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# U.S.A.I.D

A PRELIMINARY STUDY OF  
POSSIBLE  
AGRICULTURAL AID PROJECTS  
FOR  
SWAZILAND

APRIL 1985

EAST AFRICAN TECHNICAL SERVICES  
Mbabane Swaziland.

In association with

LOXTON, VENN and ASSOCIATES.

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## 1. SUMMARY

### Chapter 2. INTRODUCTION

- 2.1 The consultants were appointed by U.S.A.I.D. to undertake a rapid preliminary investigation into possible aid projects aimed at promoting the entry of more Swazi smallholders into profitable market orientated agriculture. The terms of reference are quoted and an outline of the method of study is given.

### Chapter 3. AGRICULTURE IN SWAZILAND

- 3.1 The role of agriculture in the economy is briefly reviewed. In 1980 agricultural products accounted for 57% of exports, 39% of paid employment and 33% of GDP. Of the last named about one quarter is attributable to the traditional smallholder sector, which is subsequently described.

### Chapter 4. AGRO-ECOLOGICAL REGIONS

- 4.1 Five main Agro-ecological Regions are identified and defined. These are the Highveld, Middleveld, Cool Middleveld, Lowveld and Lebombo regions.

### Chapter 5. SOILS

- 5.1 The soils of Swaziland have been mapped at a scale of 1:125 000. The wide range of soils is briefly described.

### Chapter 6. BRIEF OUTLINE OF PRODUCTION SYSTEMS

- 6.1 An outline is given of production systems for the more important agricultural enterprises which feature in Swaziland.

### Chapter 7. THE PROCESS OF ENTERPRISE SELECTION

- 7.1 It is noted that the terms of reference for the study accord well with the priorities set by the government in its development policy.

These include the creation of employment opportunities and the boosting of exports. The fact that U.S.A.I.D. will not restrict the period of any assistance given to five years is a favourable factor.

- 7.2 In the search for the best answer to the questions set by U.S.A.I.D. the consultants have endeavoured to follow a logical "screening" process to arrive at a rational end result. Four main sequential screening stages were adopted, namely consideration of (1) enterprise adaptability, (2) enterprise profitability, (3) product "marketability" and (4) a group of other factors including social acceptability, labour intensity, donor and government objectives, and so on. The main weight was placed on market investigations.

#### Chapter 8. CLIMATE AND ENTERPRISE ADAPTABILITY

- 8.1 The adaptability of enterprises is assessed mainly on the basis of temperature regimes. 169 crops and pastures and 20 possible livestock enterprises are evaluated relative to their adaptability to each agro-ecological region and a shortened list of enterprises of initial interest is derived from this first screening.

#### Chapter 9. ENTERPRISE ECONOMICS

- 9.1 Certain enterprises that are not appropriate for techno-economic and other practical reasons are eliminated from the list. For those that remain estimates are provided of gross income, variable production costs and gross margin for typical production units. This enables enterprises to be compared on the basis of profitability, the less profitable ones being eliminated from further consideration. At this stage attention begins to be focused on fruit production and attention is drawn to the fact that the fruit production enterprises are highly profitable and labour intensive.

#### Chapter 10. MARKET OVERVIEW

- 10.1 The chapter starts with an outline of the methods used in the market study and then follows a dissertation on marketing perspectives. A brief summary is provided of the market for individual commodities of interest before each is reviewed in more detail.

## Chapter 11. THE MARKET FOR SELECTED COMMODITIES

- 11.1 Here attention is concentrated on fruit crops and fruit juices and much information is provided on the local, regional and oversea markets for avocado, banana, juice, mango, papaya and pineapple.
- 11.2 There are large export markets for avocado, mango, pineapple and fruit juice. South Africa constitutes a stable market for banana on a modest scale. The export market for papaya is small but expanding.

## Chapter 12 OTHER DETERMINANTS IN PROJECT IDENTIFICATION

- 12.1 Possible aid projects are reviewed in relation to national and U.S.A.I.D. policies, labour intensity, social acceptability, infrastructure and management and institutional factors. None of these considerations eliminates fruit production as the sector of greatest interest. Reasons are given for the negation of certain enterprises including vegetable production.

## Chapter 13 THE PROJECT CONCEPT

- 13.1 It is recapitulated that fruit production is adapted, profitable, labour intensive and socially acceptable and that large export markets are available. The situation in respect of infrastructure is good (including a cannery) and Swazi smallholders have demonstrated that they can achieve high yields of good quality fruit. Less favourable factors are the situations in respect of security of land tenure, high quality standards and availability of water for irrigation but none is seen to be a serious problem.
- 13.2 Some implications of commercial production are reviewed and stress is laid on the need for thorough planning and comprehensive farmer training and servicing.
- 13.3 The recommended project would in essence comprise a central unit - "the hub of the wheel" - which would include a horticultural nursery and a number of Outgrower Production Areas (OPAs). The central unit is designated the Fruit Industry Development Unit (FIDU).

- 13.4 Priority would be given to pineapple, avocado and mango in the Middleveld, the Middleveld and Cool Middleveld and the Lowveld respectively. The FIDU which it is proposed be established in the Malkerns Valley is described. Pineapple production (probably coupled with maize production) would be promoted on Swazi Nation land in terms of standard units and standard packages of input and output services, and on settlement schemes. Avocado and mango production would be promoted in appropriate S.N.L. areas mainly on rainfed basins but also under irrigation where possible. In this regard the development and exploitation of a wide scatter of small, low cost water resources is envisaged (e.g. small earth dams). At a later date more perishable crops such as papaya, banana and strawberry could feature in the project.
- 13.5 The project would almost certainly stimulate fruit production for export on a large scale by a number of estates.
- 13.6 The first phase objective is seen to be the development of nuclei of successful fruit producing communities : the long term objective should be to make fruit production for export a major national industry.

#### Chapter 14. INSTITUTIONAL AND MANAGEMENT FACTORS

- 14.1 The project as envisaged would involve co-operation between various institutions including U.S.A.I.D., the Ministry of Agriculture, Tibiyo, the Development and Savings Bank, Swaziland Cannery, and the producers. The role of each of these is outlined. A joint venture private company established for the purpose by Tibiyo (FRUITCOR) is proposed as the main executive authority. There would be a commitment to plough profits back into the project.

#### Chapter 15. FURTHER ACTION

- 15.1 Some aspects of proposed further action are outlined. In the first instance approval in principle by U.S.A.I.D. and by the government would be needed, after which the preparation of a detailed, pre-design Development Plan should, it is proposed, be put in hand.

Chapter 16. CONCLUSION

- 16.1 The consultants are confident that the project as conceived could be highly successful, that it could benefit large numbers of "small" people and eventually become a major contributor to the economy. Because of the advantage of sunk costs a highly favourable economic I.R.R. is anticipated.

## 2. INTRODUCTION

### 2.1 BACKGROUND

- 2.1.1 The consultants were appointed by the U.S.A.I.D. mission in Swaziland to undertake a rapid investigation designed to identify on a preliminary basis one or more agricultural aid projects that would promote the entry of more Swazi smallholders into the market economy.
- 2.1.2 A member of the consultants' team at one time headed the government agricultural services in Swaziland, when he was responsible for many new developments, and the team therefore operated with the advantage of in-depth knowledge of the country and its people.

### 2.2 TERMS OF REFERENCE

- 2.2.1 The approved technical terms of reference are:

#### "Description of Services:

1. The consultant will carry out a preliminary study and rapid appraisal of markets to assist in determining the feasibility of mounting one or more viable agricultural production and marketing programs or projects in Swaziland that would stimulate increased production and promote a more commercial orientation for small scale farmers on a sustained basis. The study should focus on the development of profitable market oriented enterprises that could be implemented by Swazi smallholders on an organised and coordinated basis and that would be durable.

2. The consultant will prepare a report that will embrace the following aspects :

2.1. For the small scale Swazi farmer where and what are potential market opportunities (in Swaziland, Republic of South Africa and elsewhere) for commodities that can be produced in Swaziland at a profit?

2.2. What are the requirements and features of those

markets, particularly seasons, quality, packaging, quantity, prices, health and competition for those markets?

2.3. Who are the main competitors in those markets?

2.4. A preliminary comparative appraisal of the enterprises for the production of marketable agricultural products by small scale Swazi farmers. This appraisal will include an assessment of the economics of production including labor capital inputs, managerial skills, transport requirements, and processing potentials as well as an assessment of Swazi ability to penetrate those markets.

2.5. An assessment of the current marketing systems for agricultural products in Swaziland.

2.6. Identification of the main constraints to the attainment of the objectives, as well as the more important favourable factors.

2.7. An outline of shortlisted and favoured concepts in respect to programs or projects for the involvement of small scale Swazi farmers in lucrative market oriented agriculture.

2.8. Recommendations of the main issues to be addressed and the main matters requiring further identification in the event of U.S.A.I.D. deciding to pursue the concepts outlined in the report.

3. A maximum of ten weeks as from February 4, 1985, is allowed for the study. This imposes a marked time constraint on the study; USAID/Swaziland and the consultant recognise that under these circumstances only a preliminary broad set of results can be provided.

4. The consultant will submit monthly progress reports and meet formally with USAID/Swaziland officials in the USAID/Swaziland offices every four weeks throughout the course of the study to review progress and discuss concepts. A final meeting, after the tenth week, will be held in the USAID/Swaziland offices, at which time the consultant will present the final report."

## 2.3 METHOD

2.3.1 The consultants deployed a 6 person team on the assignment, being specialists in:

- (1) Development planning
- (2) Soils
- (3) Crop production
- (4) Livestock production
- (5) Market surveys
- (6) Production economics

2.3.2 The main thrust of the study was on enterprise adaptability, profitability and product "marketability" and time inputs were allocated accordingly.

2.3.3 The study was started with familiarisation visits to all regions. Thereafter contact was made with various government ministries and other institutions and individuals in search of information and statistics.

2.3.4 Some 60 enquiries were sent overseas for data relating to market potential and visits were made to agricultural organisations in South Africa involved in the marketing of produce of relevance to the study.

2.3.5 Then followed desk studies of enterprise adaptability, production economics, marketing systems, etc, leading to preparation of this preliminary report.

2.3.6 The consultants had two report-back meetings with the U.S.A.I.D. mission in Mbabane, when progress was reported

and clarification of certain policy issues was sought. A third meeting is scheduled to consider this report in its draft form.

2.3.7 It must be emphasised that this is a preliminary study carried out over a short period. The consultants are satisfied that the main conclusions are sound but more investigative and design work would clearly be necessary to translate the concepts outlined here into an implementable project of assured success potential.

## 2.4 ACKNOWLEDGEMENTS

2.4.1 Helpful advice and assistance was received from many government officials, particularly in the Ministry of Agriculture and Co-operatives and the Office of the Prime Minister. In this regard special mention must be made of helpful technical level discussions with Messrs. Victor Pungwayo (Director of Agriculture), Jack Mbirgo (Commissioner of Co-operatives) and Miss Dlamini (Director of Planning and Research). The consultants also drew freely on a large number of reports made available to them.

2.4.2 In the U.S.A.I.D. mission the study was co-ordinated by Mr Paul Daly, Agricultural Development Officer. In the course of review meetings clarification on objectives and some directives were provided by the Mission Director, Mr Robert Huessman. Other officials who participated in useful exchanges of views were Messrs. Harold Johnson, Deputy Director; Scott Smith, Project Design Officer; William Hammink, Economist, Assistant Program Officer; and Neil Cohen, Economist.

## 2.5 ABBREVIATIONS

C.U.	Central Unit
E.	Emalangeni
E.E.C.	European Economic Community
ha	Hectare
I.R.R.	Internal rate of return

I.T.L.	Individual Tenure Land
kg	Kilogram
M.O.A.C.	Ministry of Agriculture and Co-operatives
O.P.A.	Outgrower Production Area
R	Rand
R.D.A.	Rural Development Area
R.S.A.	Republic of South Africa
S.D.B.	Swaziland Dairy Board
S.D. & S.B.	Swaziland Developent and Savings Bank
S.N.L.	Swazi Nation Land
Swazican	Swaziland Cannerns (Pty) Ltd
Tibiyo	Tibiyo Taka Ngwane
U.S.A.I.D.	United States Agency for International Development

### 3. AGRICULTURE IN SWAZILAND

#### 3.1 INTRODUCTION

3.1.1 Swaziland is an extremely well documented country and this is also the case with the agricultural industry, which comprises two main components, viz:

- (a) the modern, more capital intensive sector based on large commercial production units, mainly in the hands of expatriates, and
- (b) the traditional Swazi sector based on small scale crop holdings and communal grazing areas. This sector is largely orientated towards satisfaction of subsistence requirements, the largest part of homestead income being derived from wage earning.

This study is concerned with the latter sector.

3.1.2 In view of the amount of information available on the agricultural sector, this chapter is confined to a brief review. For the reader interested in more detail the documents listed in Appendix 31 on which the consultants have freely drawn provide much information.

#### 3.2 AGRICULTURE IN THE ECONOMY

3.2.1 In 1980 agricultural products accounted for 57% of exports, 39% of paid employment and 33% of GDP. More than half (53%) of the agricultural contribution to GDP was derived from modern estate agriculture on Individual Tenure (I.T.L.) and 26% from agro-industries. The contribution of farm production on Swazi Nation Land (S.N.L.) was a modest 21%. Similar analytical data are not available for 1984 but the situation then was probably not markedly different from that in 1980.

- 3.2.2. The major enterprises on I.T.L. are the production of sugar, citrus, pineapple, cotton and beef. Maize is the dominant crop on SKL but cotton is important in the Lowveld. Other grain crops such as sorghum and bean are produced on a small scale by both ITL farmers and Swazi smallholders. A limited number of Swazi smallholders are involved in the production of sugarcane and pineapples (on managed settlement schemes) and of air cured tobacco in the south. Milk is produced mainly on a few farms owned by the national development body Tibiyo Take Ngwane (Tibiyo), the Dairy Board and by individual expatriates and Swazi. Vegetables and related crops such as potato are produced by both ITL farmers and Swazi smallholders.
- 3.2.3. Sugar is the most important agricultural commodity, produced in Swaziland. Production in 1984/85 from three mills amounted to 402 000 tonnes, mostly exported. The citrus industry has suffered from the effects of drought and a cyclone in recent years and production has declined somewhat from a peak of 66 000 tonnes in 1980/81 to 48 000 tonnes in 1983/84. Most of the crop is exported overseas. The small pineapple industry in the Malkerns valley produced 44 000 tonnes in 1983/84 all of which was canned for export markets. Cotton growing has been badly affected by exceptional droughts and production has shown a downward trend from a peak of 25 000 tonnes in 1980/81 to 18 000 tonnes in 1983/84. Maize production is also markedly dependent on seasonal rainfall and is estimated to range from about 120 000 tonnes in seasons of good rainfall (e.g. 1983/84) to half that amount in the very dry seasons such as 1982/83.
- 3.2.4 Livestock production (dominantly beef cattle) is important to the economy accounting for about 26% of agricultural output and 6% of GDP. The national cattle herd comprises about 614 000 head of which about 500 000 are on SNL where the production system is based on communal grazing land and where cattle also play an important social role. There are some 330 000 sheep and goats

- 3.2.5 Swaziland is self sufficient in meat and sugar, but is dependent on supplementary imports from South Africa of maize, wheat (total dependence) milk, fruit and vegetables.
- 3.2.6 Agro-industrial plants comprise three sugar mills, an abattoir plus meat freezing and canning unit, a pineapple cannery, two cotton ginneries (one of which has closed as a result of drought) and several citrus packhouses. A dairy factory is operated by the Dairy Board.
- 3.2.7 Government recurrent expenditure on agricultural services amounts to 8,6% of a national recurrent budget of E157 million and 11,8% of a national capital budget of E80 million. The capital expenditure figure represents a marked reduction in the allocation to agriculture, mainly as a result of reduced infrastructure development in the rural areas in recent years.
- 3.2.8 Official economic forecasts for the next five years based on current trends paint a somewhat gloomy picture *inter alia* featuring a population growth of 3,4% p.a. and a fall in real incomes of 2,6%; a government recurrent deficit of around E15 million p.a.; an increase in imports of 1,1% p.a. and of exports of 0,3% p.a. and hence a growing trade deficit. Growth in employment is estimated at 3 000 positions per annum and compared with a growth in the labour force of 8 500 persons per year making for an increase in unemployment of 5 500 persons per annum.
- 3.2.9 The main potential for significant contributions to the economy by agriculture are seen by the Department of Planning to lie in irrigation agriculture in the Usutu and Komati basins and in boosting dryland crop yields in the Rural Development Areas which comprise about half of SNL. At present some 40 000 ha are under irrigation, 91% is on ITL.

3.2.10 Clearly the emphasis in development planning for the agricultural section must be on employment creation and boosting of export revenues.

### 3.3. THE TRADITIONAL SWAZI AGRICULTURAL SECTOR

3.3.1 The main source of services for this sector are :

- a) The Ministry of Agriculture and Co-operatives (MOAC) which with its agricultural, veterinary, co-operative and planning and research divisions provides a comprehensive range of research, advisory, conservation and regulatory services.
- b) The Swaziland Development and Savings Bank is the main source of credit for smallholders.
- c) Tertiary education and training is provided by the University of Swaziland which has a Faculty of Agriculture near Malkerns.
- d) A two-tiered co-operative movement centered on the Central Co-operative Union and primary societies plays a role in the provision of farm inputs and in marketing.
- e) Parastatal boards with regulatory and service functions comprise those for cotton, citrus, dairy products, natural resources and electricity. The Swaziland Sugar Association handles the affairs of the sugar industry.
- f) The private commercial sector is substantially involved in trade in agricultural machinery, requisites and commodities.

