diseases, illiteracy, isolation, poor shelter, voicelessness and external shocks.

The policy objective is to create an environment that will empower the poor to participate actively in uplifting their standards of living by taking advantage of existing and future opportunities. Central to this is the transformation of the agricultural sector, structural reforms, investing in the lives of the poor to reduce their risks and vulnerability and restructuring the public expenditure pattern.

The PRSAP presents a poverty reduction framework which consists of six pillars:

- (a) Rapid acceleration of economic growth based on broad participation;
- (b) Empowering the poor to generate income and reduce inequalities;
- (c) Fair distribution of the benefits of growth through public expenditure;
- (d) Ensuring food security;

- (e) Improving the quality of life of the poor; and
- (f) Strengthening good governance.

#### *Linkages with agricultural research*

The most essential parts of the PRSAP are consolidated under the empowerment of the poor to generate income through improving access to land, increasing income from agriculture, and reducing unemployment. Chapter five of the PRSAP discusses ways and means of empowering the poor to generate their own income. Swaziland is of the view that enabling the poor to earn their own income is the most sustainable approach to poverty reduction. Amongst the four areas identified for pursuing this goal is increasing income from agriculture. Agricultural research features as the key area where resources need to be channeled in order to advance the goal of increasing income through agriculture.

The main focus under research is to develop and promote production systems that are suitable for farmers who have a weak resource base, and this will be achieved through:

- (a) Re-orienting research so that it maintains adequate focus on improving efficient and cost effective indigenous farming methods;
- (b) Promoting the adoption of well researched extension packages that are well suited to the different agro-ecological zones of the country and the socio-economic contexts of different farmers;
- (c) Conducting research and providing advice on cropping systems that maximise moisture retention in the soil.

#### *Linkages with agricultural training*

The poverty reduction and action programme has no proposal on issues related to agricultural training.

### **5.1.3 Comprehensive Agriculture Sector Policy**

The Comprehensive Agriculture Sector Policy (CASP) focuses on the contribution of the agriculture sector to the realization of the country's aspiration of the Vision 2022 and to the achievement of national development goals as enshrined in the National Development Strategy (NDS). The goal of CASP is, therefore, to ensure that the agriculture sector contributes fully to the socio-economic development of the country. The broad objective is to provide clear guidance on policy options and measures necessary to enhance sustainable agriculture sector development and its contribution to overall economic growth, poverty alleviation, food security and sustainable natural resources management.

Specific objectives set to be pursued by CASP are:

- (a) To increase agricultural output and productivity;
- (b) To increase the earnings for those engaged in agriculture by promoting adoption of diversification and sustainable intensification and use of appropriate technology;
- (c) To enhance food security;
- (d) To ensure sustainable use and management of land and water resources;  
and
- (e) To stabilize agricultural markets.

#### *Linkages with agricultural research*

The Comprehensive Agriculture Sector Policy identifies issues pertaining to agricultural research as follows:

- (a) Agricultural research is missing a clear vision, mission and strategy.
- (b) Deficiency of current agricultural research programmes in co-ordination and focus.
- (c) Limited agricultural research capacity, research skills and research facilities.
- (d) Insufficient linkages between national, regional and international agricultural research intuitions and organizations.

- (e) Inadequate information management systems and mechanism for communicating and disseminating scientific research results.
- (f) Weak linkages for research and technology transfer and lack of collaboration among government research institutions, government extension services, the University of Swaziland, NGOs, farmers, the private sector and other stakeholders.
- (g) Insufficient research on plant breeding (particularly on indigenous plants), drought tolerant varieties, water use efficiency and soil fertility, agro-biodiversity, conservation and preservation of local plant genetic resources, and farming systems.
- (h) Inadequate research programmes on animal breeding, microbiology and protozoology, and seasonal range resource condition, in particular resilience of indigenous browse species.

The Comprehensive Agriculture Sector Policy identifies the following strategies to address the above challenges:

- (a) Define the aims, objectives and strategies of agricultural research in Swaziland, using a broad forum of stakeholder consultation.
- (b) Establish training and research development programmes to enhance the current research capacity and improve research facilities, including laboratories.
- (c) Establish an Agricultural Research Board to foster coordination and cooperation between research organizations, and to assist in developing agricultural research priorities.
- (d) Strengthen linkages and formalise collaboration on research and technology transfer between government departments and institutions, the University of Swaziland, NGOs, farmers and the private sector.
- (e) Establish and maintain a functional information management and dissemination system, and link the scientific database with other information systems.
- (f) Establish linkages and research exchange programmes with regional and international agricultural research institutions – in particular with those in the SADC region - to enhance access to their latest findings.

- (g) Expand and improve research on plant breeding, particularly on indigenous plants, and enhance research on drought tolerant varieties, water use efficiency and soil fertility.
- (h) Initiate research programmes to maintain agro-biodiversity and establish a breeding programme for food crops that fits local conditions, for example open-pollinated varieties and to control and eradicate harmful alien invasive plants
- (i) Establish procedures to collect, conserve, preserve and utilize local plant genetic resources.
- (j) Strengthen and enlarge the scope of the present animal breeding programme with emphases on beef and dairy production, small ruminants, pigs and poultry.
- (k) Strengthen research on range resources and browse species based on animal preferences and nutritional values and the resilience of indigenous species, and develop a research programme on microbiology and protozoology.

#### *Linkages with agricultural training*

The comprehensive agricultural sector policy has no proposal on issues related to agricultural training.

#### **5.1.4 National Food Security Policy**

The National Food Security Policy (NFSP) is a key link in the chain required to implement Government's broad vision in improving food security. Its specific purpose is to provide clear guidance regarding the strategies and measures that must be adopted in order to improve food security for all people in Swaziland. At the same time, it must support related initiatives on reducing poverty, improving agricultural production and marketing, enhancing environmental management, strengthening disaster preparedness, improving health delivery and broadening access to water and sanitation.

### *Linkages with agricultural research*

The issue of agricultural research in the food security policy features under pillar one (food availability), which is mainly concerned with enhancing research and extension services.

Research in crops, livestock, fisheries and forestry will be essential to achieving the sustainable food productivity increases upon which the short and long term food security goals depend. Equity issues and equality between women and men should be given appropriate consideration when setting research agendas for the future. Research efforts should clearly focus on poverty eradication and on the creation of more environmentally sustainable agricultural, fisheries, forestry and food production systems. Renewed efforts should be made to involve farmers, fishers, foresters and their organisations in setting research priorities and directions, and to make experimental findings accessible to them through effective extension services. Other issues raised in the food security policy include the following:

- (a) Agricultural research and extension services are both missing a clear vision, aim and strategy related to food security.
- (b) The agricultural research and extension services are not properly capacitated.
- (c) Insufficient recognition of the importance of modern research technologies for achieving sustainable productivity increases without negative effects on the environment.
- (d) Unsatisfactory applied research on plant breeding, particularly on indigenous plants, to improve food security and value-adding to medicinal or nutritional plants.
- (e) Insufficient research on drought tolerant varieties, water use efficiency and soil fertility.
- (f) Unsatisfactory interaction between extension agents and farmers, resulting in poor acceptance or implementation of new farming methods and technologies.
- (g) Weak linkages and lack of collaboration among government research institutions, government extension services, the University of Swaziland, NGOs, farmers, the private sector and other stakeholders.

The food security policy therefore, aims at enhancing applied agricultural research, focusing on subjects critical to reach sustainable solutions needed to enhance food security. This will be implemented through the following strategies:

- a. Strengthen a demand-driven research and extension system and develop a clear vision, and aim that will act as the framework for planning, co-ordination, monitoring and evaluation of research and extension activities related to food security.
- b. Strengthen the technical and financial support that research and extension require.
- c. Facilitate capacity building in relevant fields to researchers and extension workers and establish research development programmes to enhance the current research capacity and improve research and extension facilities.
- d. Expand and improve applied research on agricultural diversification, plant breeding, indigenous and drought tolerant plants, water use efficiency and soil fertility.
- e. Introduce appropriate management principles into extension services, e.g. integrate desirable aspects of participatory approaches and introduce a broader range of extension services, including marketing, financing and other business management requirements, and provide adequate training and capacity building.
- f. Strengthen linkages and formalise collaboration on research, technology transfer and extension between government institutions, the University of Swaziland, NGOs, farmers and the private sector.
- g. Strengthen farmer-based organisations in order to improve effectiveness of extension service delivery.

#### *Linkages with agricultural training*

The national food security policy has no proposal on issues related to agricultural training

### **5.1.5 Draft National Irrigation Policy**

The overall goal of the draft National Irrigation Policy is to ensure that the irrigated agriculture sub-sector in Swaziland contributes fully to economic growth and poverty alleviation. It has the following three specific objectives:

- a. Optimize the productivity of water in the country's agricultural sector and broaden the scope for agricultural intensification and diversification;
- b. Establish an irrigation sector institutional landscape characterised by transparent regulation and strong, participatory and/or responsive and accountable institutions in Swaziland; and,
- c. Enhance the structure of the irrigated sub-sector by promoting new public and private investment opportunities for emerging farmers.

#### *Linkages with agricultural research*

The draft national irrigation policy has no proposal on issues related to agricultural research.

#### *Linkages with agricultural training*

The draft national irrigation policy has no proposal on issues related to agricultural training.

### **5.1.6 The Livestock Development Policy (1995)**

The Livestock Development Policy (LDP), approved in 1995, promotes the commercialisation of the livestock sub-sector and achievement of an efficient and sustainable livestock industry contributing to economic development. It advocates the development and promotion of smallholder livestock enterprises, entrepreneurship and formation of community livestock groups, as the main vehicle for development. The policy objectives relate to improving the national herd and animal health, nutrition, meat hygiene standards, marketing, processing industries, commercialisation and promotion of entrepreneurship, range management, research, legislation and communication. Proposed strategies for achieving these objectives focus on improving and strengthening livestock extension, raising off take levels and quality of livestock, maintaining good range and pasture management practices, ensuring adequate research, raising livestock

nutrition levels, developing competent manpower, guaranteeing meat hygiene standards and sanitary requirements, preventing diseases through animal health care, developing appropriate legislation and cattle branding.