3.3.2 Most production requisites come from South Africa, but there has been good progress in the local production of improved cotton and maize seeds. A local fertilizer industry failed and the factory in question is currently in mothballs.

3.3.3 Inadequate marketing arrangements are seen by the Ministry

of Agriculture and Co-operation to be a major constraint to the boosting of production by Swazi smallholders of grain crops, fruit and vegetables and action is currently in hand to establish a National Agricultural Marketing Board with facilities for improving the marketing of fresh produce.

- 3.3.4 The land tenure system on S.N.L. is traditional and informal. Ownership of all S.N.L. is vested in the King in trust for the Swazi people. Individual arable holdings are allocated by the chiefs under Swazi law and custom. Swazi Nation farm land is not negotiable and it cannot be encumbered as security for loans. According to Swazi customary law a chief could dispossess a farmer of his arable holding but this happens very rarely in practice. In practice therefore tenure over arable land is secure. All areas set aside for grazing are exploited communally. Stocking rates are commonly excessive with the result that very serious degradation of the natural resource base is taking place, a problem typical of the traditional pastoral sector in Africa.
- 3.3.5 The homesteads of rural Swazi smallholders are commonly scattered through the landscape and rarely are they aggregated in villages. This complicates the provision of potable water supplies and social services.
- 3.3.6 The road network has influenced the pattern of rural habitation and a ribbon pattern associated with roads is widespread. In hilly terrain there is commonly a ribbon of settlement along the slope break between the steeper and flatter land. The former will usually be used for grazing whilst the arable fields will lie below the homesteads on the less steep land. It is quite common for a smallholder to "own" several dispersed fields. thus he may have one near the homestead, one some way away and a third in a river valley.
- 3.3.7 The dominant smallholder crops are maize and cotton. The former is produced throughout the country. Cotton production takes place mainly in the hotter, drier areas.

Air cured tobacco is an important smallholder cash crop in the south around Nhlngano. Vegetables are produced on a small scale mainly under irrigation. It is common practice for smallholders to establish a few fruit trees near the homestead for domestic use and for sale locally. In the highveld, clingstone peaches are the main fruit. In the middleveld, banana, avocado, mango and guava are common in frost free areas. Fruit trees are less common in the lowveld, probably because of the aridity of the climate in that region. Smallholders are involved in the intensive production of sugar cane on organised settlement schemes in the lowveld and of pineapple on a project at Malkerns.

- 3.3.8 Most crop production on S.N.L. is under rain-fed conditions but S.N.L. includes about 300 small irrigation schemes with a total area of 2 400 ha. The larger of these were developed by the MOAC for use by Swazi smallholders.
- 3.3.9 With regard to productivity, and ignoring the very serious effects of three years of drought, it would appear that there has been good progress during the last two decades in the conversion of smallholder annual crop production from low input "scratching" mainly for subsistence to the adoption of modern production techniques such as use of improved seed, planting in rows, use of fertilizers and insecticides, etc. In the case of cotton there has been a significant improvement in yields and total production on S.N.L. but for maize it would seem that whilst yields have been boosted substantially this has been offset by a reduction in the area cultivated by individuals. The phenomenon is attributed by the MOAC to marketing problems. It is considered that the smallholder produces only for domestic needs plus a small surplus which he is assured of marketing locally. Official control over the importation of fresh vegetables has boosted vegetable production by smallholders but inadequacies in marketing systems remains a serious constraint.

3.3.10 The majority of livestock in Swaziland are owned by Swazis. Livestock play an important role in the social system and generally more importance is attached to numbers rather than quality or productivity. The percentage outturn for the market is therefore low.

#### 4. AGRO-ECOLOGICAL REGIONS

##### 4.1 INTRODUCTION

4.1.1 In broad terms Swaziland can be divided into five main agro-ecological regions, viz. (from West to East) Highveld, Cool Middleveld, Middleveld, Lowveld and the Lebombo region (Figure 4.1.1). Within each of these regions the range in edaphic conditions, slopes, aspects and therefore evapotranspiration, humidity and effective rainfall is such that a considerable degree of overlapping occurs. Species which are typically adapted to, say, Lowveld conditions can thus extend into the Middleveld and even the Cool Middleveld by way of sheltered valley sites. Conversely species from more humid regions can be and are planted in the lower drier regions.

4.1.2 As is customary in agro-ecological discussions deficiencies in rainfall are presumed to be rectified by irrigation. Crop adaptability of agro-ecological regions revolves largely around temperature considerations.

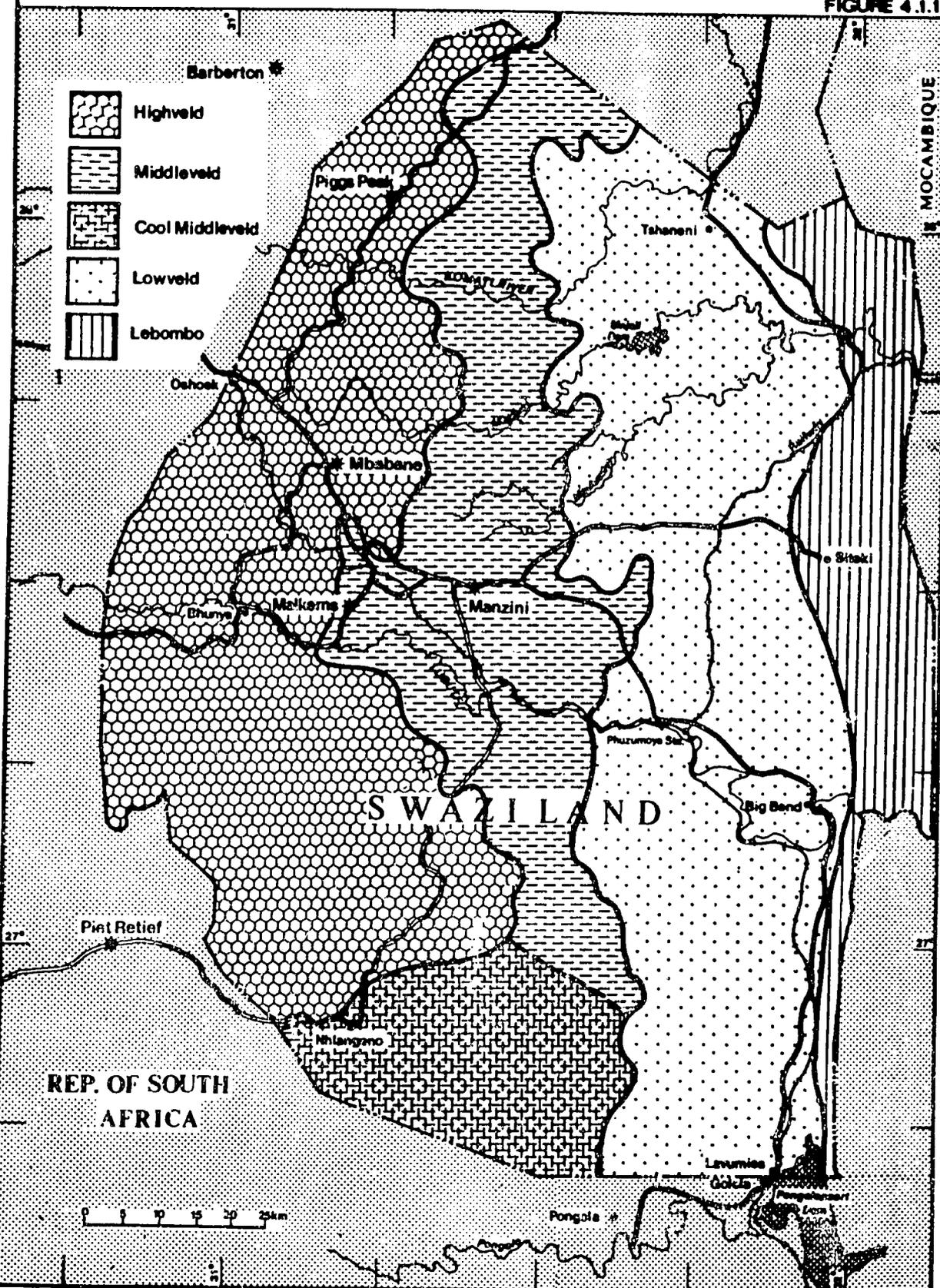
##### 4.2 HIGHVELD

4.2.1 The Swaziland Highveld occupies the most elevated parts of the country from about 1 100 metres a.m.s.l. to over 1 600 m. It is situated mainly along the western border with R.S.A. In a southern African regional context, it is situated on the dissected eastern edge of the Highveld, and therefore, unlike the R.S.A. Highveld which generally flat to gently undulating, the Swaziland Highveld is largely rolling to hilly. Mbabane is taken as representative of the Highveld.

4.2.2 Mbabane's temperature regime, is not very different from that of the Cool Middleveld, other than the higher incidence of frost. Parts of Swaziland Highveld are colder than Mbabane and may even approach similar conditions to Ermelo in R.S.A. with a mean daily maximum of 22°C and mean daily minimum of 27°C. Here winter temperatures are cold enough to satisfy the requirements of some deciduous tree species, eg. peach and plum.

# AGRO-ECOLOGICAL REGIONS

FIGURE 4.1.1



- 4.2.3 The highest rainfall areas in Swaziland are in the Highveld. Rainfall ranges from about 1 000 mm in the south to over 15 000 mm in the north-west. During the rain season there is an excess of rainfall over potential evapotranspiration on much of the Highveld. Where soil depth is adequate, rainfall is sufficient to support evergreen plant species.
- 4.2.4 The Highveld in Swaziland offers more opportunity for the production of cool-loving subtropical species than the Highveld of adjacent R.S.A. which, in general, has more severe winters. Mbabane does not receive frost every year and receives an average of only 2 to 3 days of frost per year. Avocados can take these conditions, indeed a successful avocado industry in Swaziland would extend its export season by growing a portion of the crop on suitable sites in the Highveld.

#### 4.3 MIDDLEVELD

- 4.3.1 The Middleveld, occupying the northern foothills of the escarpment, lies largely between about 500 metres a.m.s.l. and 1 100 metres. Both the mean elevation and the more elevated parts of the Middleveld are lower lying than the Cool Middleveld. Landform is largely rolling to hilly.
- 4.3.2 Malkerns, taken as representative of the Middleveld, offers a very wide range of micro-climatic conditions due to the nature of the terrain. Conditions from hot summers and frost-free winters to relatively cool summers and cold winters can be found in the Middleveld. Generalised climatic figures and even figures from nearby stations can be very misleading in such terrain. Care must be taken in matching crop to site.
- 4.3.3 Rainfall ranges from 800mm to 1 100mm. While there is generally an excess of rainfall over evapotranspiration during the rain season, it is only in cooler sites and where edaphic conditions are highly favourable that evergreen species are adapted.

- 4.3.4 The wide range of site types in the Middleveld allows a wide range of species to be grown. In the warm lower Middleveld pecan nuts would do well in valleys subject to frost. Out of the frost zone, coffee, tea, guava, avocado and granadilla, are adapted. Details are given in Chapter 8.
- 4.3.5 In the upper Middleveld a number of subtropical species produce well including avocado, granadilla and guava. The cooler temperatures allow the cool-loving citrus species such as navels and mandarins to colour.

#### 4.4 COOL MIDDLEVELD

- 4.4.1 The Cool Middleveld occupies the southern foothills of the escarpment largely between 1 000 metres a.m.s.l. and 1 300 metres. In terms of elevation there is some overlapping with the Highveld. In climatic terms it is however warmer than the Highveld. Nhlngano is representative of the Cool Middleveld. Terrain varies from gently undulating to rolling or hilly.
- 4.4.2 There is a distinct frost hazard in the lower lying valleys especially in the western areas. Rainfall ranges from 800 mm to over 1 000 mm with the larger areas enjoying over 900 mm. Although there is a slightly more favourable water balance of rainfall over evapotranspiration to be expected than in the Middleveld, it is also only during the rain season that an excess of rainfall over potential evapotranspiration occurs.
- 4.4.3 The wide range of sites in the Cool Middleveld, like the Middleveld, allows a wide range of species to be grown. As in the Middleveld, care must be taken in matching crop to site. A number of subtropical species produce well including avocado, granadilla and guava while cool-loving citrus species such as navels and mandarins colour well.

#### 4.5 LOWVELD

- 4.5.1 The Lowveld occupies a broad fairly flat to gently undulating plain between the Lebombo range to the east and the Middleveld. Elevation ranges from below 150 m in the southern Usutu valley to about 500 m at the western boundary with the Middleveld. Most of the Lowveld lies below 300 metres a.m.s.l.
- 4.5.2 Rainfall is generally in the range 500 to 750 mm. Class "A" pan evaporation is of the order 2 000 mm annually and temperatures are high. Frost is unknown in much of the area. Subtropical species which do not demand humid conditions such as papaya, mango and sugarcane are well adapted as are the heat-loving citrus species such as limes, grapefruit and Valencia orange. The climate is not hot enough for tropical species such as cashew and coconut and the humidity is somewhat low for commercial banana production.

#### 4.6 THE LEBOMBO

- 4.6.1 The Lebombo mountain range occurs at the western border of Swaziland with Mocambique. It consists of a roughly N-S oriented mountain range emerging at about 200 metres a.m.s.l. from the Lowveld plains to form a minor plateau between 500 m and 700 m. The western (rain shadow) slopes tend to be steeper than the eastern slopes.
- 4.6.2 Siteki with a mean annual rainfall of almost 850 mm is representative of the Lebombo area. Frost is virtually unknown. The mean diurnal range in temperature is lower than elsewhere in Swaziland and comparable with the coastal regions of southern Africa. The period during which rainfall exceeds potential evapotranspiration is more extended than in the Lowveld and it is thus possible to produce annual rainfed crops during the rain season. Production of most perennial crops would require irrigation.

4.6.3 The cooler temperature regime of the Lebombo, and the slightly more humid conditions would allow production of such subtropical species as avocado, coffee arabica, macadamia nut and pineapple which prefer a cooler subtropical climate.

#### 4.7 CONCLUSION

4.7.1 While in broad terms Swaziland's agro-ecological regions are fairly well understood and definable, there is considerable local variation, particularly in the Middleveld. It is essential that detailed on-site ecological studies be undertaken to confirm crop adaptability for each selected site.

4.7.2 The range in climatic conditions in Swaziland allows the production of a range of perennials from cool loving temperate species to hot loving subtropical species as well as a range of annuals from temperate crops to subtropical crops.

4.7.3 Swaziland enjoys a longer rain season than most of the summer rainfall areas of southern Africa. Even in the Lowveld there are only four months with less than 25 mm. This can be significant in extending the adaptability of some crops under rainfed conditions eg. avocado but can limit the adaptability of other crops eg. export mango will require spraying to control rain induced fruit diseases.

## 5. SOILS

### 5.1 INTRODUCTION

- 5.1.1 The soils of Swaziland have been mapped at a scale of 1:125 000 which would allow for project identification in broad terms. Detailed soil studies would form a necessary part of any project feasibility/design work.
- 5.1.2 The range in geological materials from acid igneous to basic/ultra-basic igneous rocks, the range in age of land surfaces from African (Early Tertiary) to Recent as well as the climatic range from cool humid to hot subarid has produced a wide range of soils in terms of degree of weathering.
- 5.1.3 Broadly, the distribution of the soils tends to follow the distribution of Agro-ecological regions. Thus on the Highveld the soils are most weathered, in the Middleveld and on the Lebombo weathering is intermediate while in the Lowveld relatively "youthful" soils such as Vertisols and Alfisols are common.

### 5.2 HIGHVELD SOILS

- 5.2.1 The soil parent materials in the Highveld, while largely granitic, include some basic intrusive rocks as well as metamorphosed sediments. On the relict Early Tertiary landsurfaces, soils have developed in the preweathered products of these rocks - often both deeply and highly weathered - either *in situ* or in zones of subsequent colluvial redeposition as well as from recent weathering products where the African surface has been truncated.
- 5.2.2 While the modal Highveld soil is an apedal, microaggregate, variable charge, ferrallitic or fersiallitic red (Oxisol or Ultisol) large areas are rocky or boulder strewn. Lithosols occupy a smaller area in the Highveld than in the other regions.

5.2.3 In places organic matter has accumulated to a degree which is abnormal for the sub-tropics and in places plinthite is in active formation.

5.2.4 Highveld soils are typically acid and have a very low inherent fertility status. Multiple nutrient deficiencies are common. Aluminium toxicity is common on the most highly weathered soils. Phosphate fixation is a prominent feature.

### 5.3 MIDDLEVELD SOILS (Middleveld and Cool Middleveld)

5.3.1 Soil Parent materials in the Middleveld are comparable with those of the Highveld with the exception that there are fewer relicts of the Tertiary preweathered surface products. These have been largely removed from the landscape but have accumulated, in places, on colluvial slopes.

5.3.2 The modal Middleveld soil is a red, weakly structured to non apedal, fersiallitic (Ultisol or Alfisol) soil. Lithnols occupy a larger proportion of the landscape than in the Highveld. Textural differentiation within the profile is more marked in the Middleveld than in the Highveld and, especially in the lower lying, drier areas, Aridisols are common. Aridisols are uncommon in the coal Middleveld.

5.3.3 The more highly weathered Middleveld soils (e.g. at Malkerns) like the Highveld soils are very acid and suffer from multiple nutrient deficiencies. In the drier areas inherent fertility status is usually higher, no aluminium toxicity occurs, phosphate levels are low but phosphate fixation is not the problem it is in the more highly weathered soils.

### 5.4 LOWVELD SOILS

5.4.1 The Lowveld can be fairly clearly differentiated on the basis of soils and geology into the Western parts dominated by Karoo System sediments with associated dolerite intrusions and the Eastern Lowveld dominated by basalts.

5.4.2 The Western half of the Lowveld is dominated by Lithosols with the deeper soil areas mainly comprising soils with a marked textural differentiation (variously called Solonetz, Solod, Planosols, Alfisols or Aridisols). These are generally grey sandy soils with a clay subsoil.

5.4.3 Reddish brown, heavy textured, structured, fersiallitic, soils (Luvisols, Alfisols, possibly Mollisols and Castanozems) and black Vertisols are the dominant soils of the Eastern half of the Lowveld on basalt although Lithosols occupy about 33% of the area.

5.4.4 The Lowveld soils are inherently the most fertile soils in Swaziland but the ubiquitous phosphate deficiency is also widespread there.

## 5.5 THE LEBOMBO SOILS

5.5.1 While the Lebombo region is largely covered by rock and lithosols, significant enclaves of red structured and weakly structured fersiallitic soils and, in places, red ferralitic soils occur. While the area which is physically arable is often limited by surface rock, the depth of weathering and colluviation allows for deep rooting.

5.5.2 Soil fertility in these soils is variable depending on the degree of weathering. In general fertility is comparable with that of the less weathered Middleveld soils although there is a component of highly weathered acid soils on the oldest relict surfaces. Phosphate status is generally low.

## 5.6 SOILS WITH DEVELOPMENT POTENTIAL & DETAILED SOIL MAPPING

5.6.1 Within each of the regions the soils which offer the best potential for the development of the widest variety of agricultural enterprises are to be found on the older land surfaces. On the Highveld the best potential for development is on the Oxisol/Ultisol soils on preweathered materials. In the Middleveld the Ultisols on colluvia derived from the preweathered Tertiary surfaces offer the best potential while

in the Lowveld the best potential is on the structured red fersiallitic soils in the Lowveld river cut plains. The areas in the Lebombo best suited to development are largely situated on an old surface forming a dissected plateau on the summit of the otherwise rocky range.

- 5.6.2 Considerable agronomic and horticultural experience, in the Southern African context, could be drawn upon if detailed soils mapping were to make use of the South African Binomial Soil Classification System. Correlation with the Swaziland system of Series and Sets as well as the F A O and U S D A systems could be achieved at the same time. The Binomial Classification System of South Africa leans heavily towards field proven land use capability aspects and differentiation is biased by agro-ecological and crop performance considerations.

## 6. BRIEF OUTLINE OF PRODUCTION SYSTEMS

This over-simplified section is written mainly for the non-agriculturalist - perhaps in the U.S.A. - who does not know Swaziland.

### 6.1 AVOCADO:

6.1.1 Most avocado trees in Swaziland are seedling (not grafted) trees grown near homesteads for local consumption and sale. There are very few commercial orchards. Under commercial conditions grafted material must be used and great care must be exercised to ensure that planting material and orchard sites are free of Phytophthora the causal organism of rootrot, which constitutes the main production problem. The tree is frost sensitive.

6.1.2 A range of cultivars is usually planted to extend the harvesting season the timing and duration of which will vary with cultivars and climate from March to December. The most important commercial cultivars are Fuerte and Hass. Tree population also varies with cultivar and is commonly in the range 400 trees/ha at establishment thinned to 50-60 trees/ha at maturity. Pruning is not practised. Yield curves vary but production commonly starts in the third year and peaks in the ninth year at around 100/kg tree. The life span should be 15 - 20 years.

### 6.2 BANANA:

6.2.1 There are few small commercial banana orchards in Swaziland, mostly in protected valleys in the south, but many rural households have a few trees near the homestead. The crop does best in frost free areas of high humidity and with a low wind incidence. Irrigation is essential. The main commercial cultivars are Dwarf Cavendish and the newer Williams. Propagation is by means of suckers planted in mid-season and a typical plant population would be 1500 trees/ha.

6.2.2 Polythene bunch covers are normally used to reduce cold damage and skin blemishes and to accelerate bunch

development. A 10 year cycle is normally adopted, the first yield being obtained at 18 months. A good average yield would be 20t/ha. A commercial orchard is harvested throughout the year. The main production problem is eelworm.

### 6.3 BEANS:

6.3.1 Beans are grown mainly by Swazi smallholders as a subordinate food or cash crop. Bush beans are dominant, the Speckled Sugar being the most popular cultivar. Planting takes place between September and January and the crop takes from 110 to 140 days to mature, depending on cultivar. Yields are usually low - probably averaging around 400 kg/ha although yields of up to 1200 kg/ha and more are attainable. Beans can also be grown under irrigation in frost-free Lowveld areas in winter. Most of Swaziland is too warm or too wet for high yields of dry beans but there is good potential for seed production in the Lowveld in winter.

### 6.4 CITRUS:

6.4.1 Citrus is grown almost exclusively as an estate crop under irrigation in the Lowveld. Oranges and grapefruit are dominant. Between 60% and 70% of the 50 000 tonne crop is exported overseas. Some 18 000 tonnes are processed locally and the balance is sold in South Africa and locally as fresh fruit. Citrus is not regarded as a crop suitable for smallholders except on a managed settlement scheme.

6.4.2 Probably the main problems in citrus production are root diseases and insect pests necessitating efficient irrigation and sophisticated pest control measures. The harvest season begins with Navel in April and extends to September when the Valencia crop is harvested. Yields are in the range 25 to 35 tonnes/ha from mature orchards carrying 250 trees/ha.

### 6.5 COTTON:

6.5.1 Medium staple cotton is produced in the Middleveld and Lowveld on SNL and ITF as a raingrown crop and under irrigation. The crop is planted in rows (90cm typically). The rain-fed Lowveld crop is mostly managed on a low input - low output basis with minimum spraying but in the areas of better

rainfall and under irrigation intensive pest control spraying programmes are normally necessary. Yields vary from 400 - 500 kg/ha (rain-fed; Lowveld) to 1 500 kg/ha and more in the better watered Middleveld. Under irrigation an average yield of 2 500 kg/ha is attainable. In recent years the highly leached fersiallitic soils of the Middleveld have produced good cotton crops when limed and adequately fertilized.

6.5.2 Cotton production is a long established industry in Swaziland and it is the most important cash crop on SNL. It is well supported by research and seed production services but the need for new improved cultivars is beginning to be felt. The dominant production problems are those posed by insect pests. National production of seed cotton is usually in the range 18 000 - 20 000 tonnes p.a. depending on seasonal rainfall.

6.6 EGGS:

6.6.1 Most eggs that enter the market in Swaziland are produced by orthodox commercial units. Any organized egg production scheme for smallholders should, in the opinion of the consultants, be based on serviced 500 bird units making use of batteries for health reasons. Well proven working models are available elsewhere.

6.7 GUAVA:

6.7.1 There are few commercial guava orchards in Swaziland but self sown seedling trees are ubiquitous in frost free areas and in some places form a "jungle". The seeds are spread mainly in the faeces of man and birds. Guavas grow and yield extremely well in Swaziland.

6.7.2 Commercial orchards are normally irrigated. Populations are in the range 300 400 trees/ha. Propagation is by air layering or root cutting. A good average yield would be 40t/ha, the first harvest being taken in the third year. The economic life span is typically 40 years. The crop is very tolerant of soil conditions but responds well to irrigation and good management. The dominant problem is fruit fly, which can be controlled by a combination of spring pruning and spraying resulting in a winter harvest season from May to

July. The only commercial variety in Southern Africa is Faan Retief.

## 6.8 MAIZE:

6.8.1 Maize is the staple crop of the Swazi smallholder and is an important cash crop on some ITF farms. Hybrids are used to an increasing extent, the crop typically being planted in 90cm rows in October - November and harvested in April - June. Mixed fertilizers are commonly banded below the seed and a nitrogenous side dressing is applied subsequently. Commercial growers make use of herbicides but machine and hand cultivation figure prominently in smallholder production. A stalkborer is the main pest and this can readily be controlled with insecticides. The parasitic weed Striga lutea is a serious problem in places and late planted crops are susceptible to debilitating streak disease.

6.8.2 Yields vary according to site, season and management. A good rain-fed yield would be 4 t/ha. National production is estimated to be in the range 70 000 - 110 000 tonnes p.a. depending on seasonal rainfall, about 90% of the crop being produced by Swazi smallholders.

## 6.9. MANGO:

6.9.1 Seedling mango trees are quite often planted near rural homesteads in frost free areas but there are few commercial orchards. The mango does best in hot, frost-free areas where the flowering period (July - August) is dry. This is important for vigorous flowering and fruit formation. The tree is drought resistant and can be grown without irrigation but in dry areas will respond well to irrigation. Mango is suited only to the Lowveld region in Swaziland. In the Middleveld tree vigour is excessive and fruit set is poor.

6.9.2 Commercial varieties are Sabre and Peach (fibrous) and Haden, Aill and Kent (fibreless). Plant population will vary with variety in the range 100 to 200 trees/ha, thinned to fewer trees as they mature. Old trees may be pruned. Yield varies with site and management starting in the 4th and peaking at around the 15th year. A good average yield in mature

orchards would be about 125 kg/tree. The harvest season is October to March according to variety. The main problems are flower and fruit diseases which are aggravated by wet weather in winter and spring.

6.10 MILK:

6.10.1 Very few Swazi smallholders are involved in milk production for the market. Most production is on medium to large size commercial units.

6.10.2 The consultants are the largest dairy "farmers" in southern Africa and have considerable experience in promoting dairying by smallholders. In their view any smallholder dairy project in Swaziland should for preference be in the Cool Middleveld or in the Highveld and should be based on zero grazing with hay and silage produced on associated mechanised units. Working models are available elsewhere.

6.11 PAPAYA:

6.11.1 The papaya is a tropical tree. In Swaziland it does best in frost-free Lowveld areas. Many rural families have a few trees near the homestead but the consultants have not been able to locate any commercial orchards.

6.11.2 Commercial production these days is usually based on the small fruit "Solo" type for which a good average yield is 40 t/ha from mature trees. Harvesting commences in the first year. Yields peak in the second and thereafter decline to about 10 t/ha in the fifth year. The economic life span is four years. Propagation is by potted seedling. A typical plant population would be 1 000 - 1 200 trees/ha. Irrigation is essential for commercial production. There are few production problems. The most common are fungus diseases.

6.12 PINEAPPLE:

6.12.1 The pineapple which is grown in most of the tropical and subtropical areas of the world is best adapted to warm, frost free coastal areas without severe extremes in temperature.

The Swaziland Middleveld, although not ideal for pineapple production because of a slight risk of sunburn and frost damage, has become established as a highly successful pineapple production area. This semi-perennial fruit crop is produced on both commercial estates and on a smallholder scheme in the region.

The industry is dependant on the cannery at Malkerns which at present has the capacity for a significant increase in production.

The high level of local technology in pineapple production based on many years of local research and experience, provides a sound basis for the well controlled expansion of the industry to smallholder outgrowers.

For canning purposes the large uniform variety "Cayenne" is recommended.

Planting, using plant tops or slips takes place in spring (preferably October) when temperatures and moisture conditions are optimal.

The first crop, may be harvested two years after planting and the first (main) ratoon crop is harvested 18 months later. Depending on the performance of the orchard, a second ratoon crop may be considered before replanting.

To ensure economically viable yields a high standard of production is essential. Of particular importance is :-

- (a) the use of high quality planting material (which would be readily available from the commercial estates;
- (b) correct fertilizer applied at the right time;
- (c) timeous control of weeds, pests and diseases;

(d) the use of growth regulants to regulate the time of fruit maturity and harvesting which is necessary for the regulation of fruit supply to the factory.

6.13 SUGAR:

6.13.1 Sugar cane is grown under sprinkler and flood irrigation in three zones in the Lowveld each one of which is served by a mill. One area has a refinery. South African cultivars are used and technical advice to the industry is provided by the South African Sugar Association. There are smallholder settlement schemes in the northern (Mhlume) and southern (Big Bend) areas. A good yield would be 80 tonnes of sucrose/ha/year. National production amounts to some 400 000 tonnes sugar per year.

6.14 TOBACCO:

6.14.1 The main tobacco type grown in Swaziland is a heavy air (shade) cured leaf, produced mostly as a rain-fed crop in the Nhlangano area. The crop is sown in seedbeds in July and planted out in early summer in 90cm rows with 400 - 500 kg/ha of a mixed fertilizer. Lower leaves and subsequently whole plants are harvested for curing in April-May under heavy shade. Commercial producers commonly fumigate the soil prior to planting. Traditional farmers achieve yields of about 900 kg/ha but a commercial producer would expect to harvest twice as much. Currently there is new interest in fire cured leaf for overseas export.

6.15 VEGETABLES AND POTATO:

6.15.1 A wide range of vegetables is grown in Swaziland, mostly under irrigation and mainly by smallholders. Cabbage is the most popular crop and is generally in over supply in late winter and spring and in short supply in the hot weather in late summer. Potato is grown as a summer rain-fed crop in the Highveld and under irrigation in the Middleveld and Lowveld. Swaziland has the potential to satisfy the local demand for the main vegetables and potato throughout the year but production is not so organised and marketing problems are the major constraint.

## 7. THE PROCESS OF ENTERPRISE SELECTION

- 7.1 In common with other developing countries, Swaziland is in need of assistance in many fields - infrastructural, social, human resource development, natural resource conservation, economic development and so on, and U.S.A.I.D., together with other donors and aid agencies, is already involved in assisting in various directions. It could be argued that the most serious long term economic problem in Swaziland is the degradation of the natural resource base - the rangeland in particular - as a result of overstocking under the traditional communal grazing system. A different view might be that manager training is a priority, or water development, or some other programme. Aid programmes vary in their relevance to national policies and priorities and also in their success and impact durability. In working towards the formulation of a recommendation to his client the consultant has to operate within his terms of reference. In this instance the emphasis in the terms of reference is clearly reflected by key phrases :
- .Swazi smallholders
  - .Increased production
  - .Market orientated
  - .Profitable enterprises
  - .Organised and co-ordinated basis
  - .Sustainable and durable
- 7.2 These terms of reference are particularly appropriate because they are in accord with the economic development plan of the Government of Swaziland wherein employment generation, especially in the rural areas, and the boosting of production for export are high on the list of priorities.
- 7.3 There are many reasons why so many aid programmes and projects fail. These include poor planning, inadequate management and lack of continuity. The appointment of local consultants by U.S.A.I.D. to assist with project identification reflects a decision to plan and design carefully. Similarly, the Mission Director has made it clear that much importance will be attached to adequate institutional and management arrangements for any agricultural project to be proposed by the Agency. Finally, it is heartening, and it will be welcomed by

the Swaziland Government, to note that U.S.A.I.D. will not necessarily restrict the duration of any assistance to five years. This is a key issue in any rural development programme because adoption of innovations is commonly fairly slow. Under all these circumstances prospects for ultimate success with the prospect must be good.

7.4 In the identification of a possible aid project it is important that conclusions be not distorted by any personal preference, vested interest or other bias and that the investigative and deduction processes be comprehensive, objective and of a high professional standard. As always, time and budget constraints are limitations in this regard (10 weeks : \$15 000) but within these constraints the consultants have endeavoured to follow a logical process of "screening" to arrive at a rational end result. This screening process is depicted diagrammatically in Figure 7.4. It comprises the following sequential steps.

(1) Enterprise adaptability

This initial technical screening of all possibly relevant enterprises results in a short list of those adapted to five main agro-ecological regions in Swaziland. See Chapter 8.

(2) Enterprise profitability

Here a short list of enterprises of possible interest are examined from the economic point of view with particular reference to capital and labour intensity and comparative profitability as reflected by gross margin. Chapter 9 refers.

(3) Product "Marketability"

Enterprises are then screened with regard to the market demand, requirement and potential and the list of possibilities is further reduced. Some products may be in over-supply. Others may be profitable but required by the market in only small quantities. Yet other may face a serious threat of future competition. See Chapters 10 and 11.

# THE SCREENING PROCESS

FIGURE 7.4

## 1 PRIOR DATED: SELECTION BY CLIENT

WHICH SECTOR ?

X
Social Services Development

X
Manpower Development

X
Conservation

✓
Economic Development

X
Other

WHICH INDUSTRY/ FACET

X
MINING

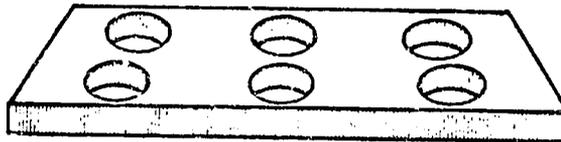
X
TOURISM

✓
AGRICULTURE

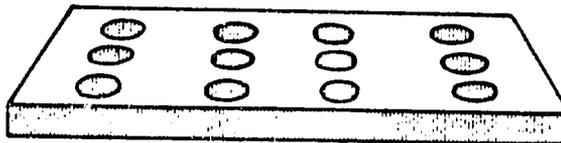
X
INFRASTRUCTURE

X
OTHER

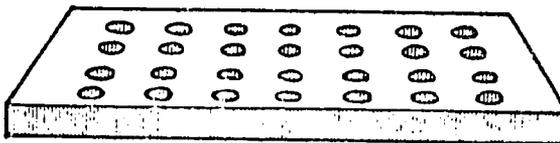
## 2 SELECTION WITHIN THE STUDY



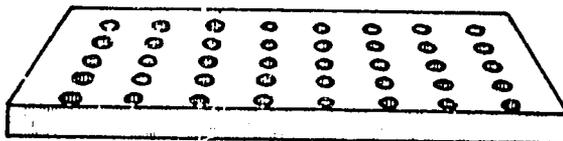
First screening  
**ADAPTABILITY**



Second screening  
**PROFITABILITY**

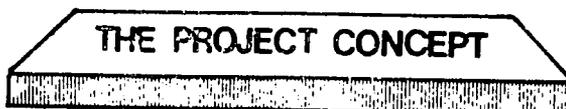


Third screening  
**MARKETABILITY**



Fourth screening  
**OTHER FACTORS**

(National policy.  
Donor objectives.  
Social Acceptability.  
Labour intensity.  
Management intensity.  
Infrastructure.  
Institutional aspects  
etc.)