#### *Linkages with agricultural research*

Under the agricultural research component, the livestock development policy aims at ensuring the availability of tested and reliable information and technology to the producer, Government and the entire industry and to develop suitable and cost-effective extension packages and methods of livestock production, resource and disease control management through research. This will be achieved through the following:

- (a) Establishing a Livestock and Veterinary Research Centre at Mpsi Farm that will serve as a catalyst, a resource and information centre and provide the livestock sector with accurate and tested back up information.
- (b) Development of suitable livestock production packages and systems that will be cost effective and profitable for the farmer.
- (c) Investigating and determining the distribution and prevalence of diseases of economic importance in Swaziland.
- (d) Development of more efficient and cost effective animal disease control prevention and surveillance measures that will maintain an acceptable standard of animal health within the country.
- (e) Development of suitable range and pasture rehabilitation methods and improve range and soil conservation and management practices.
- (f) Determination of pasture and fodder productivity and suitability according to ecological zones.
- (g) Determination of nutritional values of the various pastures, fodders and feed combinations.

- (h) Development of minimum operational requirements for establishing and running small livestock enterprises by species efficiency and profitability.
- (i) Determination of suitable breeds and crosses for beef, small ruminants, poultry, pigs and dairy for Swaziland's conditions in terms of productivity, resistance and tolerance and to advise on suitable gene pools to be protected and preserved.
- (j) Conducting appropriate trials and tests on new technologies and advise on their suitability to conditions in Swaziland.
- (k) Collaborating and cooperating with regional and international institutions and exchange any information that might be of advantage to Swaziland's development.

#### *Linkages with agricultural training*

As a means towards achieving the goals of the livestock development policy, part of the strategy involves upgrading the Veterinary Farmer Training Centre (VFTC) at Mpisi in order to provide an effective integration of auxiliary training in beef, dairy, poultry, piggery, rabbit and small ruminant production and extension, range, animal health and meat hygiene.

#### **5.1.7 National Co-operative Development Policy**

In 1964, Swaziland passed the Cooperative Societies Act, creating a legal framework for the formation of cooperatives in the country. Until 2000, the cooperative movement was operating without a policy direction. Stakeholders felt a policy should be developed to provide a basis for a new and improved law on cooperatives.

This cooperative policy provides a common reference for people working in cooperatives, either at the national, regional or international level. It helps to bring individual cooperatives together to form a stronger Swazi Cooperative movement

and provides a guide for donors and any other institutions willing to support cooperatives in the country. The Cooperative development policy provided a basis for the Co-operative Societies Act No. 5 of 2003.

*Linkages with agricultural research*

The national cooperative development policy has no proposal on issues related to agricultural research.

*Linkages with agricultural training*

Although the strategy on training is not directly linked with the core agricultural activities, the cooperative development policy, however, advocates for the upgrading of the Cooperative Development College (CODEC) to improve training of members within the different types of cooperatives in Swaziland. Farmers' cooperatives constitute a certain percentage of the cooperative movement in Swaziland.

### **5.1.8 Draft National Land Policy**

The guiding vision for the draft national land policy is “to maximise benefits to the entire society from land on a sustainable basis”. It aims to provide guidance on sustainable land use management; improve productivity, income and living conditions, thereby alleviating poverty. The policy aims at addressing issues of land under-utilisation, inappropriate land use as well as management of grazing areas.

*Linkages with agricultural research*

The draft national land policy has no proposal on issues related to agricultural research.

*Linkages with agricultural training*

The draft national land policy has no proposal on issues related to agricultural training.

### **5.1.9 National Rural Resettlement Policy**

The guiding vision of the National Rural Resettlement Policy (NRRP), which has been approved in 2003, is to establish a durable, practical and participatory framework for the planning and sustainable management of land, and the appropriate application of resettlement strategies in rural Swaziland, in order to increase agricultural production, promote the sustainable utilisation of natural resources and improve livelihoods. Key institutions involved in the formulation and implementation of this policy are MOAC and the Rural Planning, Development and Resettlement Board (RPDRB). Policy objectives focus on transparent, orderly, legitimate and equitable land allocation in both social and legal contexts, fair compensation and appropriate treatment of displaced and other people affected by resettlement, and an effective legislative framework for resettlement, resolution of land disputes and sustainable land management. In addition it emphasizes the promotion of optimal and sustainable land use and the identification of suitable land use strategies for local communities and their full participation and involvement.

In essence this policy addresses issues regarding the improvement of land uses and national economic growth through rural resettlement. The *National Rural Resettlement Policy* becomes relevant when resettlement raises issues of compensation and institutional arrangements for deciding the shape of future settlements.

#### *Linkages with agricultural research*

The national rural resettlement policy has no proposal on issues related to agricultural research.

#### *Linkages with agricultural training*

The national rural resettlement policy security has no proposal on issues related to agricultural training.

### **5.1.18 National Forest Policy**

The guiding vision for the policy is “to achieve efficient, profitable and sustainable management and utilization of forest resources and the benefit of the entire society, and to increase the role of forestry in environmental protection, conservation and rehabilitation of degraded areas.”

The policy’s main objective is to develop not only the industrial forest sector, but also community forestry and the sustainable management of natural forests and woodlands. The sustainability aspect in this policy objective takes into account the issue of natural resource accounting, where there is need to attach the true economic value to every natural resource, including land.

The policy objectives include the development of forest resources and its sustainable balance with other land and water uses, the improvement of forest productivity, to improve living conditions and alleviate poverty, to conserve the biodiversity of forest resources and to enhance forest management. A *National Forestry Programme* has been drafted and it proposes five action programmes covering industrial forestry, community forestry, urban forestry and natural forests and woodlands.

#### *Linkages with agricultural research*

The national forest policy recognises the fact that very little forestry related research is undertaken in Swaziland, save for research conducted by the commercial forest companies. The policy identifies the need for forestry research, in particular with respect to priority areas such as community forestry, natural resource management, conservation forestry and the impact of forestry on the environment.

In order to improve forestry research, the forest policy advocates for a broader research programme through collaboration between the Ministry responsible for forestry with other institutions such as the University of Swaziland, the Swaziland Foresters Association and the private sector. The research should be co-

ordinated through the National Research Council (which has not been legally formulated).

There is need for an overall science and technology research institution as a long term strategy to conduct co-ordinated natural resource research programmes. In this overall research framework, a greater co-operation is required with international research institutions and donors.

#### *Linkages with agricultural training*

The national forest policy recognizes the lack of tertiary training institutions offering forestry courses in the country. Recommendations to improve the current situation include the following:

- a. Encourage the University of Swaziland to introduce selected forestry subjects within current diploma and degree courses;
- b. To establish formal links with training institutions outside Swaziland to facilitate human resources development for the forestry sector;
- c. To encourage forestry and forestry related courses to be included as part of the training programmes offered by local training institutions;
- d. To establish a panel composed of relevant stakeholders including the Ministry responsible for forestry and the Ministry responsible for education to redesign forestry courses for primary and secondary schools; and
- e. To consider allowing credits for relevant subjects that can be taken by distance learning on the internet from accredited institutions.

#### **5.1.11 National Programme for Food Security**

The National Programme for Food Security's specific purpose is to provide clear guidance regarding the strategies and measures that must be adopted in order to improve the country's food security status. The programme is also aimed at supporting related initiatives on poverty reduction, improving agricultural production and marketing, enhancing environmental management, strengthening disaster preparedness and broadening access to water and sanitation. Implementation of the programme will ensure that development is guided and

facilitated within a structural and balance framework that respects physical limits, equity concerns, and institutional capacities. The priority components of the programme include;

- (a) Crop and livestock intensification and diversification
- (b) Support services and rural infrastructure
- (c) Community development and livelihoods diversification
- (d) Natural resources management
- (e) Health and nutrition
- (f) Disaster management and safety nets

#### *Linkages with agricultural research*

The national programme for food security has no proposal on issues related to agricultural research.

#### *Linkages with agricultural training*

The national programme for food security has no proposal on issues related to agricultural training.

### **5.1.12 National Agriculture Summit Report**

The National Agriculture Summit (NAS) held in July 18-20, 2007 raised a number of issues under various thematic areas, including agricultural research. According to the national agriculture summit report of July 2007, the following issues and solutions were raised under agricultural research:

**Issue:** The research division is dilapidated, lacks policy direction and capacity. Farmers are unable to embrace the latest farming technologies because of lack of knowledge.

#### **Solution(s):**

- ◆ *Government should formulate a clear Research Policy and improve the infrastructure, for better service delivery.*
- ◆ *Research Division should engage competent personnel and expose them to advanced training.*

**Issue:** The current research is not relevant to the needs of consumers such as training institutions, farmers, extension services, to mention but a few.

**Solution(s):**

- ◆ *Establish an autonomous National Research Council with wide stakeholder involvement.*
- ◆ *There is need to develop strong linkages with regional and international research institutions.*

## **6. INSTITUTIONS INVOLVED IN AGRICULTURAL RESEARCH**

This section presents the institutions currently conducting agricultural research in Swaziland. The institutions are classified into three main categories, Government institutions, Government parastatals and the private sector.

### **6.1 Government institutions**

#### **6.1.1 Ministry of Agriculture and Cooperatives**

Government's responsibility for the agricultural sector lies primarily with the Ministry of Agriculture and Cooperatives (MOAC). The mission statement of MOAC is: To ensure household food security and increased sustainable agricultural productivity through diversification and enhancement of commercial agricultural activities, formation of appropriate technologies and efficient extension services while ensuring stakeholder participation and sustainable development and management of natural resources in Swaziland. MOAC formulates policy and administers all legislation related to agriculture and organization and management of cooperative societies.

Research under the Ministry of Agriculture and Cooperatives is conducted by the Agricultural Research Division (ARD). Although livestock plays an important role in Swaziland's agricultural sector, there is comparatively little research on

livestock conducted by the Department of Veterinary and Livestock Services (DVLS). The Veterinary Diagnostic Laboratory of the DVLS mostly provides veterinary services such as the diagnosis of diseases. The Economic Planning and Analysis Section (EPAS) used to conduct research on socio-economic issues to provide agricultural policy information and assess and supervise Government projects and programmes. However, due to lack of capacity, EPAS no longer conducts research but concentrates on planning and monitoring of Government projects. MOAC also has forestry and fisheries sections, but neither of these sections do any research. Forestry research in Swaziland is undertaken by the private sector.