**THE PROJECT CONCEPT**

(4) Other Considerations

Finally, short listed possibilities are reviewed relative to such considerations as social acceptability, management requirements, labour intensity, available infrastructure, institutional factors and the policies and objectives of the client and the government. See Chapter 12.

7.5 Notwithstanding the need for objectivity in project identification an element of "philosophy" does inevitably influence the final recommendation. In this instance the consultants must place on record a statement of some attitudes which are reflected in their many smallholder projects, namely :

- (a) the capitalistic ethos is ingrained in man and must be advantageously exploited in the planning and implementation of rural development projects;
- (b) the potential of man to respond to training and incentives is great;
- (c) successful rural development represents the end effect of many interactive factors : if there be serious deficiencies in any one of these success will not be attainable : a comprehensive and integrated multi-disciplinary approach is therefore necessary;
- (d) requirements for technical and economic efficiency must be tempered by sensitivity in respect of human diversity and frailty;
- (e) efficient project management is vital.
- (f) labour intensive systems should be promoted where possible but in the final analysis labour intensity should be subordinate to profitability as a system determinant.

## 8. CLIMATE AND ENTERPRISE ADAPTABILITY

### 8.1 CLIMATE

#### 8.1.1 Introduction

8.1.1.1 As described in Chapter 4 viz: Swaziland has five main physiographic regions the Highveld in the west, the Middleveld, the cool Middleveld, the Lowveld and Lebombo in the east, each with distinctive climatic features.

8.1.1.2 The Highveld Region, which lies at an altitude of 1 100 - 1 600 m, has a humid, temperate climate with a mean annual temperature of 19°C. The variation in winter and summer temperatures and day and night temperatures is not high. Frosts occur in the river valleys. The mean annual rainfall is 1 000 - 1 500 mm. Most of the rain falls in the form of thunderstorms, while drizzle is a common occurrence in the high lying areas. Hail occurs frequently, particularly in the Mbabane area.

8.1.1.3 The warmer northern section of the Middleveld at 500 - 1 000 m which is well represented by the Malkerns valley has a humid sub-tropical climate with hot summers and mainly summer rainfall. The mean annual temperature is 20,5°C. Frost occurs periodically in river valleys but is seldom a threat to crops. The mean annual rainfall increases from east to west. The mean annual rainfall at Malkerns and Ezulweni is 899 mm and 1 143 mm respectively.

The Cooler, Middleveld to the south has an altitude of between 1 000 - 1 200 m. The region is well represented by Nhlangano (Goedgegun) which has a warm temperate to sub-tropical climate with hot summers and mainly summer rainfall. The mean annual temperature and rainfall for the southern part of the region is 19,5°C and 843 mm respectively.

8.1.1.4 The Lowveld Region, which lies at an altitude of 150 - 500m, experiences a hot, semi-arid, sub-tropical climate. The mean annual temperature is 22°C with considerable variation between winter and summer temperature and day and night temperature. Rare frosts occur in the region. The mean annual rainfall is 500-750mm.

8.1.1.5 The Lebombo Region lying at an altitude of between 500 - 700 m experiences a sub-humid sub-tropical climate. The average annual temperature is about 20°C and, owing to its proximity to the coast, diurnal variation in temperatures is significantly less than in the Lowveld. Frost occurs virtually only in the lowest parts of the valleys. Average annual rainfall is about 840 mm falling mainly as highly variable summer rainfall between October and March. Hail is a fairly common occurrence in this region.

## 8.1.2 Temperature

8.1.2.1 The mean daily, mean daily maximum and minimum and absolute temperatures for selected sites in the five main climatic regions of Swaziland are shown in Table 8.1.2.1.

TABLE 8.1.2.1  
MEAN DAILY, MEAN DAILY MAXIMUM AND MINIMUM AND ABSOLUTE TEMPERATURES  
FROM SELECTED SITES IN THE MAIN CLIMATIC REGIONS OF SWAZILAND

S I T E S	TEMPERATURE (°C)				
	MEAN	ABSOLUTE	MEAN	ABSOLUTE	MEAN
	DAILY	MAXIMUM	DAILY	MINIMUM	DAILY
	MAX.		MIN.		
<u>HIGHVELD</u>					
Havelock	26,8	37,5	11,4	-1,0	19,1
Mbabane	22,6	38,5	10,8	-8,4	16,7
Hlatikulu	21,0	37,5	11,3	-2,2	16,1
<u>MIDDLEVELD</u>					
Malakerns	25,2	42,7	13,3	-0,0	19,3
<u>COOL MIDDLEVELD</u>					
Nhlangano	23,8	35,1	11,7	-6,1	17,7
<u>LOWVELD</u>					
Big Bend	29,8	42,4	15,4	-3,5	22,1
Lavumisa	29,8	44,5	15,6	-1,3	22,7
<u>LEBOMBO</u>					
Siteki	24,9	40,5	13,8	2,4	19,3

### 8.1.3 Rainfall

8.1.3.1 Monthly average rainfall for selected sites in the five main climatic regions of Swaziland are shown in Table 8.1.3.

TABLE 5.1.3

## MONTHLY AVERAGE RAINFALL FOR SELECTED SITES IN THE FIVE MAIN CLIMATIC REGIONS OF SWAZILAND

SELECTED STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
<u>HIGHVELD</u>													
Havelock	288,9	261,2	199,4	102,4	43,0	29,7	25,5	41,0	80,6	162,4	216,4	225,0	1 706,6
Mbabane	237,9	208,7	175,1	76,5	33,2	20,1	21,3	28,2	60,4	128,8	174,5	211,8	1 376,5
Hlatikulu	180,3	152,7	123,3	67,3	28,9	17,4	13,3	24,2	56,3	116,5	163,6	175,7	1 124,5
<u>MIDDLEVELD</u>													
Malkerns	146,0	133,7	122,1	62,8	21,9	12,7	16,3	19,3	47,1	102,0	128,0	139,0	951,5
Kubuta	114,2	109,6	95,3	53,4	19,7	15,2	14,9	18,0	38,4	69,8	108,8	119,1	776,4
<u>COOL</u>													
<u>MIDDLEVELD</u>													
Nhlangano (Goedgegun)	124,2	117,1	85,8	64,1	24,3	16,2	13,6	17,5	46,7	86,2	131,5	128,8	856,0
<u>LOWVELD</u>													
Wisselrole (Big Bend)	82,3	64,9	62,0	35,2	22,4	13,5	9,1	11,3	27,2	48,3	71,9	84,9	533,0
Lavumisa (Gollel)	78,3	82,2	57,4	41,2	20,0	14,6	11,4	15,2	34,0	55,2	81,7	83,2	574,4
Tshaneni	116,4	107,0	80,9	39,4	17,6	13,4	13,0	12,2	29,4	53,0	93,6	93,4	669,3
<u>LEBOMBO</u>													
Siteki	148,6	127,0	113,0	59,8	28,1	17,8	16,7	19,2	41,1	76,9	102,8	121,7	863,7

## 8.2 CROP AND PASTURE ADAPTABILITY

- 8.2.1 To assess the climatic adaptability of crops and pastures, to the various climatic regions of Swaziland, reference is made to Ehlers (1974) who demarcated relatively homogeneous temperature zones in southern Africa which are characterised by a code consisting of two numbers and a letter. These codes in turn, are based on the mean daily temperatures and calculated mean night temperatures for the three summer months December, January and February and the three winter months June, July and August. These values for five representative sites in the four climatic regions of Swaziland are given in Table 8.2 with the relevant Ehlers classification given in each case.
- 8.2.2 A wide range of crops and pastures have been subjected to the Ehler's climatic adaptability classification system, the results of which are presented in Table 8.2.2. The adaptability of each crop is shown as optimal, sub-optimal, probable, marginal or not adapted for each of the five climatic zones. Where an enterprise is not optimal the main limiting factor is indicated.

TABLE 3.2

TEMPERATURE DATA AND EHLERS AGRO-ECOLOGICAL ZONES FOR FIVE SITES REPRESENTING THE MAIN CLIMATIC REGIONS OF SWAZILAND

SITE	REGION	TEMPERATURES								EHLER'S ZONE
		SUMMER (D; J; F)				WINTER (J; J; A)				
		MAX	MIN	DAILY MEAN	NIGHT MEAN	MAX	MIN	DAILY MEAN	NIGHT MEAN	
Mbabane	Highveld	24,8	14,2	19,5	16,1	13,9	5,3	12,1	7,8	57/25
Nhlangano (Goedgedun)	Cool Middleveld	26,7	15,9	21,3	17,9	21,2	7,6	14,4	10,1	67/36
Siteki	Lebombo	27,4	16,7	22,1	18,6	21,6	10,9	16,2	12,8	67-77/46
Malkerns	Middleveld	27,5	16,7	22,1	18,7	22,6	9,0	15,8	11,5	77/46
Big Bend	Lowveld	31,6	20,6	26,1	22,6	25,5	6,7	16,1	10,2	89/46

TABLE 8.2.2

CROP ADAPTABILITY TO THE FIVE MAIN CLIMATIC ZONES OF SWAZILAND

CROP/PASTURE	REGION									
	HIGHVELD		COOL MIDDLEVELD		LEBOMBO		MIDDLEVELD		LOWVELD	
	(MBABANE)		(NHLANGANO)		(SITEKI)		(MALKERNS)		(BIG BEND)	
	57/25	67/36	67/36	67/36	67-77/46	67-77/46	77/46	77/46	89/46	89/46
ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*	
<i>Abutilon theophrasti</i> (Chinese jute)	SO	14	SO	14	SO	14	SC	14	O	11
<i>Acacia mearnsii</i> (Black wattle)	O		O		O		SO		M	7
<i>Acroceras macrum</i> (Nile grass)	P		P		O		O		M	13
<i>Achmea magdalenae</i> (Silk grass)	N	14	N	14	N	14	N	14	O	11
<i>Aegele marmelos</i> (Bael fruit)	N	14	N	14	N	14	N	14	D	7
<i>Aframomum</i> spp. (Grains of Paradise)	N	14	N	14	N	14	N	14	N	13
<i>Agave sisalana</i> (Sisal)	N	14	N	14	O		O		O	
<i>Agropyron</i> spp. (Wheat grass)	N	13	N	13	N	13	N	13	N	13
<i>Agrostis</i> spp. (Bent grass)	N	13	N	13	N	13	N	13	N	11, 13
<i>Aleurites fordii</i> (Tung nut)	N	14	N		O		O		P	
<i>Allium</i> spp. (Onions, leeks, garlic etc)	O	7	O	7	O	7	O	7	P	11
<i>Alysicarpus vaginalis</i> (Alyse clover)	N	14	N		N	14	N	14	O	
<i>Amorphophallus campanulatus</i> (Elephant Yam)	N	14	N	14	N	14	SO	14	O	
<i>Anacardium occidentale</i> (Cashew nut)	N	14	N	14	N	14	N	14	O	
<i>Ananas</i> spp (Pineapple)	N	14			O		O		SO	11
<i>Anethum graveolens</i> (Dill)	O		O		N	13	N	13	N	13
<i>Anthyllis vulneraria</i> (Kidney vetch)	O		O		O		O		N	13
<i>Apium</i> spp (Celery)	N	14	N	14	O	3, 7	O	3, 7	O	3, 7
<i>Arachis hypogaea</i> (Groundnut)	N	14, 16	SO	14, 16	SO	16	SO	16	O	
<i>Asparagus officinalis</i> (Asparagus)	SO	16, 17	M	17	N	17	N	17	N	17
<i>Astragalus chinensis</i> (Chinese vetch)	N	14	SO	14	P		P		O	11
<i>Atriplex nummularia</i> (Old man salt bush)	N	16	O		SO	16	SO	16	O	
<i>Avena sativa</i> (Oats)	O	7	N	18	N	18	N	18	N	18
<i>Averrhoa</i> spp (Coromandel gooseberry)	N	14	N	14	N	14	N	14	P	
<i>Basella alba</i> (Malabar Spinach)	N	14			N	14	N	14	SO	11

\* SEE KEY TO COMMENTS

TABLE 8.2.2 (Contd)

CROP/PASTURE	REGION									
	HIGHVELD (MBABANE)		COOL MIDDLEVELD (NHL ANGANO)		LECOMBO (SITEK1)		MIDDLEVELD (MALKERNS)		LOWVELD (BIG BEND)	
	57/25		67/36		67-77/46		77/46		89/46	
	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*
<i>Benincasa hispida</i> (Ash Gourd)	N	14	N	14	N	14	N	14	N	14
<i>Beta vulgaris</i> (Beetroot)	SO		SO		O	7	O	7	O	7
<i>Beta vulgaris</i> (Sugarbeet)	O		O		O		SO	13	N	13
<i>Bixa orellana</i> (Anatto)	N	14	N	14	SO	14	SO	14	O	
<i>Bouteloua</i> spp (Grama, Side Oats)	N	14	O		O		O		O	
<i>Brassica</i> spp (Cabbage, Cauli., Kale etc)	SO	7, 14	O	7	O	7	O	7	SO	7
<i>Bromus</i> spp (Brome grass)	O		O		O		N	13	N	13
<i>Cajanus cajan</i> (Pigeon pea)	N	14	N	14	SO	14	SO	14	O	
<i>Calendula officinalis</i> (Marigold)	O		O		SO		N	13	N	13
<i>Camellia sinensis</i> (Tea)	SO	11	SO	13	N	13	N	13	N	13
<i>Cananga odorata</i> (Oil tree, Ylang-Ylang)	N	14	N	14	N	14	N	14	P	
<i>Canarium</i> spp (Javanese almond)	N	14	N	14	N	14	N	14	P	
<i>Canavalia ensiformis</i> (Sword bean)	N	14	N	14	N	14	P		O	
<i>Canna edulis</i> (Canna)	N	14	N	14	SO	14	O		O	11
<i>Capsicum</i> spp (Green pepper)	O		O		O		O		N	13
<i>Capsicum</i> spp (Chillies)	N	14	SO		O		O		O	
<i>Carica papaya</i> (Papaya)	N		N		SO	14	SO	14	O	11
<i>Carthamus tinctorius</i> (Safflower)	O		O		SO	13	SO	13	N	13
<i>Carum carvi</i> (Caraway)	O		P		SO	13	SO	13	N	13
<i>Carya illinoensis</i> (Pecan nut)	N	14	SO	18	N	13	N	18	N	13, 18
<i>Caryocar nuciferum</i> (Butternut)	N	14	M	14	M	14	O		O	
<i>Casimiroa edulis</i> (Sapote)	N	14	SO	15	O		O		O	
<i>Cenchrus ciliaris</i> (Blue Buffalo Grass)	N	14	M	14	SO	14	O		O	
<i>Chenopodium</i> spp (Goosefoot)	O		SO		N	13	N	13	N	13
<i>Chloris gayana</i> (Rhodes grass)	SO	14	O		O		O		O	
<i>Chrysanthemum carinatum</i> (Chop Suey Green)	O		SO		N	13	N	13	N	13
<i>Chrysanthemum cinerariifolium</i> (Pyrethrum)	O		N	13	N	13	N	13	N	13
<i>Cicerarietinum</i> (Chick pea)	N	14	M	14	SO	14	O		SO	13
<i>Cichorium intybus</i> (Chicory)	O		O		SO		N	13	N	13
<i>Cinnamomum</i> spp (Cinnamon)	N	14	N	14	N	14	N	14	SO	11
<i>Citrullus</i> spp (Watermelon)	N	14	O		O		O		O	
<i>Citrus</i> spp (Grapefruit, Valencia, Lime)	N		N		N		SO	14	O	
<i>Citrus</i> spp (Navel, lemon)	N	14	SO		O		O		N	13, 11
<i>Cocos nuciferum</i> (Coconut)	N	14	N	14	N	14	N	14	P	
<i>Coffea arabica</i> (Coffee arabica)	SO	15	SO	15	O		O		N	13
<i>Coffea canephora</i> (Coffee robusta)	N	14	N	14	N	14	N	14	O	

TABLE 8.2.2 (contd)

CROP/PASTURE	REGION									
	HIGHVELD (MBABANE)		COOL MIDDLEVELD (MHLANGAND)		LEBOMBO (SITEK1)		MIDDLEVELD (MALKERNS)		LOWVELD (BIG BEND)	
	57/25		67/36		67-77/46		77/46		89/46	
	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*
Cola spp (Kola nut)	N	14	N	14	N	14	N	14	O	11
Coriandrum sativum (Coriander)	O		P		SO	13	SO	13	N	13
Crotalaria spp (Crotalaria)	N	13	N	13	SO		O		O	
Cucumis spp (Cucumber, pumpkin)	O		O		O		O		P	
Cuminum cuminum (Cumin seed)	O		O		O		N	13	N	13
Cyamopsis tetragonolobus (Guar)	N	14	N	14	N	14	N	14	O	
Cymbopogon citratus (Lemon grass)	N	14	N	14	N	14	N	14	O	
Cynodon spp (Quick grass)	O		O		O		O		O	
Cyphomandra betacea (Tree Tomato)	N	14	N	14	N	14	O		O	
Daucus carota (Carrot)	SO	7	SO	7	O	7	O	7	O	7
Desmodium spp (Clover)	N	14	N	14	SO	14	O		O	
Digitaria decumbens (Lowveld finger grass)	N	14	N	14	SO	14	P		O	
Dioscorea spp (Yam)	N	14	N	14	N	14	N	14	O	11
Echinochloa colonum (Japanese millet)	O		O		O		O		SO	
Eleusine coracana (African manna millet)	N	14	N	14	N	14	N	14	O	
Eragrostis curvula (Weeping love grass)	O		O		O		O		SO	13
Eragrostis tef (Teff)	O		O		SO		N	13	N	13
Eugenia caryophyllata (Clove)	N	14	N	14	N	14	N	14	O	11
Festuca spp (Fescue)	O		O		SO		N	13	N	13
Ficus carica (Fig)	N	1, 14	O	1	N	1	N	1	N	13
Fragaria ananassa (Strawberry)	O		O		O		O		N	13
Furcraea foetida (Mauritius Hemp)	N	14	N	14	N	14	N	14	P	11
Glycine max (Soya)	SO		SO		O		O		SO	
Glycyrrhiza glabra (Liquorice)	N	14	SO		P		P		P	
Gossypium spp (Cotton)	N	14	N	14	O		O		O	
Helianthus annuus (Sunflower)	SO		O		O		O		SO	
Hibiscus spp (Kensaf, Okra, Sorrel)	N	14	SO		SO		O		O	
Hordeum spp (Barley)	SO	12	O	12	SO	12	SO	12	N	13, 11
Humulus lupulus (Hops)	N	20	N	20	N	20	N	20	N	20
Hyperrhenia hirta (Thatch grass)	O		O		O		O		SO	
Ipomoea batatas (Sweet potato)	N	14	SO	14	SO	14	O		O	
Labiab niger (Dolichos bean)	P		O		O		O		SO	
Lactuca sativa (Lettuce)	SO		SO		O	7	O	7	O	7
Lathyrus spp (Chick pea, rough pea)	P		O	7	O	7	O	7	O	7
Lens esculenta (Lentil)	O		O		O	7	O	7	O	7

\* SEE KEY TO COMMENTS

TABLE 8.2.2 (contd)

CROP/PASTURE	REGION									
	HIGHVELD (MBABANE)		COOL MIDDLEVELD (NHLANGANO)		LEBOGMO (SITEK1)		MIDDLEVELD (MALKERNS)		LOWVELD (BIG BEND)	
	57/25		67/36		67-77/46		77/46		89/46	
	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*
<i>Lespedeza</i> spp (Lespedeza)	N	14	N	14	N	14	SO	14	O	
<i>Linum leucocephala</i> (Linseed)	N	14	P		P		O		P	
<i>Litchi chinensis</i> (Litchi)	N		N		N		SO		SO	11
<i>Lolium</i> spp (Ryegrass)	O	7	O	7	O	7	O	7	O	7
<i>Lotononis bainesii</i> (Birds foot trefoil)	N	14	P		P		O		O	
<i>Lupinus</i> spp (Lupin)	O	7	O	7	O	7	O	7	O	7
<i>Macadamia integrifolia</i> (Macadamia)	N	14	N	14	SO		SO	14	O	
<i>Malus sylvestris</i> (Apple)	M	18	N	18	N	13, 18	N	13, 18	N	13, 18
<i>Mangifera indica</i> (Mango)	N	14	N	14	N	14	SO	14	O	
<i>Manihot esculenta</i> (Cassava)	N	14	N	14	N	14	SO	14	O	
<i>Manilkara achras</i> (Sapate Marmalade Fruit)	N	14	N	14	N	14	N	14	O	
<i>Medicago arabica</i> (Spotted Lucerne)	N	14	N	14	M	14	O		O	
<i>Medicago sativa</i> (Lucerne)	SO	16	O		O		O	16	O	
<i>Melilotus alba</i> (White sweet clover)	P		P		P		P		SO	
<i>Melilotus indica</i> (Annual yellow clover)	SO		O	7	O	7	O	7	O	7
<i>Menta</i> spp (Mint)	O		SO		N	13	N	13	N	13
<i>Musa</i> spp (Banana)	N	14, 15	N	14, 15	SO	14	SO	14	O	15
<i>Nicotiana tobacum</i> (Tobacco)	N	14	O		P		O		SO	13
<i>Olea europaea</i> (Olive)	N	1, 14	N	1, 14	N	1	N	1	N	
<i>Ornithopus sativus</i> (Seradella)	O		O	7	O	7	O	7	O	7
<i>Oryza sativa</i> (Rice)	N	14	N	14	N	14	SO		O	
<i>Panicum maximum</i> (Guinea grass)	SO		O	15	O		O		O	
<i>Panicum miliaceum</i> (Manna)	P		O		O		O		P	
<i>Paspalum</i> spp (Paspalum)	SO	14, 15	SO	15	O		O		O	
<i>Passiflora edulis</i> (Purple granadilla)	O	11	O	11	O	11	SO	11	M	
<i>Passiflora laurifolia</i> (Yellow granadilla)	N	14	N	14	SO	14	O	14	O	
<i>Pastinaca sativa</i> (Parsnip)	SO		N	13	N	13	N	13	N	13
<i>Pennisetum</i> spp (Kikuyu, babala, Napier fodder)	SO	15	O		O		O		O	
<i>Persea americana</i> (Avocado)	SO	11, 15	O	11	O	11	O		SO	11
<i>Phaseolus lunatus</i> (Butter bean)	O		O		O		O		O	
<i>Phaseolus vulgaris</i> (Common bean)	O	16	SO		SO		SO	7	O	7
<i>Phileum nodosum</i> (Timothy)	O		SO	13	M	13	N	13	N	13
<i>Phoenix dactylifera</i> (Date palm)	N	14, 19	N	14, 19	N	14, 19	N	14, 19	N	19
<i>Phormium tenax</i> (New Zealand Hemp)	SO		O		O		SO		N	13
<i>Physalis peruviana</i> (Cape Gooseberry)	SO	11	SO	11	O		O		SO	11

\* SEE KEY TO COMMENTS

TABLE 8.2.2 (contd)

CROP/PASTURE	REGION									
	HIGHVELD (MBABANE)		COOL MIDDLEVELD (NHLANGANO)		LEBOMBO (SITEKI)		MIDDLEVELD (MALKERIS)		LOWVELD (BIG BEND)	
	57/25		67/36		67-77/46		77/46		89/46	
	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*	ADAPT.	COMMENT*
<i>Pimenta</i> sp (Allspice)	N	14	N	14	M	14	SO	11	O	11
<i>Pimpinella anisum</i> (Anise)	O		O		SO		N	13	N	13
<i>Piper nigrum</i> (Pepper)	N	14	N	14	N		N		SO	
<i>Pistacia</i> sp (Pistacio nut)	SO		SO	19	SO	18	N	13	N	13
<i>Pisum sativum</i> (Garden pea)	SO	7	SO	7	SO	21	SO	21	SO	21
<i>Plectranthus</i> spp (House potato)	N	13	N	13	N	13	N	13	P	
<i>Poa</i> spp (Blue grass)	O		P		P		N	13	N	13
<i>Poncirus trifoliata</i> (Trifoliolate orange)	N	14	P		P		P		N	13
<i>Prunus amygdalus</i> (Almond)	SO	16	SO	18	N	18	N	18	N	18
<i>Prunus armeniaca</i> (Apricot)	O		SO	18	N	18	N	18	N	18
<i>Prunus avium</i> (Cherry)	N	18	N	18	?	18	N	18	N	18
<i>Prunus rumestica</i> (Plum)	M	18	N	18	N	18	N	18	N	18
<i>Prunus persica</i> (Peach)	SO		N	18	N	18	N	18	N	18
<i>Psidium</i> spp (Guava)	M	14	M	14	SO	14	O		O	
<i>Pyrus communis</i> (Pear)	SO	18	N	18	N	18	N	18	N	18
<i>Raphanus sativus</i> (Japanese radish)	SO	7	SO	7	O	7	O	7	O	7
<i>Ricinus communis</i> (Castor oil)	N	14	N	14	N	14	SO		O	
<i>Saccharum officinarum</i> (Sugarcane)	N	14	M	14	M	14	SO		O	11
<i>Secale cereale</i> (Rye)	O	7	N	18	N	18	N	18	N	18
<i>Sesamum indicum</i> (Sesame)	N	14	N	14	P	14	P		O	
<i>Setaria</i> spp (Millet grain)	N	14	N	14	SO		O		O	
<i>Simmondsia chinensis</i> (Jjoba bean)	N	14, 16	N	14, 16	N	14, 16	N	16	P	
<i>Solanum melungena</i> (Aubergine)	N	14	O		O		O		O	
<i>Solanum tuberosum</i> (Potato)	O		SO	13	SO	13	SO	7	SO	7
<i>Sorghum</i> spp (Grain sorghum Columbus grass)	SO		SO		SO		O		O	
<i>Stizolobium</i> spp (Velvet bean)	N	14	N	14	N	14	P	14	O	
<i>Tamarindus indicus</i> (Tamarind)	N	14	N	14	N	14	N	14	P	11
<i>Trifolium hybridum</i> (Alsika clover)	O		O		O		O		N	13
<i>Trifolium patense</i> (Red clover)	SO	14	SO	14	O		O		SO	
<i>Trifolium repens</i> (Common New Zealand Clover)	O		O		O		O		N	
<i>Triticum aestivum</i> (Wheat)	SO	16	N	18	N	18	N	18	N	18
<i>Vicia</i> spp (Vetch)	P		P		P		P		N	
<i>Vigna</i> spp (Mung bean)	N	14	N	14	N	14	SO		SO	
<i>Vitis vinifera</i> (Grape)	SO		SO		SO	16	SC	18	SO	18, 13
<i>Voandzeia subterranea</i> (Bambara groundnut)	N	14	N	14	N	14	SO	14	O	
<i>Zea mays</i> (Maize)	SO		O		O		O		M	13
<i>Zinziber officinale</i> (Ginger)	N	14	N	14	N	14	N	14	O	11

\* SEE KEY TO COMMENTS

KEY TO COMMENTS

1. Crop usually grown in winter rainfall region.
2. Usually grown as annual crop, but biennially for production of seed in the case of biennial crops.
3. Too low temperatures stimulate flower and seed production.
4. Is grown as an annual crop where frost threatens.
5. Average monthly minimum temperatures should exceed - 4,0°C.
6. Average monthly maximum temperatures should exceed - 7,0°C.
7. Is grown as a winter crop in sub-tropical and hot regions, i.e. summer temperature regions 77 and higher.
8. Somewhat resistant to frost.
9. Somewhat resistant to frost but is damaged by frost just prior to reaping stage.
- 10 Reasonably resistant to frost.
- 11 The winter must be frost-free.
- 12 Endures frost except at flowering stage. Relative humidity must be low while the grain ripens; a lot of solar radiation is required during this period.
- 13 Summers too hot.
- 14 Summers not hot enough.
- 15 Winters too cold.
- 16 Rainfall and hence humidity too high.
- 17 Suited to areas with frost in winter.
- 18 Winter too warm.
- 19 Annual rainfall <300 mm essential.
- 20 Daylength inadequate.
- 21 Diurnal temperature extremes excessive.

## 8.3 LIVESTOCK ADAPTABILITY

### 8.3.1 Introduction

8.3.1.1 The Swazi people have always been stock owners and consequently there are local naturally adapted breeds of all the major livestock species.

8.3.1.2 The adaptability of livestock to the physiographic regions of Swaziland is summarised in Table 8.3.1.

### 8.3.2 Dairy Cattle

8.3.2.1 The world's main dairy breeds are all of European origin and these are well adapted to the Highveld and cool Middleveld.

8.3.2.2 Periodic heat stress in the warm Middleveld and Lebombo regions means that some environmental modification is necessary if maximum productivity is to be maintained.

8.3.2.3 High producing dairy cows are not well adapted to the Lowveld region where prolonged periods of excessive heat are experienced.

### 8.3.3 Beef Cattle

8.3.3.1 The beef breeds of European origin (*Bos taurus*) are well adapted to all regions of Swaziland except the Lowveld.

8.3.3.2 The beef breeds of (*Bos indicus*) origin are well adapted to all regions of the country, but particularly to the Lowveld. In addition to the Swazi Nguni these breeds include the Brahman and Afrikaner as well as developed hybrids such as the Beefmaster, Bonsmara and Santa Gertrudis.

TABLE 8.3.1

ADAPTABILITY OF LIVESTOCK TO THE PHYSIOGRAPHIC REGIONS OF SWAZILAND

LIVESTOCK SPECIES:		Dairy Cattle	Beef Cattle	Wool Sheep	Dual Purpose Sheep	Meat Sheep	Mohair Goats	Meat Goats	Milch Goats	Pigs	
Physiographic Region	Mean Annual Temp Rainfall										
	°C	mm									
1. Highveld	19	1 000+	O	O	SO	O	O	SO	SO	O	O
2a Middleveld (Warm)	20,5	900+	SO	O	M	SO	SO	SO	SO	M	SO
2b Middleveld (Cool)	19,5	840	O	O	M	SO	O or P	P	O	M	SO
3. Lowveld	22	500	M	O	N	M or P	SO or P	P	O or P	N	M
4. Lebombo	20	840	SO	O	M or P	SO or P	SO or P	SO or P	SO or P	M	SO

KEY:

O = Well adapted.

SO = Moderately well adapted or adapted with minor environmental modification.

M = Not well adapted except with major environmental modifications.

N = Not recommended.

P = Climatically adapted but with limitations due to other factors such as grass seeds or predators.

TABLE 8.3.1 (contd.)

ADAPTABILITY OF LIVESTOCK TO THE PHYSIOGRAPHIC REGIONS OF SWAZILAND

LIVESTOCK SPECIES:		Poultry Egg	Poultry Meat	Poultry Turkeys	Ostrich	Dual Purpose Rabbits	Cold Water Fish	Warm water Fish	Freshwater Crustaceans Crayfish Prawns		Crocodiles	
Physiographic Region	Mean Annual Temp											
	°C	mm										
1. Highveld	19	1 000+	0	0	0 or P	M	SO	0	SO	M	N	M
2a Middleveld (Warm)	20,5	900+	SO	SO	SO	M	SO	N	0	M	SO	0
2b Middleveld (Cool)	19,5	840	SO	SO	SO	SO	SO	N	0	M	M	SO
3. Lowveld	22	500	M	M	M	0	M	N	0	N	0	0
4. Lebombo	20	840	SO	SO	SO	M	SO	N	0	SO	SO	0

KEY:

0 = Well adapted.

SO = Moderately well adapted or adapted with minor environmental modification.

M = Not well adapted except with major environmental modifications.

N = Not recommended.

P = Climatically adapted but with limitations due to other factors such as grass seeds or predators.

#### 8.3.4 Sheep

8.3.4.1 The indigenous sheep of Swaziland are of the fat-tailed hair-coated variety and have a small mature body size. Although meat conformation is poor they are notable for their fertility and hardiness to heat and drought as well as local diseases and external parasites. They are not well suited to commercially orientated livestock enterprises.

8.3.4.2 The Merino wool sheep is widespread in southern Africa, but is not well adapted to tall grassland, to areas where grass seeds are a problem or to warm humid conditions. This type of sheep could only be run commercially on natural grazing in the Highveld region.

8.3.4.3 Dual-purpose (wool/mutton) sheep are more adaptable climatically than pure wool sheep and could have a role in the Middleveld and Lebombo regions, particularly as a follower flock to another grazing species (such as dairy cows) on planted pastures.

8.3.4.4 Meat sheep, which carry little or no wool, such as the Dorper from South Africa or the Wiltiper from Zimbabwe, are better adapted to the warm dry Lowveld areas, particularly where grass seeds are a problem. However, in the extensive, wilder areas predators may prove to be a limiting factor.

#### 8.3.5 Goats

8.3.5.1 Mohair is currently commanding very high prices on the world market and this naturally draws a lot of attention to the Angora goat. Climatically the Angora is adaptable to both the cool Highveld and the hot dry Lowveld regions, but less well suited to the warm humid regions. However constraints such as predators, grass seeds and bushes with hooked thorns, will prove to be major natural limitations in most parts of Swaziland. Angora goats could be incorporated into a Lowveld beef ranch or run with cattle in the Highveld region, where nutritional supplements and planted pastures would be needed to support the

8.3.5.2 Meat goats have a traditional role in Swaziland and are well adapted and complementary to cattle in the Middleveld, Lebombo and particularly the Lowveld regions. Most slaughter and marketing at present is probably through informal channels. Indigenous goats respond well to upgrading to the improved, commercially bred, red-headed farm goat.

8.3.5.3 The environmental requirements of milch goats are very similar to those of dairy cows.

### 8.3.6 Pigs

8.3.6.1 Commercial pigs are normally housed and varying degrees of environmental modification can therefore be applied. Climatically, pigs are best adapted to the Highveld region, but with suitable housing, could produce equally well in the Middleveld and Lebombo regions.

8.3.6.2 As with all confined production systems, a reliable source of piped drinking water is a pre-requisite to success.

### 8.3.7 Poultry

8.3.7.1 Like pigs, commercial poultry is normally housed and in the Highveld, Middleveld and Lebombo regions will produce well in properly designed sheds. Experience in a similar environment in neighbouring KwaZulu has shown that relatively inexperienced small scale (500 bird) producers with simple housing have produced broilers and eggs at levels that are remarkably close to the standards expected by sophisticated large scale commercial enterprises.

8.3.7.2 Turkeys are not generally grown in the African context, but would have similar climatic requirements to fowls. The frequency of severe thunderstorms in the Highveld region could well be a limiting factor, unless breeds noted for calm temperament are selected.