### **6.1.1 Agricultural Research Division**

Agricultural research was initiated by the then Department of Agriculture in 1959 with the establishment of a central station at Malkerns, and sub-stations at Nhlangano and Big Bend. Experimental plots are located at Mangcongco, Luve and Hebron. This extensive coverage was necessitated by the divergent topographical zones within the country.

Currently, the agricultural research division conducts applied and adaptive research on crops, soils, and socio-economics. Crop screening involves the initial evaluation and introduction of crop varieties with an aim of identifying the most suitable cultivars and practices of producing these crops and the control of pests and diseases using the most economical and environmentally friendly pesticides. Under socio-economics, research activities include monitoring and evaluation of technology adoption and identification of constraints impeding technology adoption.

The broad objectives of ARD include the following:

- a. To identify and recommend suitable crop varieties for the different agro-ecological zones of the country;
- b. To develop appropriate technologies for both small and large scale farmers but with more emphasis on small-scale farmers;

- c. To monitor pests dynamics in the country;
- d. To collect, conserve and utilize plant genetic resources; and
- e. To identify better methods of handling, processing and utilization of foods.

The division comprises the following units: plant protection, cereals agronomy, cotton breeding, horticulture, root and tuber crops, food science and technology, soil fertility and crop nutrition, grain legume and gene bank.

#### *Plant Protection*

The main function of the Plant Protection Section is to conduct research on pests control methods. The objective is to provide farmers with pests control recommendations that are effective, economical, practical and safe to both the environment and the farm.

The Plant Protection Section is divided into four units; namely General Entomology, Cotton Entomology, Plant Pathology and Weed Science. The entomology unit is important in insect pest control, management and research. The Entomology unit is divided into two sub units, namely General Entomology and Cotton Entomology. The Plant Pathology unit is responsible for the research, management and control of plant diseases. This unit is also responsible for implementing phyto-sanitary measures in accordance with the Plant Control Act of 1981. The Weed Science sub-unit is responsible for the control, management and research into weed related problems

#### *Cereal Research*

This section carries out research on maize, sorghum and wheat. Its activities involve the introduction and testing of a wide variety of cereal varieties suitable to the country's climatic and soil environments. The work is centered on crop variety evaluation and the development of appropriate cultural practices including times of planting, plant population and spacing and in expensive weed control techniques.

#### *Cotton Breeding Research*

The main objective of the cotton Breeding Research program is to develop and provide cotton varieties that are suitable to the farming systems in Swaziland.

The research is partly financed by the cotton industry through a levy on seed cotton produced and centered on cotton breeding and entomology.

#### *Horticulture Research*

The Horticulture Research Section conducts research on sub-tropical and deciduous fruits, vegetables and mushrooms. It also produces and sells fruit tree seedlings to the farming communities.

#### *Root and Tuber Crops Research*

The Objectives of the section are to:

- (i) Find alternative crops to cereal crops in the country for farmers;
- (ii) Multiply and distribute suitable cassava and sweet potato varieties to the farmers and lastly;
- (iii) Improve food security and create incomes for poorer households in the country's drought prone areas.

#### *Food Science and Technology*

The objectives of the Food Science and Technology Unit are to:

- (i) Check the chemical and nutritional qualities of food products;
- (ii) Enact the recommendations of the Food Act;
- (iii) Verify and confirm food ingredients;
- (iv) Provide permits of approval for stakeholders; and
- (v) Research and analyze food products for stakeholders.

#### *Soil Fertility and Crop Nutrition*

The Soil Fertility and Crop Nutrition Section conducts research on fertilizer, lime and any other chemical and practices that are used in order to improve soil fertility hence improved crop nutrition and increased crop production. The Primary objective of this section is the re-appraisal of fertilizer and lime requirements under varying soil, climatic and crop husbandry conditions, without undermining the cost effectiveness of the technology.

#### *Grain Legume Research*

The mandate of the Grain Legume Research Section is to carry out research on legumes such as, phaseolus beans, groundnuts, bambara nuts, cowpea, pigeon pea, soybeans and mung beans. Activities involve the evaluation and initial introduction and testing of a wide variety of legumes under the different agro-ecological zones of the country.

#### *Gene Bank*

This section of the Research Division is responsible for the collection, conservation and protection of indigenous plants and seeds to prevent them from becoming extinct. In situations of relocation this unit is assigned to find and collect any possible endangered plant for their conservation. This is for the protection of all plant species in Swaziland.

#### *Staff complement*

Regarding the staff complement under the Agricultural Research division, two main categories of personnel are identified, that is, technicians and professionals. These two categories are based on qualifications, as shown in Table 7. As can be seen from Table 7, the qualifications of staff under the Research division ranges from O'level holders (school leavers) to Ph.D qualifications. At the professional level, a great majority have a Bachelor of Science degree to a Master of Science degree. There is currently only one staff member with a Ph. D. qualification.

**Table 7: Academic Qualifications of Agricultural Research Division Staff as at May 2007**

	Technicians				Professionals (Researchers)		
	O'level	Certificate	Diploma	BSc	BSc	MSc	PhD
	2	8	4		14	9	1
Total	2	8	4		14	9	1

Source: Malkerns Research Station-Chief Research Officer

Presently, there are 6 vacant posts for technicians and 3 vacant posts for Research Officers. Apart from the research efforts made by the Research

Division, there are a number of constraints faced by the Division and these include:

- a. lack of policy direction in research
- b. insufficient competent researchers
- c. very weak linkages between research and extension
- d. inadequate research facilities
- e. poor infrastructure, making the environment not conducive for conducting professional research

## **6.2 Parastatals: University of Swaziland**

The University of Swaziland seeks to pursue excellence in teaching, research, outreach and enterprise development in various disciplines in order to serve the needs of the Kingdom of Swaziland and beyond. Agricultural research under the University of Swaziland is conducted by four main units, namely: Faculty of Agriculture, UNISWA Research Centre, UNISWA Consultancy and Training Centre and the Swaziland Institute for Research in Traditional Medicine, Medicinal and Indigenous Food Plants.

### **6.2.1 Faculty of Agriculture**

Research within the Faculty of Agriculture of the University of Swaziland is conducted under the following departments:

- a. Department of Agricultural Education and Extension
- b. Department of Agricultural Economics and Management
- c. Department of Animal Production and Health
- d. Department of Crop Production
- e. Department of Horticulture
- f. Department of Home Economics
- g. Department of Land Use and Mechanisation

The main objectives of the Faculty of Agriculture are:

- (i) To adopt teaching strategies that are responsive to the needs and aspirations of the internal and external environment of the Faculty of Agriculture in favour of proper balance of teaching, research, outreach and enterprise development;
- (ii) To produce human resources at all levels who are well equipped for the job market and self-employment;
- (iii) To collaborate with all stakeholders in the development and dissemination of technology and information;
- (iv) To develop and operate a library that provides an excellent information service to the academic community of the Faculty and to serve as a reference centre for the public;
- (v) To conduct demand-driven research aimed at increased production, poverty alleviation and environmental conservation
- (vi) To disseminate research-derived information in a usable form to all stakeholders
- (vii) To develop and operate teaching and research and commercial farms
- (viii) To provide consultancy services

#### *Staff complement in the Faculty of Agriculture*

The Faculty of Agriculture, has grown from offering certificates and diplomas in general agriculture, agricultural education and home economics to undergraduate and post-graduate programmes. These developments have been a result of curriculum review based on MCorkle *et al.*(1990) and the current public demand for graduates with varied agricultural skills. As can be observed from the Table 8 below, a great majority of the lecturers have masters' to PhD degrees. In this regard, one is inclined to believe that the Faculty of Agriculture has the capacity to (i) teach and train technicians in the various departments that are required; (ii) conduct research to provide basic and applied research; and (iii) carry out outreach or community service to address urgent community needs.

**Table 8: UNISWA Academic Staff in the Faculty of Agriculture by Department, Rank, and Qualification between 2006/2007**

	Rank									Qualification				
	Local					Expatriate				Local			Expatriate	
	TA	L	SL	AP	P	L	SL	AP	P	BSc	MSc	PhD	MSc	PhD
Agricultural Education & Extension	-	2	1	2	1	1	-	-	1	-	-	6	1	1
Agricultural Economics & Management	1	*	3	*	-	-	1	1	-	1	-	3	-	2
Animal Production & Health	-	4	1	-	-	4	-	-	-	1	-	4	-	4
Crop Production	-	4	2	-	-	1	-	-	1	-	1	5	-	3
Home Economics	-	5	1	*	-	3	2	-	-	-	2	4	1	4
Land Use & Mechanization	-	4	1	-	-	2	-	-	-		3	2	2	0
Horticulture	-	1	-	-	*	1	1	-	-	-	1	-	-	1
<b>Totals</b>	1	20	9	2	2	12	4	1	2	3	7	24	4	16

**Key:**

TA – Teaching Assistant

L – Lecturer

SL – Senior Lecturer

AP – Associate Professor

P – Professor

\*Means 1-2 vacant positions

**Source:** University of Swaziland Calendar 2007/2008, Kwaluseni, Swaziland

### 6.2.2 UNISWA Research Centre

The UNISWA Research Centre was established in 1995. It serves as the focal point for research at the University. It also endeavours to facilitate the coordination, strengthening, promotion, generation, accumulation and

dissemination of knowledge and information through research and enhance economic growth and development and promote socio-cultural values. The main objectives of the UNISWA Research Centre are:

- a. To promote meaningful research at UNISWA by vitalizing research culture, liaising with relevant organs to harmonise teaching and research activities, and introducing incentives that are conducive to effective utilisation of available competencies and capabilities;
- b. To strengthen staffing and upgrade facilities at the Research Centre to become the University's focal point for identifying, prioritizing and coordinating research, and compiling and disseminating research findings;
- c. To formulate, review, implement and monitor policies and procedures for processing research proposals for funding;
- d. To establish links with industry and other sectors for cooperation in handling research needs and provision of funding for research; and
- e. To accommodate the diversity in research and encourage problem-specific and creative research to address UNISWA's academic requirements and national and regional needs.

### **6.2.3 UNISWA Consultancy and Training Centre**

The UNISWA Consultancy and Training Centre (CTC) was established in 2000. Its mission is to contribute to the development of Swaziland by providing quality skills training and consultancy services to government, non-governmental organizations, parastatal organizations, private sector companies and individuals. Its objectives are to:

- a. Provide professional service to stakeholders through consultancy and training on short courses;
- b. Link the University of Swaziland with the public through consultancy;

- c. Provide an environment in which administrators, academics, technicians and students work together to serve the public;
- d. Generate income for the University of Swaziland through consultancy and training by involving the University staff; and
- e. Improve the quality of teaching by integrating theory and practice through consultancy.

*Swaziland Institute for Research in Traditional Medicine, Medicinal and Indigenous Food Plants*

The Institute serves as Swaziland's leading institution for the design, coordination and execution of multidisciplinary research in traditional medicine and indigenous wild edible and medicinal plants. It strives to combine the expertise of scientists and traditional medical practitioners (TMPs) with a view to producing derived pharmaceuticals and promoting the use of traditional medicine in national health care, and to create general awareness regarding the qualities of indigenous food plants.

The objectives of the institute are to:

- a. Promote ethno botanical surveys for indigenous non-cultivated fruits, vegetables and medicinal plants in order to design and maintain a database, documenting the available bioresources and the technological exploitation.
- b. Provide a forum for the meeting of researchers on medicinal and food plants with nutritionists and TMPs in an atmosphere of mutual trust and respect.
- c. Collect seeds of the under-utilised indigenous fruits and vegetables to form a gene bank, which could be used to broaden the food base.
- d. Conduct plant propagation studies in order to conserve biological diversity.
- e. Isolate and identify bioactive compounds from plants through activity guided fractionation using chromatographic and spectroscopic techniques.

f. Develop the isolated compounds into new drugs for the treatment of common diseases

g. Organize in-service training programmes for the upgrading of technical officers and exchange of information.

h. Work towards making traditional medicine a safe and acceptable alternative system of health care.

### ***Staff complement***

The work of the Institute is carried out by full time researchers, technical and administrative staff appointed to the Institute as well as by lecturers in the related faculties of the University of Swaziland or researchers in the research institutes who have interests falling within the areas of ongoing research in the Institute (i.e. Research Affiliates). A Research Affiliate is a person having an approved research project, in progress, with the Institute whether as the sole researcher or as part of a team. The privileges of a research affiliate are also extended to people who officially assist the Institute in an advisory capacity.

### ***Relationship with Herbalists***

The emphasis of the research carried out by the Institute is on African food and medicinal plants for which material is locally available. To promote the flow of information from herbalists and people knowledgeable in the herbal remedies, the Institute engages the services of herbalists on consultancy or other basis to assist with the collection and verification of authentic information. All such information is kept confidential by the institute. The name and address of the donor of each recipe is recorded against the recipe such that acknowledgement will be made to the appropriate person in any publication. Adequate remuneration can also be fed back to the appropriate donors from licences to patents. Confidential agreements will be signed as appropriate bearing in mind the provision of the United Nations Convention on Biological Diversity.

Collaborative research on food and medicinal plants among scientists from different disciplines who traditionally work in isolation would enhance our

development capacity in the production of new food and therapeutic materials from our flora which are safe and acceptable to the populace. The development of these products is best approached in a collaborative manner as no single discipline can handle it successfully alone. The Institute provides the necessary forum and facilities for the interaction of scientists and those with indigenous knowledge on plants for a profitable exploitation and management of our bioresources. Insights are also provided into some aspects of our cultural heritage which hitherto has been misunderstood by many.

### **6.3 Parastatals under the Ministry of Agriculture and Cooperatives.**

Parastatals under the Ministry of Agriculture and Cooperatives include: National Maize Corporation (NMC), National Agricultural Marketing Board (NAMBoard), Swaziland Cotton Board (SCB) and Swaziland Dairy Development Board (SDDB).

#### **6.3.1 National Maize Corporation**

*NMC was established in 1985 in accordance with the Companies Act of 1912. Its objective is to guarantee a market to local maize farmers at competitive prices. The corporation has been, inter alia, entrusted with the following key responsibilities:*

- (i) To guarantee an all year round competitive market for Swazi maize farmers.*
- (ii) To reduce marketing barriers and costs to Swazi farmers by improving maize marketing and logistics services.*
- (iii) To guarantee all year round supplies of maize at reasonable cost to the nation.*
- (iv) To increase the efficiency of the maize market in Swaziland by promoting the availability of white maize to consumers at reasonable cost in all regions of the country.*

#### **6.3.2 National Agricultural Marketing Board**

*The National Agricultural Marketing Board is a Public Enterprise established through an Act of Parliament (NAMBoard Act No. 13 of 1985 mandated to:-*

*(i) Regulate where appropriate importers and exporters of scheduled agricultural products;*

*(i) Facilitate in the Marketing, Processing, Storage, Transportation, Distribution and Sale of Scheduled Agricultural products;*

*(ii) Advise the government in all matters related to the supply and demand of scheduled agricultural products.*

### 6.3.3 Swaziland Cotton Board

The Swaziland Cotton Board was established through the Cotton Act No.26 of 1967. The Board's broad functions and objectives are:

*(iii) To promote and develop Cotton production and processing. This is achieved by directing and funding Cotton Research, providing good quality planting seed to the farmers, assisting with Credit for Inputs.*

*(iv) Providing extension advice to the farmers, and facilitating marketing of the produce.*

*(v) Processing of the cotton is also of interest as it creates a market for the cotton crop and hence the Board liaises with potential investors in cotton industrial manufacturing.*

### **6.3.4 Swaziland Dairy Development Board**

The Swaziland Dairy Board is a public enterprise wholly owned by the Swaziland Government. It was established in 1971 under the Dairy Act No. 28 of 1968. As provided in the Act, the Board's primary function is to develop and regulate the industry.

None of these parastatals undertake agricultural research as a major activity within their annual programmes. In instances where decisions need to be based on empirical findings, the organizations normally engage the services of consultants. The Swaziland Cotton Board, however, relies on the services of the Agricultural Research Division (ARD) of MOAC, which has a cotton research section based at the Lowveld Experiment Station in Big Bend. Cotton farmers pay a levy through SCB to contribute towards cotton research. NAMBoard on the

other hand is in the process of strengthening its research wing, which is currently staffed with one Research Officer.

## **6.4 Private Sector**

Private companies in the country undertake commodity-oriented research on crops, which include sugarcane, pineapple, citrus, and forestry.

### **6.4.1 Swaziland Sugar Association**

Sugarcane research is conducted by the Swaziland Sugar Association, which is a private but non-profit making organization. It was established in 1967 through the Act of 1967, with the responsibility to perform services necessary for the general development of the industry and the marketing of sugar, to ensure optimum returns on investments for producers. Agricultural research is conducted by the Technical Services Division based at Simunye. The mandate of the Technical Services Division is to provide technical advice on agronomy, irrigation, extension, pest and disease control as well as training on sugarcane production to all sugarcane growers in Swaziland.

### **6.4.2 Swaziland Citrus Board**

Research on citrus fruit crops, primarily grown on commercial farms, is conducted by the Citrus Growers Association of Southern Africa (CGASA), based in Hillcrest, South Africa. Local companies do not conduct research but send their research requests to the CGASA through the Swaziland Citrus Board (SCB). Local citrus companies pay annual subscriptions to the SCB, which subscribes to the CGASA. The annual subscriptions are used to fund the research request from member countries. Commercial pineapple producers, such as Swazican, rely entirely on the services of the South African Agricultural Research Council (ARC) for their research needs. These are normally soil analyses and plant nutrient requirements.

## **6.5 Forestry Industry**

Private commercial forestry companies such as Sappi Usuthu and Shiselweni Forestry Company engage in forestry research. Sappi focuses its research on plant protection and weed control. It does research in collaboration with its parent company in the Republic of South Africa (RSA) and other institutions in RSA. Research at Shiselweni Forestry Company is mainly adaptive, focusing on identifying improved suitable varieties of timber for improved productivity. The commercial forestry companies normally engage the services of South African companies such as the Institute of Commercial Forest Research (ICFR) and Tree Pathology Cooperative Programme (TPCP) for their research needs.

## **7. INSTITUTIONS INVOLVED IN AGRICULTURAL TRAINING**

This section presents the institutions currently providing tertiary agricultural training and in-service training in Swaziland. The institutions are classified into three main categories, namely, Government institutions, parastatals and the private sector.

### **7.1 Government institutions**

#### **7.1.1 Ministry of Agriculture and Cooperatives**

Government's responsibility for the Agricultural sector lies primarily with the Ministry of Agriculture and Cooperatives (MOAC). The mission statement of MOAC is: To ensure household food security and increased sustainable agricultural productivity through diversification and enhancement of commercial agricultural activities, formation of appropriate technologies and efficient extension services while ensuring stakeholder participation and sustainable development and management of natural resources in Swaziland. MOAC formulates policy and administers all legislation related to agriculture and organization and management of cooperative societies.

Agricultural training under the Ministry of Agriculture and Cooperatives is provided in the field of animal production and health, through the Veterinary and Farmer

Training Centre (VFTC). This is the only Farmer training centre under the Ministry of Agriculture and Cooperatives that offers a full time training programme with a certificate. Apart from the VFTC, the Ministry also runs four other training centres, which are normally used for conducting short-term farmer training programmes and staff workshops. These are Lutheran Farmer Training Centre, Nhlanguano Farmer Training Centre, Lowveld Farmer Training Centre and Mphophoma Farmer Training and Conference Centre.

### ***Veterinary and Farmer Training Centre***

The Veterinary and Farmer Training Centre (VFTC) is located at Mpisi and falls directly under the Department of Veterinary and Livestock Services (DVLS). The Centre offers a two – year Advanced Certificate in Animal Health and Production. Refresher courses ranging from four to six weeks are also offered to officers already employed. Farmers are also offered short course on animal production and health. The broad objectives of VFTC include the following:

- (i) To train Veterinary Assistants in Animal Health and Production;
- (ii) To provide in-service training for officers already within the establishment register; and
- (iii) To provide training for local livestock farmers in animal health control and management to help them carry out reasonably good standards of animal production.