8.3.7.3 More sophisticated housing systems would be required for poultry in the hot Lowveld region.

8.3.7.4 A reliable source of piped drinking water is essential for any poultry enterprise.

### 8.3.8 Ostrich

8.3.8.1 The ostrich (*Struthio australis*) is indigenous to all but the hot humid areas of southern Africa and has been farmed commercially for the past 90 years. The end products are skins, feathers and meat.

8.3.8.2 A warm dry climate as found in the Lowveld region is optimal for ostriches and the cooler drier Middleveld would also prove suitable if simple shelters and supplementary feeding were provided.

### 8.3.9 Rabbits

8.3.9.1 Although in many ways more suited to a domestic "backyard" production system, there is a place for commercial rabbit production in Swaziland with suitable simple housing. Pelts, which could be collected by a central marketing organisation, would be the main source of income, with the meat as a by-product, perhaps for domestic consumption.

### 8.3.10 Fish

8.3.10.1 Cold water fish such as trout (*Salmo gairdneri*) could be commercially produced only in the Highveld region.

8.3.10.2 Warm water fish such as Tilapia (*Oreochromis mossambicus*), barbel (*Clarias gariepinus*) and carp (*Cyprinus carpio*) could be produced successfully anywhere in Swaziland except in the Highveld region where water temperatures would limit growth for all but the more adaptable carp.

### 8.3.11 Freshwater Crustaceans

8.3.11.1 Freshwater crayfish (*Cherax tenuimanus*) are very sensitive to water temperature and the Lebombo region with its milder winters and cooler summers appears the most suitable area for this species. Environment modifications (such as shade in hot weather and solar water heating in winter) would be necessary in other regions.

8.3.11.2 Freshwater prawns (*Macrobrachium rosenbergi*) require high water temperatures for optimal production and are probably thus well suited to the Lowveld region. Means of water heating would be needed in the regions although the Highveld region would generally prove too cold.

### 8.3.12 Crocodiles

8.3.12.1 The Nile crocodile (*Crocodylus niloticus*) is indigenous to the rivers of Africa, and crocodile farming could fit in well in the Middleveld and Lowveld. Requirements for success include a source of cheap meat (e.g. donkeys), a warm climate and assured supplementary income from tourists.

## 9. ENTERPRISE ECONOMICS

- 9.1 Having established what enterprises are climatically adapted to Swaziland the list of adapted enterprises must be further screened from the economic point of view. In this regard there are two perspectives - that of the country and that of the producer. For example, given a supply of irrigation water and certain infrastructure and services a smallholder could well earn good profits from macadamia production, but in practice it would not make sense for the state to develop an irrigation scheme for macadamia growing or to provide a nut cracking facility.
- 9.2 As previously stated, the various determinants of enterprise suitability, for smallholder production in this instance, do not operate in isolation but are interactive and some enterprises can be eliminated for various techno-economic and other practical reasons which can conveniently be considered under the head of enterprise economics. Macadamia production is one such example. Another is cashew.
- 9.3 Therefore, before considering the comparative profitability of enterprises it is convenient at this stage to eliminate those that are not appropriate for various techno-economic and other practical reasons. Products of enterprises eliminated on this basis are listed in Table 9.3.
- 9.4 It is not feasible to compare the profitability of enterprises on the basis of nett farm income (N.F.I.) because of the many possible variations in the size and structure of production units (unknown at the preliminary investigation level), and hence the many possible variations in fixed or overhead costs. For example, the fixed cost structure of a single tobacco producer on S.N.L. would be very different to that of a producer on an organised settlement scheme, where fixed cost structure might include land rental and service costs which do not apply to S.N.L. Similarly the fixed cost structure of a larger unit would be different to that of a small unit. For these reasons the most suitable basis for study of

T A B L E 9.3

ELIMINATION OF SOME CLIMATICALLY ADAPTED ENTERPRISES FOR TECHNO-ECONOMIC AND OTHER PRACTICAL REASONS

ENTERPRISE	R E G I O N					REASON FOR ELIMINATION
	HIGH-VELD	COOL MIDDLE VELD	LE-BOMBO	MIDDLE VELD	LOW VELD	
<b>1. CROPS</b>						
Avocado		x	x	x	x	
Allspice					x	No significant commercial value
Anise	x	x				No significant commercial value
Aubergine		x	x	x	x	No significant market demand
Black Wattle	x	x	x			Land too limited. Could become a weed
Beetroot	x	x	x	x	x	No significant market demand
Butternut				x	x	No significant market demand
Barley		x				Irrigation needed. Best grown on estate scale
Banana					x	
Butter Bean	x	x	x	x	x	No significant commercial value
Blue Grass	x					No significant commercial value
Bean (common)	x					
Cashew nut					x	Irrigation needed. Best grown in humid tropics
Cabbage	x	x	x	x		
Chillies			x	x	x	Estate production only
Caraway	x					No significant market demand

T A B L E 9.3

ELIMINATION OF SOME CLIMATICALLY ADAPTED ENTERPRISES FOR TECHNO-ECONOMIC AND OTHER PRACTICAL REASONS

ENTERPRISE	R E G I O N					REASON FOR ELIMINATION
	HIGH-VELD	COOL MIDDLE VELD	LE-BOMBO	MIDDLE VELD	LOW VELD	
Chop Suey Green	x					No significant market demand
Chick Pea				x		No significant market demand
Chicory	x	x				Unproven. Research needed
Coffee arabica			x	x		
Coffee robusta					x	
Coriander						No significant market demand
Carrot	x	x	x	x	x	No significant market demand
Clover				x	x	Only relevant as livestock pasture
Clove					x	No significant market demand
Cotton			x	x	x	
Cucumber/Pumpkin	x	x	x	x	x	No significant commercial value
Citrus (Grapefruit)					x	Irrigation needed. Unsuitable for smallholder production
Citrus (Navel)			x	x		" " "
Cassava					x	No significant commercial value to smallholder
Cape Gooseberry			x	x		No significant market demand
Castor Oil					x	An estate scale crop
Dill	x	x				No significant market demand

T A B L E 9.3

ELIMINATION OF SOME CLIMATICALLY ADAPTED ENTERPRISES FOR TECHNO-ECONOMIC AND OTHER PRACTICAL REASONS

PAGE 3 OF 7

ENTERPRISE	R E G I O N					REASON FOR ELIMINATION
	HIGH-VELD	COOL MIDDLE VELD	LE-BOMBO	MIDDLE VELD	LOW VELD	
Frescue	x	x				Only relevant as livestock pasture
Ginger					x	No significant commercial value
Green pepper	x	x	x	x		No significant market demand
Granadilla, purple		x	x			Production technicalities too complex
Granadilla, yellow				x	x	" "
Groundnut					x	
Guar					x	Too innovative
Guava				x	x	
Japanese millet	x	x	x	x		No significant commercial value
Japanese raddish			x	x	x	Only relevant as livestock feed
Kenaf				x	x	No significant market demand
Kidney vetch	x	x	x	x		No significant commercial value
Kola nut					x	Unproven
Lettuce			x	x	x	Too perishable. No significant market demand
Lentil	x	x	x	x	x	No significant market demand
Lespedeza					x	No significant market demand
Linseed				x		Only extensive estate production viable
Lupin	x	x	x	x	x	Only relevant as livestock feed

T A B L E 9.3

ELIMINATION OF SOME CLIMATICALLY ADAPTED ENTERPRISES FOR TECHNICO-ECONOMIC AND OTHER PRACTICAL REASONS

ENTERPRISE	R E G I O N					REASON FOR ELIMINATION
	HIGH-VELD	COOL MIDDLE VELD	LE-BOMBO	MIDDLE VELD	LOW VELD	
Lucerne		x	x	x	x	Irrigation needed. Mechanisation excessive. Demand limited
Macadamia					x	Irrigation required. Too innovative
Mango					x	
Lucerne		x	x	x	x	Irrigation needed. Mechanisation excessive and demand limited
Millet grain				x	x	Insignificant market demand
Maize	x	x	x	x		
Nile grass			x	x		No significant commercial value
New Zealand Hemp		x	x			Unstable market. Economically non-viable
Onions	x	x	x	x		
Old man salt bush	x				x	Only significant as livestock feed in arid environment.
Oats	x					No significant market demand
Pineapple		x	x	x		
Papaya					x	
Quick grass	x	x	x	x	x	No significant commercial value
Paspalum			x	x	x	No significant commercial value
Potato	x	x	x	x	x	
Pigeon Pea					x	No significant commercial value

T A B L E 9.3

ELIMINATION OF SOME CLIMATICALLY ADAPTED ENTERPRISES FOR TECHNO-ECONOMIC AND OTHER PRACTICAL REASONS

ENTERPRISE	R E G I O N					REASON FOR ELIMINATION
	HIGH-VELD	COOL MIDDLE VELD	LE-BOMBO	MIDDLE VELD	LOW VELD	
Pyrethrum	x					Unproven. Research needed
Rhodes grass		x	x	x	x	Only relevant as livestock pasture
Rice				x	x	Water resource too limited
Rye	x					No significant market demand
Red clover			x	x		Only relevant as livestock pasture
Sisal			x	x	x	Decortication problem. Best grown on estate scale
Sugar beet	x	x	x			Conflict with sugar cane industry
Sword bean					x	No significant market demand
Safflower	x	x				No significant market demand
Sweet potato		x	x	x	x	
Soya bean		x	x	x		
Sugar cane					x	
Strawberry	x	x	x	x		Production technicalities too complex. Very high production costs
Sunflower		x	x	x		
Seradella	x	x	x	x	x	No significant market demand
Sesame					x	No significant market demand

T A B L E 9.3

ELIMINATION OF SOME CLIMATICALLY ADAPTED ENTERPRISES FOR TECHNO-ECONOMIC AND OTHER PRACTICAL REASONS

ENTERPRISE	R E G I O N					REASON FOR ELIMINATION
	HIGH-VELD	COOL MIDDLE VELD	LE-BOMBO	MIDDLE VELD	LOW VELD	
Sorghum	x	x	x	x	x	No significant commercial value
Tung nut			x	x		An estate scale crop
Tea	x					Unproven. Availability of suitable sites uncertain
Tomato				x	x	
Teff	x	x				Only relevant as livestock feed
Thatch grass	x	x	x	x		Only extensive production
Tobacco		x		x		
Timothy	x					No significant commercial value
Velvet bean					x	No significant market demand
Watermelon		x	x	x	x	Prohibitive transport costs to RSA markets
Wheat	x					Extensive estate production only
Yam					x	No significant commercial value

T A B L E 9.3

ELIMINATION OF SOME CLIMATICALLY ADAPTED ENTERPRISES FOR TECHNO-ECONOMIC AND OTHER PRACTICAL REASONS

ENTERPRISE	R E G I O N					REASON FOR ELIMINATION
	HIGH-VELD	COOL MIDDLE VELD	LE-BOMBO	MIDDLE VELD	LOW VELD	
2. <u>LIVESTOCK</u>						
Dairy	x	x		x		Limited number of potential participants
Beef	x	x	x	x	x	Excessive constraints imposed by tradition
Goat (meat)				x	x	No commercial significance to smallholder
Goat (milk)	x					No commercial significance
Pig	x					Limited number of potential participants
Sheep	x					Communal grazing system
Poultry	x	x	x	x		Limited number of potential participants

enterprise comparative profitability is the gross margin which is defined as :

"Gross income less variable production costs."

- 9.5 It is relatively easy to prepare estimates of gross margins for annual crop enterprises but the matter is more complex in the case of perennial crops and livestock enterprises in which there is a lead time before production commences and in which yield will normally vary over time. There can also be debate as to what initial enterprise establishment costs can be regarded as fixed investment costs. Is the initial establishment cost of a fruit tree a capital cost or is it part of the variable cost of production? How should the initial liming of land be treated in this regard?
- 9.6 For the perennial crop enterprises of interest the consultants have identified initial establishment costs and subsequent gross margins during the bearing life and total life (inclusive of establishment costs) of the crop. In the case of livestock enterprises the estimates of gross margins relates to the productive period, after making various assumptions as to the *modus operandi* and initial investment.
- 9.7 Enterprise gross margin varies according to the method of production. Thus the cost structure of estate scale production will be different to that of production by a smallholder. In this instance the interest is confined to smallholder production and the estimates, where possible, have been framed accordingly, the various assumptions being recorded.
- 9.8 Management efficiency is a key determinant of enterprise profitability and this is a factor which it is difficult to quantify. Should the yield levels adjusted for purposes of estimating gross income be those attainable by the best farmers, or should they purport to represent an average figure for all producers, or some other category? In framing the estimates the consultants have adjusted yields which in their view would apply to the the "upper third quarter" of producers in terms of management efficiency.

- 9.9 This is a preliminary investigation in which one is not much concerned with detail, either of assumption or of quantum, and a tolerance of up to 20% in an estimate of gross margin is probably acceptable for the purpose for which the estimate is prepared, i.e. for initial broad screening of enterprises or the basis of relative profitability.
- 9.10 Summaries of estimated enterprise gross-margins, with their associated establishment costs, expected yields, gross-incomes and variable costs are presented in Tables 9.10a, 9.10b, 9.10c, 9.10d. In addition, transport distances to produce selling points used in the calculation of enterprise gross-margin estimates, and expected annual labour intensity for each enterprise are presented in the summary tables. More detailed breakdown of gross-margin estimates, at an appropriate level, are provided in appendices 28 - 30.
- 9.11 Table 9.10a, summarises the gross-margin estimates for annual crops, grown on an estate scale. All inputs to production, and production practices are based on standard commercial operations and scale. The summary of gross-margin estimates for the same crops but on a smallholder scale, is presented in Table 9.10b. At smallholder level, labour intensive operations such as hand hoeing, hand spraying of pesticides and hand harvesting, would substitute for the use of weedicides, and the relevant mechanical operations. Crops grown on a very small scale, such as tomato, and onion, would have a reduced inorganic fertilizer application rate, and be substituted by manure at no cost. As the level of inputs is lower than the estate scale, yields attained by smallholders are likely to be lower than estate scale, but this will be compensated for, to a degree, by reduced input costs. The opportunity cost of hiring labour has been included in the gross-margin estimates at smallholder scale. To provide an indication of gross-margins attainable when family labour is used, the gross-margins excluding labour costs have been shown as "return to labour".
- 9.12 Table 9.10c summarises the gross-margin estimates for selected sub-tropical fruits at an estate scale. It is believed that yields comparable to the estate scale could be achieved at smallholder scale, with a reduction in costs by substituting mechanical operations, where possible with hand labour, and using manure to

substitute part of the inorganic fertilizer. Should this be achieved, gross-margin estimates would be higher than that of the estate scale. Remarks relating to areas where costs can be reduced are furnished in Appendix 29 with the breakdown of estate scale gross-margin estimates.

- 9.13 Table 9.10d summarises the gross-margin estimates for the livestock enterprises. The Dairy being based on a zero grazing 200 milking cow unit, reflects an estimated gross-margin at the estate scale. This could, however, be attainable on a smallholder scale where each smallholder rents 4 - 6 dairy cows, and the necessary facilities are in the form of one large central unit, available to each smallholder. In the case of the dairy, the capital costs of the buildings and equipment are excluded since they do not fall into the variable costs category. However, maintenance and repair costs on these items have been included in order to reflect annual costs pertaining to them after construction and installation.

Both the broiler unit and egg unit gross-margin estimates are based on a smallholder scale, and these in particular can be operated as a family unit. As for the dairy, capital costs of buildings and equipment have been excluded, but repairs and maintenance costs included. The concept of the smallholder broiler and egg unit has been put into practice in KwaZulu, Lesotho and Transkei where they are both operating successfully.

**TABLE 9.10.A**  
**U.S. A.I.D. PROJECT SWAZILAND**  
**SUMMARY OF GROSS MARGIN\* ESTIMATES FOR SELECTED ANNUAL CROPS**  
**(Emalangeni - March 1985)**

**ESTATE SCALE**

ENTERPRISE	AVERAGE YIELD	PRICE PER TON	AVERAGE GROSS INCOME PER HA	AVERAGE TOTAL VARIABLE COSTS PER HA	AVERAGE GROSS-MARGIN PER HA	VARIABLE COST BREAK-EVEN YIELD	TRANSPORT ALLOWANCE TO PRODUCE SELLING POINT	ASSOCIATED OVERHEAD COSTS	AVERAGE LABOUR INTENSITY PER HA
	(t/ha)	(E/t)	(E/ha)	(E/ha)	(E/ha)	(t/ha)	(km)		(labour days/ha)
<b>ANNUAL CROPS</b>									
Cabbage (I)	55	100	5 500	4 382	1 118	43,80	100	High	168
Cotton (I)	2,5	820	2 050	1 411	639	1,72	100	Medium	127
Cotton (R) : (Middleveld)	1,5	820	1 230	899	331	1,10	100	Medium	58
: (Lowveld)	1,0	820	820	679	141	0,83	100	Medium	36
Fire cured tobacco (R)	1,6	2 200	3 520	2 638	882	1,20	100	Medium	211
Groundnuts (R) : (Middleveld)	1,8	550	1 010 <sup>a</sup>	714	296	1,30	100	Low	24
Maize (R) : (Highveld)	5,0	313 <sup>b</sup>	1 565	782	783	2,50	100	Low	11
: (Middleveld)	4,5	313 <sup>b</sup>	1 409	751	658	2,40	100	Low	11
Onion (I)	25	190	4 750	3 114	1 636	16,40	100	Medium	83
Potato (I)	35	200	7 000	4 966	2 034	24,80	100	Medium	136
Potato (R)	27	200	5 400	4 446	954	22,20	100	Medium	108
Tomato (I) :	30	347	10 410	6 938	3 472	20,00	100	High	289
Tomato (R) : (Summer)	22	347	7 634	5 647	1 987	16,30	100	High	208
Soyabean (R) : (Middleveld)	1,8	400	720	465	255	1,20	100	Low	4
Sunflower (R) : (Middleveld)	2,0	325	650	511	139	1,60	100	Low	9

Notes : \* Interest on operating costs excluded.