For one to qualify for admission into the Advanced Certificate programme on Animal Health and Production, the candidate must have at least three O'level credits from science related subjects and at least a pass in English Language. The programme offered at VFTC covers a wide variety of subjects under animal production and health as well as rural development and marketing. The courses are:

Anatomy and physiology, dipping and insecticides, rural sociology, range management, academic communication skills, farm accounts, marketing, microbiology and parasitology, general animal husbandry practices, farm

technology, business planning and policy, dairy production, poultry production, piggery and feedlotting.

The current curriculum was developed in collaboration with the Faculty of Agriculture of the University of Swaziland in 1997 with the assistance of the International Fund for Agricultural Development (IFAD). Further consultations are currently being held between the two parties with the aim of developing a diploma programme in Animal Health and Production, a programme that was once offered by the University of Swaziland until the early 1980s.

Currently, the VFTC has two full time lecturers who hold a Bachelor of Veterinary Science degree and a Bachelor of Science degree in Agriculture, respectively. There are currently three vacancies for Lecturers and the recruitment process is handled by the Civil Service Commission (CSC). On average, the VFTC is

## **7.2 Ministry of Education**

The Ministry of education is responsible for coordinating education and training at all levels in Swaziland. The coordination covers primary education, secondary education, tertiary education and vocational training. Presented below, are institutions under the jurisdiction of the Ministry of education that offer agricultural training.

### **7.2.1 Ngwane Teacher Training College**

Ngwane Teacher Training College (NTTC) is an affiliate of the University of Swaziland. It offers a three year Primary teacher's diploma, with a specialty in agriculture amongst others. Major subjects offered include crop production, animal production and health, land use and mechanization and agricultural economics and marketing. The department of agriculture in the college has three lecturers, one with a Master of Science degree and the other two with Bachelor Science degrees in Agricultural Education.

In developing their curriculum in agriculture, the College works in close collaboration with the Faculty of Agriculture of the University of Swaziland.

### **7.2.2 Vocational Centres**

Through the Ministry of Education, the Government of Swaziland also offers vocational training to citizens who do not qualify for admission to institutions of higher learning such as UNISWA or NTTTC. The vocational training is offered through skills centres, namely Nhlanguano Agricultural Skills Training Centre (NASTC) and Siteki Industrial Training Centre (SITC). These centres offer a two year Vocational Certificate in Agriculture. For one to qualify for admission, the candidate must have reached at least Form 2 level of education. The current curriculum for these centres was developed by the Ministry of Education in collaboration with the Faculty of Agriculture of the University of Swaziland. Courses offered within the two years include; soil conservation, water conservation, farm management, botany, vegetable production, introduction to economics, agricultural marketing, soil science, irrigation, poultry production, piggery and production of field crops.

Products of these skill centres are expected to run their own production projects, however some have joined private farms as Labourers and Non Governmental Organisations (NGOs) as development officers

Instructors under the two centres are qualified with a Diploma in Agriculture obtained from the University of Swaziland.

### **7.3 Parastatals: University of Swaziland**

The University of Swaziland seeks to pursue excellence in teaching, research, outreach and enterprise development in various disciplines in order to serve the needs of the Kingdom of Swaziland and beyond. Agricultural training under the University of Swaziland is offered through the Faculty of Agriculture.

#### **7.3.1 Faculty of Agriculture**

Training under the Faculty of Agriculture of the University of Swaziland is conducted through the following departments:

- a. Department of Agricultural Education and Extension

- b. Department of Agricultural Economics and Management
- c. Department of Animal Production and Health
- d. Department of Crop Production
- e. Department of Horticulture
- f. Department of Home Economics
- g. Department of Land Use and Mechanisation

The main objective of the Faculty of Agriculture is:

- a. To adopt teaching strategies that are responsive to the needs and aspirations of the internal and external environment of the Faculty of Agriculture in favour of proper balance of teaching, research, outreach and enterprise development;
  - (i) To produce human resources at all levels who are well equipped for the job market and self-employment;
  - (ii) To collaborate with all stakeholders in the development and dissemination of technology and information;
  - (iii) To develop and operate a library that provides an excellent information service to the academic community of the Faculty and to serve as a reference centre for the public;
  - (iv) To conduct demand-driven research aimed at increased production, poverty alleviation and environmental conservation
  - (v) To disseminate research-derived information in a usable form to all stakeholders
  - (vi) To develop and operate teaching and research and commercial farms
  - (vii) To provide consultancy services

### ***Degrees offered***

The University of Swaziland, Faculty of Agriculture, has grown from offering certificates and diplomas in general agriculture, agricultural education and home economics to undergraduate and post-graduate degrees. The degrees currently offered are as follows:

- BSc. Agricultural Economics and Agribusiness Management

- BSc. Agricultural Education
- BSc. Agronomy
- BSc. Animal Science
- BSc. Food Science, Nutrition and Technology
- BSc. Home Economics
- BSc. Home Economics Education
- BSc. Horticulture
- BSc. Land and Water Management
- BSc. Textile and Apparel Design and Management

Post graduate degrees are as follows:

- MSc. Agricultural Education
- MSc. Agricultural Extension
- MSc. Crop Science
- MSc. Agricultural and Applied Economics

#### **7.4 Private institutions**

Two private institutions were identified as registered institutions offering in-service training in agriculture. The target groups include employees within the private sector, private companies and non governmental organizations working on agricultural related initiatives. These institutions are Mananga - Centre for Regional Integration and Management Development (MANANGA) and Africa Management Development Institute (AMADI).

##### **7.4.1 Mnanaga Management Centre**

Formerly known as Mananga Agricultural Management Centre, MANANGA was established in 1972 by the Commonwealth Development Corporation (CDC) as an international management development centre catering for middle and senior managers. MANANGA operates as a limited liability company in Swaziland. It is a wholly African organization with a well established network of associates, organizational and institutional collaborators in the SADC region, Africa and

beyond. In support of its work, MANANGA has had a significant backing from the Netherlands Government, European Community, and Commonwealth Fund for Technical Co-operation and many international, regional and national agencies who share the belief that effective management is key in bringing together benefits of development to the people in the developing world.

The mission of MANANGA is to be the management development resources centre for Africa, promoting regional integration and development in Africa through training, organizational and institutional capacity development, research, high quality advisory and consulting services. The main focus of the centre is on management development in key strategic sectors crucial for the development of Africa.

MANANGA offers mainly in- service training through short courses. The courses are normally offered in response to the demand expressed by the clientele in the country. In the agricultural sector, courses offered include the following:

- Rural Livelihoods, Poverty Reduction and Sustainable Development Programmes
- The Management of Rural Development
- Extension Participatory Community Development
- Project Management for Food Security
- Agricultural Marketing and International Trade
- Social Agro Forestry and Energy Planning
- Irrigation Technologies and Methods for Small Scale Farmers
- Integrated Water Resources Management
- Management of Irrigation Projects.

In effecting its mandate, MANANGA collaborates with various institutions regarding information sharing and these include, the Ministry of Agriculture and Cooperatives, Institute of Development Management (IDM) and Swaziland Institute of Management and Public Administration (SIMPA).

#### **7.4.2 Africa Management Development Institute (AMADI)**

Africa Management Development Institute (AMADI) is a management training, research and consultancy firm registered in Swaziland in 2003 under the companies Act. AMADI was formed to:

- Provide short-term training to Government, NGOs and Private Organisations and Enterprises
- Collaborate and network with donor agencies, public and private institutions, and other NGOs in the implementation of local, national and regional community based projects.
- Enhance the management of resources through education activities in collaboration with the local communications, donor agencies, public sectors, and other institutions
- Provide applied research to Governments, NGOs and Private Organisations and Enterprises

Like MANANGA, AMADI offers mainly in- service training through short courses. The courses are normally offered in response to the demand expressed by the clientele in the country. In the agricultural sector, courses offered include the following:

- Agriculture Extension Service Delivery and Management
- Drought and Food Security Management
- Agricultural Management and Rural Development
- Research Methods for Agriculture and Rural Development
- Forest Sustainability and Land Use
- Conservation and Natural Resource Management
- Agribusiness, Marketing and Export Management

Agriculture being an applied science requires participants to have practical sessions. AMADI strives to strike a balance between the practical and theory components of the courses by collaborating with local agricultural institutions such

as the Ministry of Agriculture and Cooperatives, Dalcrue Farm under Tibiyo Taka Ngwane, Nutri Foods at Nokwane and Africa Cooperative Action Trust (ACAT).

## **8. COORDINATION OF THE NARS**

### **8.1 Present Structure of NARS**

Presently, there is no formal structure of NARS that exist in Swaziland. However, research activities, though uncoordinated, they are carried out by individual institutions.

The Agricultural Research Division (ARD) of the Ministry of Agriculture and Cooperatives (MOAC) is the country's principal agricultural research agency. Nowadays ARD's research focuses mainly on foodcrops like maize, beans, cowpeas, fruit, groundnuts, and sorghum. Cotton is an important traditional cash crop for the farmers in SNL areas and also the subject of ARD's research. The ARD has its head quarters at Malkerns with an experiment station at Big Bend, an experimental farm at Nhlanguano, and experimental plots at Mangcongco, and Luve. The Lowveld Experiment Station at Big Bend mainly conducts research on cotton, in particular on cotton breeding and entomology. Most of the recurrent costs of this station are provided by the Swaziland Cotton Board (SCB), which raises funds for research by a tax on cotton production. MOAC matches SCB's funds by providing personnel, offices, and infrastructure. Appendix 1 presents the structure of the ARD.

Although livestock plays an important role in Swaziland's agricultural sector, there is comparatively little livestock research. What livestock research is done is carried out by the Veterinary Diagnostic Laboratory (VDL) of the Department of Veterinary Services of MOAC, which mostly provides veterinary services such as the diagnosis of diseases and vaccine production.

The University of Swaziland (UNISWA), Faculty of Agriculture provides training to BSc and MSc levels, while Ngwane Teacher Training Collage provides training to Diplomas in Agricultural Education. The Faculty of Agriculture conducts

agricultural and related research, but most of the staff's time is spent on teaching. Collaboration between the university and MOAC is done mainly on an informal basis. Most of the research conducted by the Faculty of Agriculture is devoted to major staple crops and to a lesser extent to livestock. Faculty staff also does some work in the areas of home economics, nutrition, agricultural mechanization, land and water management and agricultural economics. The present organizational structure of the Faculty of Agriculture is provided in a chart form in Appendix 2. The Uniswa CTC conducts cross-cutting research, which includes agricultural issues.