(I) : Irrigated

(R) : Raingrown

a = includes sale of groundnut hay

b = estimated Swaziland price

**TABLE 9.10.B**  
**U.S. A.I.D. PROJECT SWAZILAND**  
**SUMMARY OF GROSS MARGIN\* ESTIMATES FOR SELECTED ANNUAL CROPS**  
**(Ema!ageni - March 1985)**

SMALLHOLDER SCALE

ENTERPRISE	AVERAGE YIELD	PRICE PER TON	AVE GROSS INCOME PER HA	AVE TOTAL VARIABLE COSTS PER HA	AVERAGE GROSS-MARGIN PER HA	RETURN TO LABOUR PER HA	VARIABLE COST BREAK-EVEN YIELD	TRANSPORT ALLOWANCE TO PRODUCE SELLING POINT	ASSOCIATED OVERHEAD COSTS	AVERAGE LABOUR INTENSITY PER HA
	(t/ha)	(E/t)	(E/ha)	(E/ha)	(E/ha)	(E/ha)	(t/ha)	(km)		(labour days/ha)
<u>ANNUAL CROPS</u>										
Cabbage (I)	40	100	4 000	3 111	889	1 486	31,10	100	High	166
Cotton (I)	2,0	820	1 640	1 130	510	934	1,38	100	Medium	123
Cotton (R) : (Middleveld)	1,2	820	984	961	293	514	1,17	100	Medium	57
: (Lowveld)	0,75	820	615	532	83	229	0,65	100	Medium	41
Fire cured tobacco (R)	1,1	2 200	2 420	1 792	628	1 225	0,81	100	Medium	166
Groundnuts (R) : (Middleveld)	1,4	550	785 <sup>a</sup>	648	137	355	1,19	100	Low	60
Maize (R) : (Highveld)	3,5	313 <sup>b</sup>	1 096	655	441 *	570	2,09	100	Low	34
: (Middleveld)	3,0	313 <sup>b</sup>	939	599	340 *	459	1,91	100	Low	31
Onion (I)	15	190	2 850	1 914	936	1 356	10,10	100	Medium	118
Potato (I)	28	200	5 600	4 435	1 165	1 673	22,20	100	Medium	142
Potato (R)	21	200	4 200	3 710	490	913	18,60	100	Medium	117
Tomato (I)	20	347	6 940	3 941	2 999	3 923	11,40	100	High	268
Tomato (R) : (Summer)	12	347	4 164	2 771	1 393	2 051	8,00	100	High	190
Soyabean (R) : (Middleveld)	1,4	400	560	357	203	281	0,90	100	Low	21
Sunflower (R) : (Middleveld)	1,6	325	520	421	99	232	1,30	100	Low	37

Notes : \* Interest on operating costs excluded.

(I) : Irrigated

(R) : Raingrown

a - includes sale of groundnut hay

b - estimated Swaziland price

\* POSTSCRIPT:

The estimate assumed an increase in the R.S.A. producer price of maize which would have affected the Swaziland price. In any event the price increase did not eventuate. The gross margins will be close to E259/ha and E184/ha for the Highveld and Middleveld respectively.

**TABLE 9.10.C**  
**U.S. A.I.D. PROJECT SWAZILAND**  
**SUMMARY OF ESTIMATED AVERAGE GROSS MARGINS\* FOR SELECTED SUBTROPICAL FRUITS**  
**(Emlangeni - March 1985)**

**ESTATE SCALE**

	ESTAB DURATION	TOTAL DURATION	ESTAB COST	ESTAB COST PER YEAR OF BEARING LIFE	YEAR OF FIRST POSITIVE NET CASH FLOW	AVERAGE YIELD	PRICE PER T	AVE GROSS INCOME PER HA	AVE TOTAL VARIABLE COST	AVE GROSS MARGIN	TRANSPORT ALLOWANCE TO MARKET	AVERAGE LABOUR INTENSITY
	(years)	(years)	(E/ha)	(E/ha)	(year)	(t/ha)	(E/t)	(E/ha)	(E/ha)	(E/ha)	(km)	(labour days/ha)
Avocado (R) : Total Life	3	15	3 089	-	4	7	-	5 203	3 196	2 007	450	131
: Bearing Life	-	12	-	257	-	9	716	6 504	3 737	2 767	-	149
Banana (I) : Total Life	1	10	3 346	-	2	23	-	4 680	3 296	1 384	-	199
: Bearing Life	-	9	-	372	-	26	200 <sup>a</sup>	5 200	3 291	1 909	-	214
Guava (R) : Total Life	2	40	2 765	-	8	22	-	1 530	1 446	84	-	136
: Bearing Life	-	38	-	73	-	23	70 <sup>a</sup>	1 610	1 450	160	-	141
Mango (Fresh)(I)												
: Total Life	3	50	2 204	-	4	9	-	5 778	3 693	2 085	450	130
: Bearing Life	-	47	-	47	-	10	642	6 147	3 881	2 266	-	134
Pineapple(R): Total Life	2	4	3 995	-	3	30	-	2 550	1 740	810	20	83
: Bearing Life	-	2	-	-	-	60	85	5 100	1 482	3 618	-	166

Note : \* Interest on operating costs excluded.

(I) : Irrigation

(R) : Raingrown

a - Price net of transport costs

TABLE 9.10.D

## U.S. A.I.D. PROJECT SWAZILAND

SUMMARY OF GROSS MARGINS\* FOR SELECTED LIVESTOCK ENTERPRISES  
(Emalangeni - March 1985)

<u>ESTATE SCALE</u>	AVERAGE YIELD	PRICE	AVE GROSS INCOME	AVERAGE VARIABLE COST	AVERAGE GROSS MARGIN	VARIABLE COST BREAK-EVEN YIELD	TRANSPORT ALLOWANCE TO PRODUCE SELLING POINT	ASSOCIATED OVERHEAD COSTS	AVERAGE LABOUR INTENSITY
	(£/cow/ day)	(E/£)	(E/£)	(E/£)	(E/£)	(£/cow/day)	(km)		(labour days/ cow p.a.)
Dairy : (Zero grazing, 200 cow unit)	16	0,42	0,475 <sup>a</sup>	0,38	0,095	12,12	50	High	19
<u>SMALLHOLDER SCALE</u>									
	(kg/batch)	(E/kg)	(E/batch)	(E/batch)	(E/batch)	(kg/batch)	(km)		(labour days/ batch)
Broiler units : (500 bird unit - 5 batches p.a.)	1 000	1,85	1 850	1 471	379	795	-	Medium	18
	(doz eggs/ bird p.a.)	(E/doz)	(E/bird)	(E/bird)	(E/bird)	(doz eggs/ bird p.a.)	(km)		(labour days/ birds p.a.)
Egg units : (480 bird unit - 10 mths per batch (5 76 birds p.a.))	16	1,24	20,28 <sup>b</sup>	16,6	3,68	13	100	Medium	0,24

Notes : \* Interest on operating costs excluded.

a - includes sale of cull cows, surplus heifers and bull calves.

b - includes sale of spent hens.

## 10. MARKET OVERVIEW

### 10.1 SCOPE AND OBJECTIVES

10.1.1 This market study has been undertaken to investigate market opportunities for a range of products that are adapted to production in Swaziland and suited to production by small scale commercial farmers. The major objectives of this preliminary survey are to study both the qualitative and quantitative aspects of the demand for and supply of agricultural products in order to identify market opportunities in Swaziland, the Republic of South Africa and elsewhere.

10.1.2 The scope of the study is wide and within the time and budget constraints it has not been possible to analyse market trends in depth for all markets and products of interest. This report does, however, indicate present and expected market trends and highlights those products that show favourable potential and merit further investigation. Greater attention was given to those offering better income opportunities.

### 10.2 SURVEY METHOD AND DATA RELIABILITY

10.2.1 Information for this survey was gained through personal interviews with people involved in produce marketing in Swaziland, and representatives of major producer associations and agricultural control boards in R.S.A. In addition 60 organisations/companies in overseas countries, were contacted by mail, in an effort to obtain statistical data and information on market trends. Extensive use was also made of published literature relating to the products of interest. There is an element of unreliability inherent in these methods of data collection.

10.2.2 Current foreign trade statistics were not readily available for all countries so that, at times, it has been necessary to include incomplete outdated statistics, purely to give an indication of historical trends and comparative demand in different countries, in order to highlight matters requiring additional research.

### 10.3 MARKETING PERSPECTIVE

- 10.3.1 Swaziland is currently a nett importer of basic food commodities mainly from the R.S.A. For political and various other reasons it is highly desirable for Swaziland to reduce its reliance on imports. However, where there is free movement of goods, Swaziland enjoys no environment advantages relative to the source areas of imports and its competitiveness in the local market must stem mainly from reduced transport costs and labour advantages. South African producers on the other hand, benefit considerably from the economies of scale related to large scale commercial production of many of the important products currently imported (.e.g. broilers, maize). The climatic variations in R.S.A. and sophisticated storage and transport system ensure continuity of supply of most perishables.
- 10.3.2 The market within Swaziland is relatively small. The population in 1984 was estimated to be 625 900, roughly 36 people/km<sup>2</sup> (Source Swaziland Economic Review 1982-1984). Neighbouring R.S.A. has a population of 26,7 million, roughly 219 people/km<sup>2</sup>. (Source - R.S.A. Abstract of Agricultural Statistics 1985). The demand for staple commodities is high in Swaziland and large quantities of maize, wheat products, potato and cabbage are consumed.
- 10.3.3 The R.S.A. represents a large and stable market for a wide range of products, but this market is becoming increasingly competitive. The production of most sub-tropical fruits is escalating rapidly in R.S.A. The similarity in environmental conditions in Swaziland and parts of R.S.A. (i.e. eastern and north-eastern Transvaal and Natal), reduces any seasonal advantage that local producers may gain through different harvesting dates, to just a few days at the beginning or end of the season. The R.S.A. does, however, offer possibilities as an outlet for fruit not suitable for overseas export but it should not be regarded as a potential dumping ground because poor quality produce will be discounted more heavily in time. The high cost of transport from Swaziland to the major Witwatersrand markets is also a serious constraint.

- 10.3.4 The market within other Southern African countries is limited and restricted mainly to staple products. Long distances and the associated high transport costs of high bulk, low valued products almost certainly rules out exporting on a significant scale to these countries from Swaziland.
- 10.3.5 Of most interest is the potential to produce high value commodities for overseas export. Local producers have an important seasonal advantage for most sub-tropical crops with a short harvesting period, as produce can be supplied during the Northern Hemisphere off-season. Swaziland will experience competition mainly from R.S.A., Brazil and Peru. Good potential exists for export to Western Europe and the middle East. Japan is a very large market and merits further investigation. A continued high inflation rate in Swaziland could, however, seriously reduce Swaziland's ability to retain a significant export industry in the long run.
- 10.3.6 France, the United Kingdom and the Federal Republic of Germany are the largest importers of tropical fruits. Swaziland benefits from duty-free access to the European Economic Community (EEC) in terms of the Lome Convention. The EEC consists of 11 countries, namely Belgium, Denmark, France, the Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, the Netherland and the United Kingdom and most recently Spain. The importance of duty-free access to these markets is well illustrated by the duties payable on selected products by R.S.A., Brazil and Peru amongst many others, given in Appendix 1. The sugar tax is levied on imports of specified fruit products to which sugar has been added in the manufacturing process. This levy is applied on such imports from third world countries, whether duty-free or not. As a result, EEC importers insist on importing fruit juices and fruit pulp without added sugar and the demand for imported jams is limited.
- 10.3.7 The market in the Middle East, particularly in the oil exporting countries, has grown significantly over the last decade. Swaziland is well placed to export to these countries and is already exporting citrus to the major

Arabian Gulf States. Imports from R.S.A. and Israel are politically unacceptable in this market so Swaziland faces competition mainly from other African countries, (e.g. Kenya, Ivory Coast and Martinique) and South American countries. Indications are that a good demand for fresh mangoes and citrus, tropical fruit juices and fruit pulps exist. To date avocados have not been well received in the Middle East and little, if any, growth in demand is anticipated in the short to medium term.

- 10.3.8 Within the agricultural sector in Swaziland, there is currently a marked contrast in production practices on Swazi Nation Land (SNL and on ITL). In the traditional subsector, production on SNL is mainly for subsistence and productivity levels are generally low. Maize is the major crop. Small quantities of potato, tomato and cabbage are also produced. Production on the settlement schemes is more commercially orientated, as on ITL, and sugar, pineapples and cotton are important crops.
- 10.3.9 A major constraint to the development of a market orientated agricultural sector on SNL, is the relatively small size of the average holding and the associated problems posed by dryland production and low income levels. In the longer term, as irrigation facilities are developed and with improved extension services, production of cash crops, and later perennial crops, can be expected to become more important. Much of Swaziland is ideally suited to the production of high value crops such as avocado, mango, banana and guava. Under normal conditions and assuming a well informed agricultural sector, the economic forces of comparative advantage should encourage Swaziland to promote and maximise the export of high value commodities and to rely on imported staples as necessary.
- 10.3.10 Successful production and marketing of agricultural produce depends to a large extent on the accurate evaluation of the structure and volume of consumer demand and the production to meet this demand. This is especially relevant in relation to the marketing of fresh and processed fruit on export markets.

Southern African producers have however been slow to adopt a sound and effective marketing strategy, possibly because the marketing of over 80% of agricultural produce (by volume) in R.S.A. is controlled to some extent by official marketing schemes, (see Section 10.4 for details). This directly affects Swaziland because of the substantial trade between the two countries, (i.e. in 1978-1982 88% of imports in terms of value were from R.S.A. and 30% of exports were to R.S.A), and the free movement of goods in terms of the Common Customs Union Agreement.

- 10.3.11 The reasons for the large degree of market intervention in R.S.A. are many. One of the most important is the Government's policy to promote self-sufficiency in the production of agricultural produce and in the manufacture of agricultural requisites and inputs. Import levies protect local requisite manufacturers, so that local production costs are in general well above those in most developed countries. Government subsidies on producer prices help to balance this out, but many agricultural products are exported at below cost.
- 10.3.12 The cost price squeeze situation (i.e. current increases in farm input prices exceed increases in producer prices), aggravated by recent severe drought conditions has initiated calls for a change in R.S.A. agricultural marketing structures and a move towards a more free market structure. Similar demands are being voiced by the USA in relation to EEC import tariffs and production subsidies. In evaluating market potential it must therefore be borne in mind that the interventionist market structures are increasingly being abandoned.
- 10.3.13 The nett value of a commodity to the producer depends on the interplay between production costs, producer prices recovered in the market place and the cost of marketing to that place. The dominant component of the latter is transport costs. Swaziland is situated a considerable distance from the major market in Southern Africa - the Pretoria, Witwatersrand and Vereeniging (PWV) area - and from the export embarcation

points at Jan Smuts airport and Durban harbour. Unfortunately export through Maputo, is hampered by inadequate maintenance of terminal facilities and the actions of militant forces in the hinterland. It is unlikely that direct export to overseas countries from Matsapa Airport will be possible on a regular basis, at favourable rates in the short to medium term.

10.3.14 In short, the choice of enterprises is related not only to markets, but profitability and the suitability for production on S.N.

#### 10.4. CURRENT MARKETING SYSTEMS

10.4.1 The following is a brief summary of current marketing systems in Swaziland.

<u>Avocado</u>	R.S.A. and Europe via Johannesburg airport.
<u>Citrus</u>	Dominantly exported overseas in collaboration with the Citrus Board in R.S.A.
<u>Cotton</u>	Farmers sell to ginneries in Swaziland and R.S.A in terms of fixed price arrangements.
<u>Maize</u>	Free marketing. The Swaziland Milling Company is the major buyer.
<u>Mango</u>	Sold locally and in R.S.A.
<u>Poultry &amp; Eggs</u>	Uncontrolled local marketing.
<u>Vegetables &amp; potato</u>	Uncontrolled local marketing. Theoretically imports are by permit only.
<u>Pineapple</u>	The fruit is mostly sold to Swazican.
<u>Banana</u>	Uncontrolled local marketing. Marketing in R.S.A. is controlled by the Banana Board.
<u>Beans</u>	Uncontrolled local marketing.
<u>Soyabean</u>	Uncontrolled local marketing.
<u>Groundnut</u>	Uncontrolled local marketing.
<u>Sugar</u>	Marketing locally and overseas organised by the Swaziland Sugar Association.
<u>Beef</u>	Uncontrolled local marketing. Swaziland Meat Corporation is a major buyer. Exports to R.S.A. are controlled by permit.

Tobacco Sold in R.S.A. by arrangement with the Tobacco Board. Fire cured leaf may be exported direct to Europe.

Milk Marketing is controlled by the Swaziland Dairy Board.

Granadilla Sold to factories in R.S.A.

## 10.5 SUMMARY OF THE MARKET FOR INDIVIDUAL COMMODITIES

10.5.1 The following summary is for easy reference purposes. It embraces only selected commodities of possible interest. Further information is provided in Chapter 10.6 and 11.

### 10.5.2 AVOCADO:

Local Markets:	Swaziland very limited. R.S.A. becoming increasing competitive
Overseas Markets:	EEC mainly France.
Competitors on Export Markets	RSA, Kenya and Mexico could become important. Israel at beginning of season.
Marketing Season:	March to August.
Quality:	Critical for success on overseas markets. Non-export grades for Swaziland and RSA.
Packaging:	4kg cartons with 14 to 18 fruit.
Prices:	E2.50 - E3.50/carton.
Constraints:	Predicted doubling of RSA production volumes, also Israel and Spain. Increased competition could depress prices during main importing season, so that consumers become reluctant to pay high prices for Swaziland and RSA fruit. Effective economic long term control & prevention of phytophthora.
Other Markets of Interest:	Japan.