The large commercial estates and other private companies finance and conduct their own programs of agricultural research. The work is problem-oriented and focuses mainly on testing and adapting technologies that are relevant for the major export and cash crops they produce.

Sugar production is the principle crop grown on the ITDL lands and accounts for about 60% of total agricultural exports (by value) and 75% of ITDL's crop production (by quantity). Most of the large sugar estates conduct their own agronomic and plant protection research (e.g., Simunye Sugar Co, Mhlume Sugar Co., and Illovo. Together they conduct their research through the SSA. The sugar estates also financially support the Swaziland Sugar Association, which conducts research and does marketing activities on their behalf. Appendix 3 presents the structure of SSA.

Research on pineapples and citrus fruit crops, primarily grown on commercial farms, is conducted by Swazican. Table 9 shows the overview of the present structure of NARS in Swaziland.

**Table 9: Overview of the present structure of the NARS in Swaziland**

Institutional category	Supervising agency	Executing agency		Research focus	Research staff
		Name	Acronym		
Public	Ministry of Agriculture & Cooperatives	Agriculture Research Division	ARD	Crops and socio-economics	24
Parastatal	Ministry of Education – University of Swaziland	Faculty of Agriculture		Crops, livestock, socio-economics, land and water management, agricultural education and extension, and food and nutrition.	53
		UNISWA Research Centre	URC	Cross-cutting research areas	3
		UNISWA Consultancy and Training Centre	CTC	Cross-cutting research areas	2
	University of Swaziland	Swaziland Institute for Research in Traditional Medicine, Medicinal and Indigenous Food Plants	SIRMIP	Indigenous medicinal and food plants	2
Private	Sugar Industry	Swaziland Sugar Association	SSA	Sugarcane	11
	Forest Industry	Sappi, Peak Timber & Shiselweni Forestry		Forestry	Sappi – 2 Mondi – 1 SFC – 1

Private commercial forestry companies such as the SAPPI Usuthu Company and the Shiselweni Forestry Company engage in forestry research. SAPPI Usuthu focuses on adaptive research issues and plant protection. It does research in collaboration with its parent company in South Africa and other institutions in

South Africa and the United Kingdom. Appendix 4 presents the structure of SAPPI Usuthu.

When it was initially established it was envisaged that ARD.s facilities and staff would undertake privately sponsored agricultural research. But over time the private (largely estate-crop) sector developed its own programs of research rather than channel their funds through ARD.

## **9. RESEARCH METHODOLOGIES AND NEEDS**

### **9.1 Working Methodologies for Agricultural Research**

This section discusses the methodologies for conducting research by the various research institutions in the country. It focuses mainly on funding mechanisms and collaborations between local, regional and international institutions. The discussion also touches on the needs identified by the institutions, which if appropriately addressed could improve the overall development and coordination of agricultural research and training at national level.

#### **9.1.1 Government institutions: Ministry of Agriculture and Cooperatives**

Research conducted by the Ministry of Agriculture and Cooperatives through the Agricultural Research Division (ARD) is mainly funded by the Swaziland Government through its annual recurrent budget. Collaboration between the ARD and local research and training institutions is very poor. Apart from the informal collaboration between the ARD and individual staff members of the Faculty of Agriculture of the University of Swaziland in conducting crop trials, no other form of formal collaborations were identified with other local research and training institutions.

#### **Commodity Research Programmes:**

- Cereals Research Programme:

This sections deals with maize, sorghum and wheat. It is charged with the introduction and the initial evaluation of cereals in the different agro-ecological zones of the country and the development of appropriate technologies covering

times of planting, plant population and spacing. This sections conducts research on-station as well as on-farm.

- Grain Legumes Agronomy:

This section is assigned with the responsibilities of beans, groundnuts. Jugo beans, cow pea, soybeans, pigeon pea, mungbeans and insambansamba. The work of this section is similar to that of the above.

- Horticulture Research Programme:

Investigations in this programme centre on fruit and vegetable introductions and initial evaluation, and the development techniques. Research is carried out on the common vegetables that include cabbages, tomatoes, carrots, onions, swiss chard, beetroot, peppers, green beans and of late baby vegetables. Fruits include citrus, apples, litchis, peaches, avocados, grapes, mangoes and blue berries. Fruit tree seedlings are also produced under this programme.

- Roots & Tuber Crop Research Programme:

This programme deals with the introduction and initial evaluation of root and tuber crops. These include sweet potatoes, cassava and taro. The programme is conducted on - station as well as on-farm.

- Cotton Breeding Research Programme:

This section concentrates on improving cotton varieties in order to yield heavily seed cotton of superior quality. While maintaining trials on irrigated varieties the emphasis is on the development of rainfall varieties since most farmers on SNL do not irrigate. This programme is also responsible for the Cotton Seed Production Scheme assisted by the Swaziland Cotton Board.

### **Supporting Research Programmes**

- Plant Protection Research Programme:

This programme consists of three programmes viz, plant pathology, entomology and weed science. The main mandate of this programme is to evaluate new pesticide formulations that are introduced in the market, identify the most

economic and effective ways of controlling pests and monitor pest dynamics. This programme is also responsible for Sanitary and Phytosanitary (SPS) issues.

- Agricultural Economics Research Programme;

This programme's responsibility is to investigate problems and constraints of socio-economic nature that prevent the adoption of improved farming technologies. It also reviews the impact of research programme on agricultural production on SNL.

- Soil Fertility & Crop Nutrition Research Programme:

The primary objective of this programme the re-appraisal of fertilizer and lime requirement under varying soil, climatic and crop husbandry conditions with attention to cost effectiveness.

- Soil Chemistry Section:

This section provides back-up soil and plant analysis data for the other sections of ARD.

- Biometry Section:

This section assists in the design, analysis and into protection of research data. It is also responsible for the design at agricultural surveys.

- Food Science & Technology Research Programme:

This section is charged with the responsibility of investigating chemical properties of food and food products. The section is also responsible for investigating food crop quality, processing and preservation methods. Work is carried out in the laboratory as well as on-farm i.e. working with consumers out in the field.

- National Plant Genetic Resources Centre:

This centre is responsible for the collection , identification, characterization, documentation and preservation of plant germplasm in-situ as well as ex-situ.

Collected germplasm is that of cultivated crops and that of their wide relatives. The germ plasm is the conserved for future use.

- Collaborators with ARD:

There is collaboration with the International Agricultural Research Centres (ARLs). This is either directly through SADC regional projects. Such IARCs include International Centre for Research in the Semi-arid Tropics. (ICRISAT) through the sorghum and Millet improvement Network. (SMINET), International Centre for Tropical Agriculture through South African Ben Research Network (SABRN) etc.

Collaboration is also with the regional seed companies. They supply ARD with germplasm that has been tested under their conditions and under Swaziland conditions that it can be released for sale in the country.

- Funding:

ARD is mostly funded by the Government of Swaziland. However there is some financial assistance from some of the regional projects and these include the SADC Plant Genetic Resources project, NSIMA & SABRN

Although efforts are being made to improve the Agricultural Research Division, there are a number of research needs by the Division, and they include:

- National agricultural research policy
- Competent researchers
- Linkages between research and extension
- Research facilities
- Infrastructure to provide conducive environment to conducting professional research

As the research conducted by the Agricultural Research Division is mainly focusing on crops, research on other areas in the agricultural sector has not been conducted by the Ministry of Agriculture & Cooperatives. There is need to establish a research facility for livestock in line with the provisions of the Livestock

Development Policy of 1995. The Economic Planning and Analysis Section also needs to be capacitated so that it is able to conduct socio-economic research to inform policy decisions on issues related to agricultural marketing and trade, food security and socio-economic issues.

**b. Parastatals: University of Swaziland**

Agricultural research under the University of Swaziland is conducted by four main units, namely: Faculty of Agriculture, UNISWA Research Centre, UNISWA Consultancy and Training Centre and the Swaziland Institute for Research in Traditional Medicine, Medicinal and Indigenous Food Plants (SIRMIP). The research is conducted on crops, livestock, socio-economics, land and water management, agricultural education and extension, food and nutrition, and indigenous medicinal and food plants.

Research conducted by the above units of the University are funded through the UNISWA Research Board, Food Agriculture and Natural Resource Policy Analysis Network (FANRPAN), African Technology Policy Studies Network (ATPS), and payments from clients on contracted research.

The University collaborates with a number of local institutions both on issues of agricultural research and training. These include the Ministry of Agriculture and Cooperatives, private companies and NGOs through student internships. Private companies are also consulted regularly for soliciting their input in validating the University curriculum. This is not only applicable to the Faculty of Agriculture but other Faculties as well. Currently, the University is having discussions with Sappi to introduce courses in forestry, chemical/process engineering and occupational health. The Swaziland Electricity Company (SEC), Swaziland Post and Telecoms (SPTC) and Sappi are also preparing a proposal in collaboration with UNISWA for introducing courses on heavy duty electrical engineering within the University curriculum.

Other local institutions conducting training in agriculture, such as, Ngwane Teacher Training College (NTTC), Nhlanguano Agricultural Skill Training Centre (NASTC), Siteki Industrial Training Centre (SITC) and the Veterinary Farmer

Training Centre (VFTC) have collaborated with the University in designing their curricula.

Regionally, the University collaborates with a number of Universities in the region, some of which include, the University of KwaZulu Natal, University of Fort Hare. Agricultural institutions such as SADC Food Agriculture and Natural Resources (FANR) Directorate, FANRPAN also collaborate with the University on issues related to applied agricultural research and training.

Internationally, UNISWA has had collaborations through research, with the World Conservation Union, UNEP, FAO and the University of Copenhagen.

In order to improve its service delivery on agricultural research and training, the University requires funding for conducting research in response to the needs expressed by stakeholders in the agricultural sector.

### **c. Private sector**

#### **(i) Swaziland Sugar Association**

Research on sugarcane is conducted by the Technical Services Division of the Swaziland Sugar Association (SSA). The research strengths of SSA are on agronomy, engineering (irrigation, drainage and system design) and pest and disease control. The research conducted by SSA is based on research needs identified by sugarcane producers in the country. The funds for conducting research are received from annual contributions made by local sugarcane producers.

In effecting its mandate, SSA collaborates with the local sugar companies, Swaziland Water and Agricultural Development Enterprise (SWADE), South African Sugar Research Institute (SASRI), Mauritian Sugar Research Institute (MSRI) and the Zimbabwe Sugar Industry Experiment Stations (ZSIES). SSA has also participated in the validation of the curriculum of the Faculty of Agriculture of the University of Swaziland.

The research results are disseminated to the local sugarcane producers through extension officers employed by SSA. This is done through workshops, field visits and seminars.

Swaziland Sugar Association currently relies entirely on its international collaborating partners for breeding new sugarcane varieties.

## **(ii) Swaziland Citrus Board**

Research on citrus fruit crops, primarily grown on commercial farms, is conducted by the Citrus Growers Association of Southern Africa (CGASA), based in Hillcrest, South Africa. Local companies do not conduct research but send their research requests to the CGASA through the Swaziland Citrus Board (SCB). Local citrus companies pay annual subscriptions to the SCB, which subscribes to the CGASA. The annual subscriptions are used to fund the research request from member countries. Commercial pineapple producers, such as Swazican, rely entirely on the services of the South African Agricultural Research Council (ARC) for their research needs. These are normally soil analyses and plant nutrient requirements.

### **d. Forestry Companies**

Private commercial forestry companies such as Sappi Usuthu, Shiselweni Forestry Company and Peak Timbers Limited (formerly known as Mondi Forest) engage in adaptive forestry research. Sappi focuses its research on plant protection and weed control. This is done in collaboration with its parent company in the Republic of South Africa (RSA) and other institutions in RSA. Research at Shiselweni Forestry Company and Peak Timbers Limited mainly focuses on identifying improved suitable varieties of timber for improved productivity. The commercial forestry companies normally engage the services of South African companies such as the Institute of Commercial Forest Research (ICFR) and Tree Pathology Cooperative Programme (TPCP) for their research needs. Research conducted by these companies is wholly funded through their internal annual budgets.

Amongst the three companies, only Sappi Usuthu has a clear organizational structure with a forestry research unit. All companies expressed the need for local forest breeders, pathologists and biometricians to improve their research units.

#### **10. NETWORKING FOR AGRICULTURE RESEARCH, TRAINING AND DEVELOPMENT (TO DISCUSSED IN WORKSHOP)**

Agriculture and Training needs, as well as alliances and networks, for in country, regional and international were discussed and is shown i the attached Excel files (Agricultural Research Institutions, Agricultural Training Institutions, and Needs and Alliances).

#### **11. OVERALL DISCUSSION & CONCLUSIONS**

Agricultural research in Swaziland is conducted by the Ministry of Agriculture and Cooperatives, the University of Swaziland, Swaziland Sugar Association, and private forest companies.

Under the Ministry of Agriculture and Cooperatives, it is only the Agricultural Research Division that conducts research and the focus on only on crops. Agricultural research under the University of Swaziland is conducted by the Faculty of Agriculture, UNISWA research centre and the UNISWA Consultancy and Training Centre. The Faculty of Agriculture conducts research on crops, livestock, socio-economics, land and water management, agricultural education and extension, and food and nutrition. The UNISWA Research Centre and UNISWA Consultancy and Training Centre both conduct research on cross cutting issues and these are normally based on client needs.

Tertiary agricultural training is offered by the Faculty of Agriculture of the University of Swaziland, Ngwane Teacher Training College and the Veterinary and Farmer Training Centre. There are also two vocational centre that offer skills training in agriculture and these are Nhlangano Agricultural Skills Training Centre and Siteki Industrial Training Centre.

Based on the situational analysis, it is evident that there seems to be some form of collaboration amongst agricultural training centres but very weak linkages between training institutions and agricultural research institutions. Another observation made was that there seems to be poor collaboration and linkages between agricultural research institutions themselves and this has seriously degraded the state and advancement of agricultural research in the country. The lack of an agricultural research policy and a National Research Council puts the country in an uncertain position of establishing a National Agricultural Research and Development System.

It is discouraging to note that a National Research Council (NRC) was in fact established in 1972 by Cabinet as national priority with the aim of establishing an apex body responsible for setting up research ethics and identifying research priority areas for Swaziland. As an umbrella body, the NRC was tasked with monitoring the research work of other institutions in Swaziland. However, up to today that initiative has not yielded any positive results.

It is therefore, incumbent upon the Government to resuscitate the process of formalising and operationalise the NRC. The completion of this process will no doubt give the much needed impetus to develop a vibrant NARS in the country.

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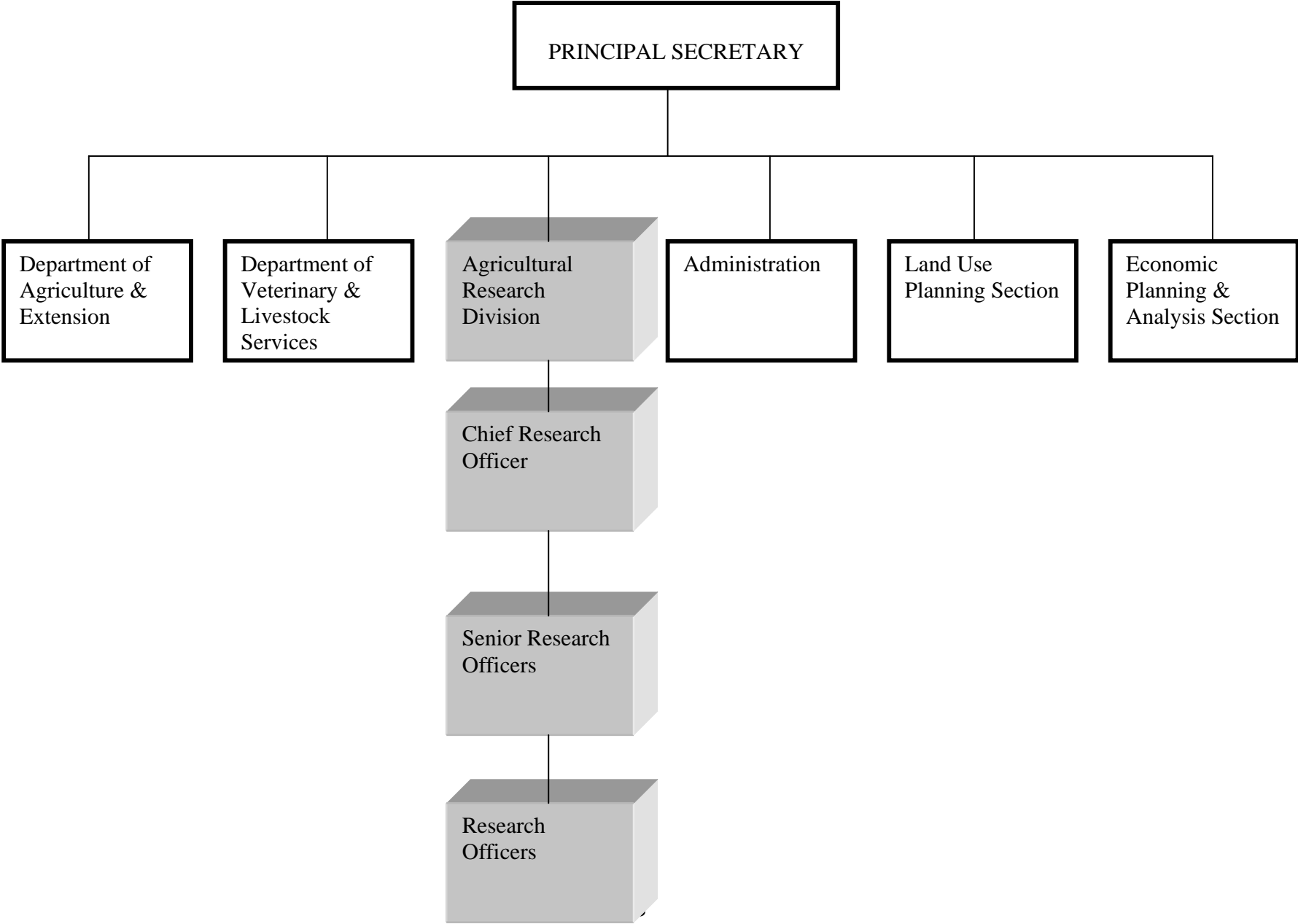
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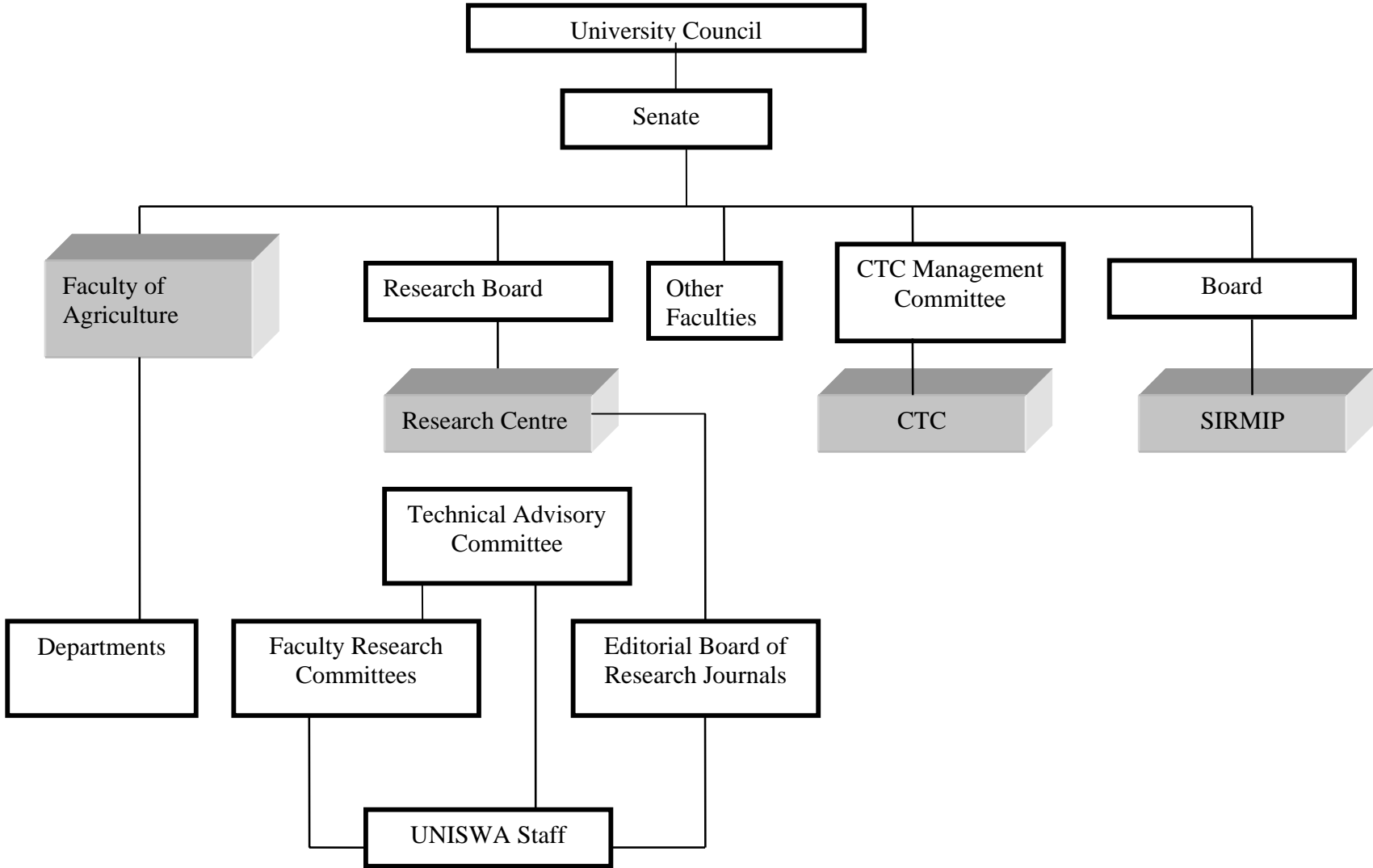
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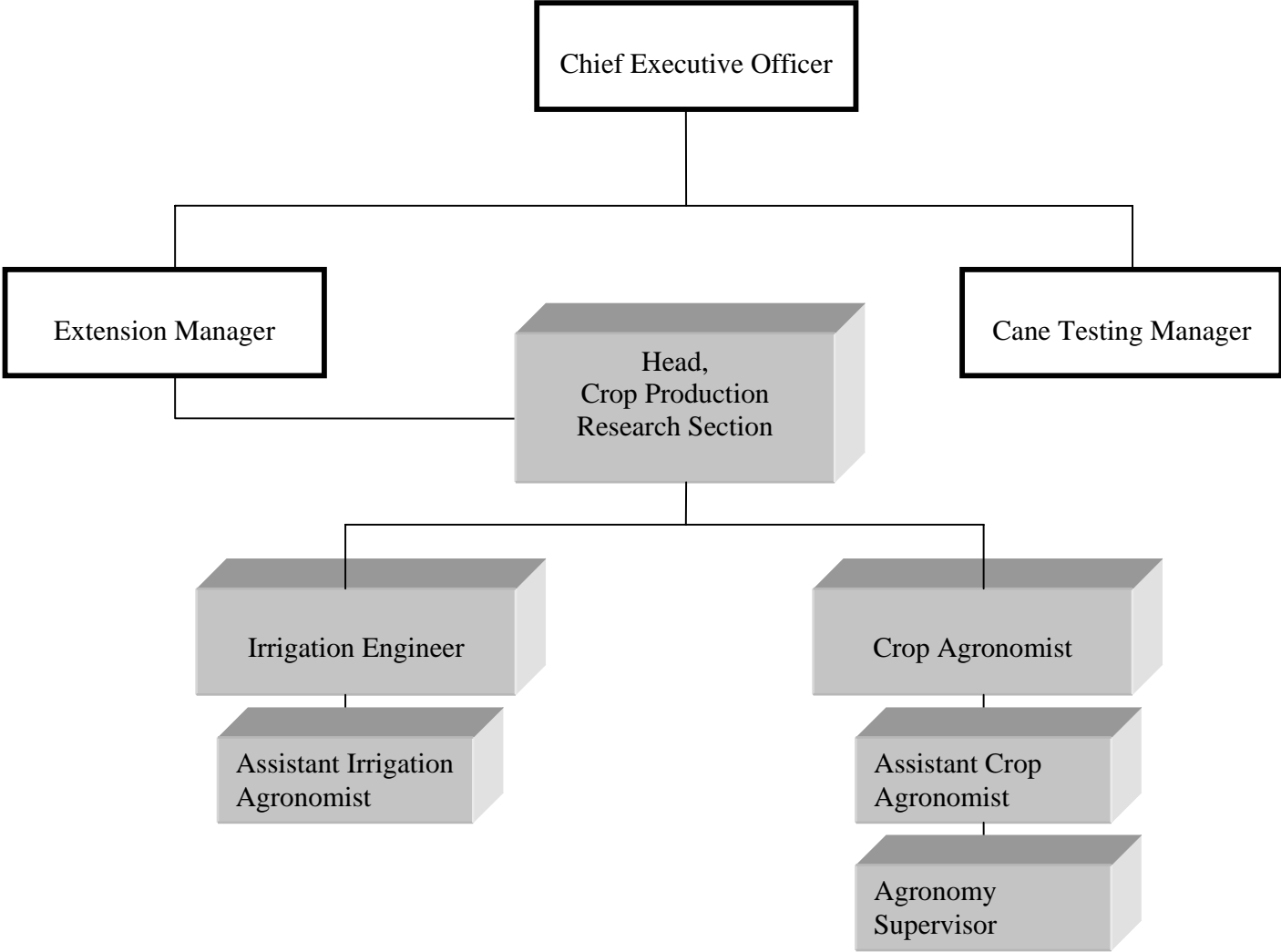
**APPENDIX 1: MINISTRY OF AGRICULTURE & COOPERATIVES - ORGANISATIONAL STRUCTURE OF AGRICULTURAL RESEARCH**



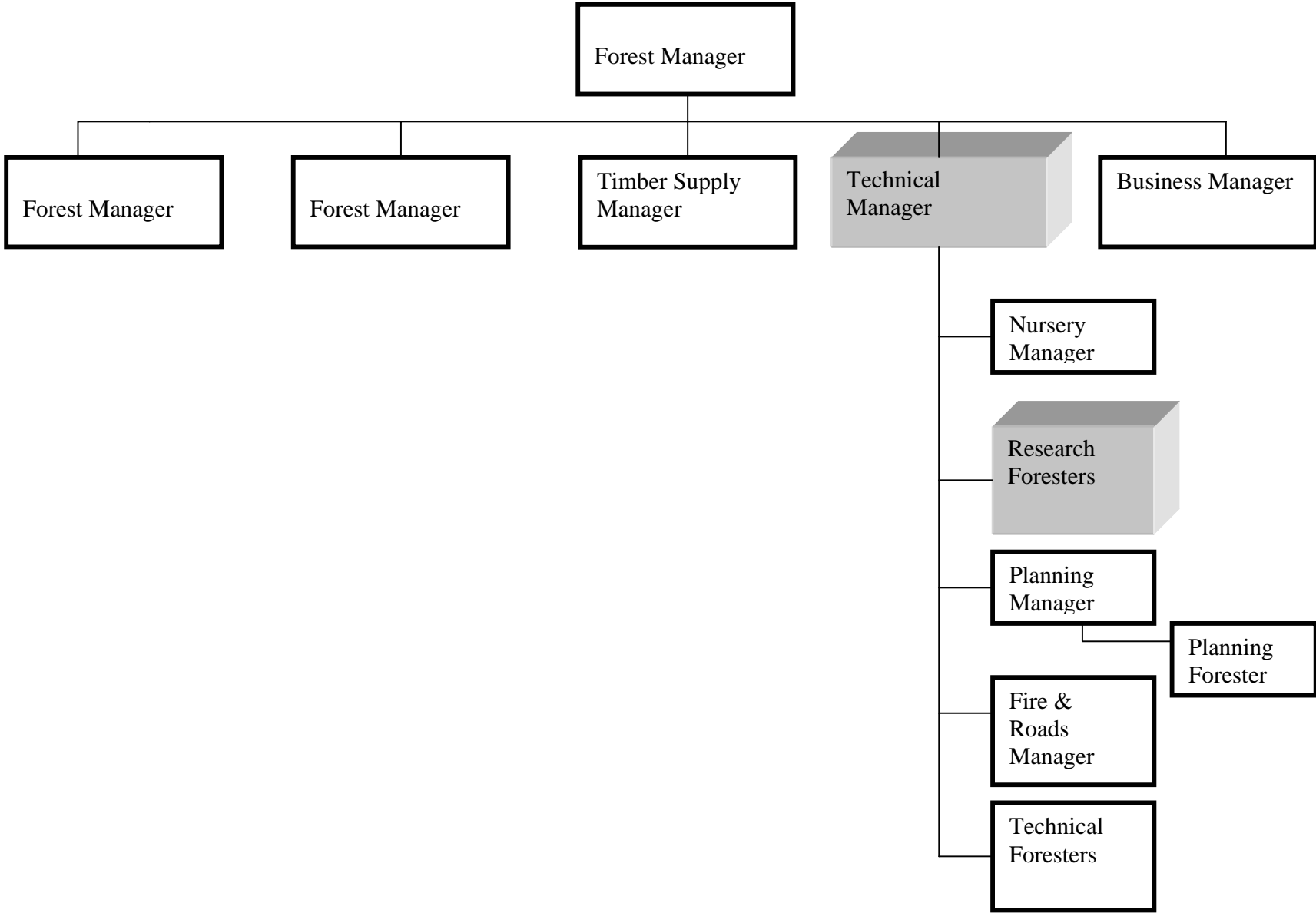
**APPENDIX 2: UNIVERSITY OF SWAZILAND – ORGANISATIONAL STRUCTURE OF AGRICULTURAL RESEARCH**



**APPENDIX 3: SWAZILAND SUGAR ASSOCIATION – ORGANISATIONAL STRUCTURE OF AGRICULTURAL RESEARCH**



**APPENDIX 4: SAPPI USUTHU – ORGANISATIONAL STRUCTURE OF AGRICULTURAL RESEARCH**



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