### 10.5.3 BANANA:

Local Markets:	Swaziland, small. R.S.A. large but well supplied (one channel pool price system).
Overseas Markets:	None - depressed world price.
Marketing Season:	All year, surplus occurs October to December.
Quality:	Becoming more important.
Packaging:	20kg cartons. RSA Banana Board currently investigating bulk handling.
Producer Prices:	E3.50/20kg carton.
Competitors:	Eastern and North-Eastern Transvaal, Natal.
Main Constraints:	Small Swaziland market and RSA market well supplied.

### 10.5.4 CHICORY

Local Markets:	Swaziland zero in absence of coffee packer. RSA self-sufficient except in drought years (one channel fixed price system).
Overseas Markets:	Brief investigation reveals well supplied market and low prices.
Marketing Season:	All year if dried/roasted.
Quality:	Average.
Packaging:	In bulk/bags for drying.
Product Prices:	75 - 16c/kg undried root (RSA).
Main Constraints:	Absence of nearby drying facilities. The RSA Chicory Board is sole importer of unroasted chicory and issues permits for roasted chicory imports and unlikely Swaziland could capture a share of RSA market.

### 10.5.5 CITRUS:

Local Market:	Swaziland market small.
Overseas Markets:	Middle East, also EEC.
Marketing Season:	May - September.
Quality:	Important for export.
Packaging:	Cartons for export, pockets for local sales.
Producer Prices:	Varies markedly by type, variety, grade, size, etc.
Competitors:	RSA, Brazil.
Main Constraints:	Economics of production relative to other sub-tropicals.

### 10.5.6. COTTON

Local Market:	Swaziland small, guaranteed unlimited market in RSA through one channel fixed price marketing system.
Producer Prices:	Prices are favourable and vary for different grades of seed cotton 167 to 198c/kg.

### 10.5.7 DAIRY:

Local Market:	Market small and decreasing in Swaziland due mainly to high retail prices and poor marketing. Consumption of milk powder, U.H.S. milk, condensed milk etc is high and increasing. RSA market very competitive.
Marketing season:	All year.
Quality:	Very important.
Packaging:	Pasteurised in 1 litre cartons. Also 1/4 and 1/2 litre cartons.
Competitors:	Swaziland Dairy Board, Tibiyo.
Constraints:	Lack of effluent marketing system.

### 10.5.8 FRUIT JUICE:

- Local Market:** Swaziland small.  
RSA becoming increasingly competitive especially guava and orange.
- Overseas market:** Demand is mainly for orange, apple and grape juice. Small trade in pineapple and other tropical juices. Middle East of main interest.
- Marketing Season:** All year if preserved.
- Quality:** Competitive price more important than superior quality.
- Packaging:** Most not packed in southern Africa. On world market in -  
Granadilla juice - hot packed 12-15° Brix (strenght)  
Granadilla concentrate - frozen 24-30° Brix  
Guava pulp - hot packed 8-14° Brix  
Mango pulp - hot packed/frozen 13-18° Brix  
Pineapple pulp, juice hot packed/frozen 15° Brix.
- Producer Prices:** World prices 1982 (Source ITC):
- |                      | US\$ F.O.B./tonne |
|----------------------|-------------------|
| Granadilla juice     | 1000 - 1600       |
| Mango pulp           | 850               |
| Guava pulp           | 500 - 600         |
| Pineapple pulp/juice | 900 - 1000        |
| Papaya pulp          | 400 - 500         |
- Competitors:** Brazil, Taiwan, India, Mexico, Philippines, Ivory Coast.
- Main Constraints:** Products relatively unknown on world market. Price fluctuations are common and competitive - could increase.

### 10.5.9 MAIZE:

Local Market:	Swaziland relies largely on imports. Unlimited guaranteed market in RSA (one channel) fixed price marketing system).
Packaging:	70kg bags.
Producer prices:	Vary for different grades. Average guaranteed floor price E261/ton for 1983/84. Anticipated 30% increase for 1984/85 reported.

### 10.5.10 MANGO

Local Market:	Limited in Swaziland. RSA under exploited.
Overseas market:	EEC especially France, UK and Federal Republic of Germany and the Middle East.
Marketing Season:	Mid-December to March.
Quality:	Critical for export.
Packaging:	4 - 5kg cartons. 12 - 14 mangoes/carton preferred.
Producer prices	E3.00 - E3.50/carton.
Competitors:	Peru, Brazil and Kenya.
Main constraints:	Quality, high air freight costs, problems still encountered during sea freight.

10.5.11 PAPAYA

Local Market:	Swaziland limited. RSA small and underexploited.
Overseas Market:	Very small but growing rapidly. Mainly EEC - UK, France and Federal Republic of Germany.
Major Competitors:	Brazil.
Marketing Season:	Mainly August to December. Limited quantities all year.
Quality:	Particularly important for export. Southern African fruit tends to be inferior. Quality could limit demand on RSA market too.
Packaging:	Cardboard cartons - varies because of widely different fruit size.
Major constraints:	Suitable cultivars. Quality. Price relative to Brazil.

10.5.12 PINEAPPLE

Products:	Mostly canned.
Local:	Fresh market small. Swaziland Fruit Canners could increase their intake by 11 000 tonnes to 55 000 tonnes per annum.
R.S.A.:	Canned market is limited - consumers prefer fresh. Fresh market preference is for Queen.
Overseas market:	Small fresh export market, but expanding. Canned market adequately supplied but Swaziland has advantage of duty-free access to EEC.
Competitors:	Canned - Thailand, Philippines.
Marketing Season:	All year.
Quality:	Critical for airfreight exports. Keeping quality important for seafreight.
Packaging - canned - fresh	24 x A12½ cans/basic carton(20.41kg). 4,6 or 8 fruit per carton for luxury airfreight market; other grades are packed 10, 12, 15 or 20 fruit/carton.
Producer prices:	For canning +/- E85/tonne. Varies for different grades and maturity. Fresh - local E250/tonne - export E400/tonne.
Main Constraints:	Increasing competition on world markets could depress prices. High transport costs.

10.5.13 POULTRY:

- Local Market:** Good demand in Swaziland supplied largely by imports i.e. 90% eggs and 75% - 80% broilers. RSA market is very large but extremely competitive.
- Major Suppliers:** Rainbow chickens, Tinkhukhu Farm, Swaziland Citrus Estates.
- Packaging:** Eggs in 1/2 dozen cardboard containers. Broilers frozen whole and in pieces. Most broilers produced locally are sold live.
- Prices:** Eggs E1,26 - E1,27/dozen (wholesale). Live chickens E2,50 - E4,50/each.
- Main constraints:** Availability of low priced supplies from RSA, particularly frozen chickens.

10.5.14 SUGAR:

- Local market:** 3 sugar mills are working at capacity and no prospects for establishing a fourth.
- Overseas market:** Oversupplied and prices are low. Swaziland benefits from preferential prices in EEC but only a fixed quota. Only small quantities export to USA because of the introduction of quotas in 1981.
- Constraints:** World surplus.

10.5.15 VEGETABLES (including POTATO)

Local Market:

Official fresh produce markets in major centres are small. Demand in Swaziland not quantified for this study.

Packaging:

For official markets, vary for vegetable type.

E.g. Cabbage - 27kg pockets;  
Potato - 15kg pockets;  
Onions - 10kg pockets;  
Tomato - 6kg boxes.

Producer Prices:

Current prices high due to ban on imports of vegetables. Possibility of ban being lifted soon. Conservative use of current prices should be made.

## 10.6 OVERVIEW OF THE MARKET FOR INDIVIDUAL COMMODITIES

10.6.1 Market conditions have been investigated for environmentally adapted commodities for production in Swaziland. The scope of the study is broad, so that not all products are covered in detail. Greater attention has been given to those obviously offering better income opportunities. Attention has also been given to the potential to expand existing production of the relatively more lucrative commodities currently produced in Swaziland. The markets for commodities like maize, cotton and the many others for which there is an assured market in R.S.A., in terms of the Control Board system, are not analysed in depth as economic factors will determine the scale of production.

10.6.2 A brief description of the markets for individual commodities of interest is given in the following sections :-

10.7 Beverages - Chicory, Coffee, Fruit Juices, Tea.

10.8 Fruit - Avocado, Banana, Citrus, Fig, Granadilla, Guava, Litchi, Mango, Pawpaw, Pineapple and Strawberry.

10.9 Livestock and Livestock Products - Dairy Cattle, Poultry.

10.10 Vegetables (including Potato).

10.11 Miscellaneous - Cotton, Maize, Pyrethrum, sugar, tobacco fire cured.

10.6.3 A more detailed analysis of the complex market conditions for those commodities which are of interest, for production for export from Swaziland, is given in Chapter 11, i.e. avocado, banana, fruit juice, mango, pawpaw and pineapple.

## 10.7 BEVERAGES

### 10.7.1 CHICORY

10.7.1.1 Chicory production within Southern Africa is limited in the R.S.A. to areas within close proximity to the only drier, at Alexandria in the Eastern Cape. The chicory is produced locally as an annual and the oven dried root is roasted and blended with coffee. No chicory is currently consumed fresh as a salad. Chicory is produced under rain-fed conditions so that production volumes decrease

significantly during droughts, and imports are necessary. These irregular imports have accounted for less than 10% of the overall market since 1966. Consumption in the 1980s has remained relatively static at 14 000 tonnes dry.

10.7.1.2 The South African Chicory Control Board exercises tight control over the local market through a one channel marketing scheme. The Board is the sole importer and exporter of unroasted chicory in R.S.A., and no roasted and/or ground chicory may be imported except under permit from the Department of Agriculture. The Board fixes producer prices of undried root and selling prices of dried chicory. Prices tend to be based on costs of production and exceed world market prices.

10.7.1.3 Production for the R.S.A. market is not recommended, particularly in view of the substantial investment in drying facilities that would be necessary and the small and irregular demand for external supplies.

## 10.7.2 COFFEE

10.7.2.1 Virtually all coffee consumed in Southern Africa (+25 000 tonnes per annum) is imported. Robusta, which accounts for about 90% of the demand, is allow quality coffee processed primarily for instant coffee. Local roasters claim that locally produced robusta is of an inferior quality and has poor roasting characteristics and hence rely almost totally on imported unroasted robusta. The market for good quality Arabica Coffee is limited to about 2 500 tonnes per annum (10% of demand), about half of which is produced locally. Southern Africa has the potential to produce all her Arabica needs. However, low yields and increasing local production costs against falling world prices have, limited production. There are no import tariffs or market regulations to protect local producers. Roasters and packers are strongly opposed to any interference with free market forces.

10.7.2.2 Coffee is oversupplied on world markets. About 70% of production is Arabica Coffee. The international

market is essentially controlled and is divided into two sectors. A quota market is controlled by the International Coffee Organisation (ICO),, in which quotas are applied to keep world price within a given range. The main producers of the ICO are Brazil and Columbia, with the EEC and USA being the main importers. The non-quota market is shared by the many non members as well as by members where production exceeds their ICO quota. Prices vary greatly depending on supplies, but are expected to become less favourable as competition on world markets increase. Brazil has traditionally supplied about 30% of world trade, but severe frost killed a large proportion of the coffee plantations in the mid seventies. Indications are that the re-established estates are now coming into full production and a significant upswing in world production is anticipated. Non-quota market prices will fall dramatically and importing members will find the ICO's quota system less acceptable.

10.7.2.3. Although coffee is well suited to production by small scale farmers, the present instability and depressed world prices almost certainly rule out production of Arabica Coffee for the non-quota market.

### 10.7.3. FRUIT JUICES

10.7.3.1 The market for fruit juices both locally and abroad has grown considerably during the last decade. Demand is currently mainly for the more traditional flavours. The most important of which are orange, apple, grape and to a lesser extent pineapple. The volumes of tropical fruit juices traded are limited to 2 to 3% of the total market.

10.7.3.2 The production and processing of fruit purely for juice is seldom economic in its own right. To date most juices are produced as a by-product to the fruit canning process, or from fruit unsuitable for fresh consumption, or other processing.

10.7.3.3 The market outlook for fruit juices is favourable and is considered in more detail in section 11.4. A review of the market for fruit pulp/juice used as flavouring by

other industries for baby foods, ice-cream and yoghurt is also included.

#### 10.7.4 TEA

10.7.4.1 The international market for tea is currently over-supplied and many well-established producers have ceased production. International discussions, through FAO and UNCTAD over the last 15 years, have failed to negotiate any agreement to control prices at a level acceptable to producers, packers and consumers. The world situation has been aggravated by a doubling in exports of good quality tea from China, in the late seventies.

10.7.4.2 The marketing of tea in Southern Africa has been controlled by an agreement between producers and packers, under which locally produced tea is purchased at an agreed price. This price is based on local production costs and is well in excess of world market prices. A recent R.S.A. cabinet decision was taken to ensure that +/-35% of the tea consumed, is bought from local producers and production levels are being expanded to this level. Tea production in R.S.A. is highly profitable.

10.7.4.3 Although the tea produced locally is of high quality, price rather than quality is the more important determinant of demand on overseas markets. The lifespan of tea bushes is long - up to 90 years - so that under present market conditions expansions in production should be modest and dependant on growth in local consumption.

### 10.8 FRUIT

#### 10.8.1 GENERAL INTRODUCTION

10.8.1.1 The production and marketing of sub-tropical fruit differs to that of most annual crops in that orchard establishment is costly, generally taking several years before the orchard starts to bear, and the production is perennial. There is a time lag between market evaluation (and orchard establishment) and market participation.

10.8.1.2 The markets for sub-tropical fruits are essentially of free market structure. Ruling price levels are inversely related to the volume of production, resulting in cyclical production and producer price trends. The papaya has one of the shortest lifespans and the cyclical nature of market trends is marked.

10.8.1.3 A pre-requisite of marketing success is a sound knowledge of the nature of demand. The choice of cultivars should be based on the adaptability to the physical environment but also on the market demand in terms of consumer tastes and preferences.

10.8.1.4 When appraising market potential it must be borne in mind that production purely for the overseas export market, involves dependence on factors other than supply and demand conditions, which are uncontrollable and affect market performance. These include :

- i) the relative movement of local and export market inflation rates.
- ii) Exchange rate movements.
- iii) Trade protection measures in destination countries.

## 10.8.2 AVOCADO

10.8.2.1 Despite an anticipated two-fold increase in volumes of avocados traded internationally by 1990, avocado production is likely to become important in Swaziland. Local producers have an important seasonal advantage in that the local crop is harvested during the European off-season. Environmental and economic conditions are similar to those in R.S.A., the leading off-season supplier, but Swaziland does have the important advantage of duty-free access to the EEC.

10.8.2.2 The market outlook for avocados is presented in greater detail in Section 11.2.

### 10.8.3 BANANA

10.8.3.1 Banana production in Southern Africa remains profitable despite the growing surplus of bananas on world markets and the downward pressure on prices. Most bananas produced in Southern Africa are marketed through the single channel pool price marketing system administered by the R.S.A. Banana Board, which has control over both wholesale and producer prices. Producer prices have shown an average annual increase of almost 15% (nominal terms) from 1973/74 to 1983/84.

10.8.3.2 Current production in Swaziland is reported to be about 2 000 tonnes per annum. Indications are that any substantial increase in plantings will need to be geared towards the R.S.A. market. See Section 11.3. for further details.

### 10.8.4 CITRUS

10.8.4.1 Citrus in Southern Africa is produced primarily for the export market. Farmers generally regard the sale of non-export grade fruit on the local fresh market and to processors purely as a contribution to overhead costs. Production in Swaziland is currently about 65 000 tonnes per annum from 2 600 hectares ( 650 000 trees) in the Lowveld. The area planted to citrus decreased by 40% from 1971/72 - 1981/82. Increases in producer prices in the 1980s have not kept pace with inflation, despite a substantial reduction in production volumes. See Appendix 2 for recent trends in production volume and producer prices. There are only six registered commercial citrus growers compared to 42 in 1967. The trend towards bigger production units is largely related to unfavourable economics from small scale production, high costs of irrigation, and the difficulty in producing and packing quality fruit for export from small independent units. Future increases in production are likely to be from improved cultivars and production techniques rather than expansions to existing plantings.

10.8.4.2 Swaziland is a major producer of grapefruit. The annual production of 33 000 tonnes represents about 40% of

total grapefruit production in Southern Africa and 51% citrus production in Swaziland. Valencia (23 800 tonnes) and other oranges represent 42% of Swaziland citrus production, the balance of 7% is made up of soft citrus and other exotic varieties. Some West Indian and Tahiti Limes are also produced. Roughly 72% of the grapefruit crop, 66% of the oranges and 87% of soft citrus exotics are exported annually. Details of varieties planted, harvesting periods, anticipated production volumes and market distribution are given in Appendix 3.

10.8.4.3 The Middle East is the major market for Swaziland citrus. Roughly 80% of the orange crop is exported to the Arabian Gulf countries annually. Japan has traditionally been a major market, but since 1983 the Japanese Government has insisted that all citrus undergo cold sterilization prior to shipment. Such facilities are not currently available in Southern Africa, so exports of grapefruit in particular have been redirected to European markets. Discussions about the possibilities of conducting the sterilization of fruit on board during shipment are in hand, but the problem is yet to be resolved.

10.8.4.4 Swaziland Fruit Cannery, located in the Malkerns Valley, process citrus during the pineapple off-season in May, June and July. The average annual intake is 6 000 tonnes Marsh grapefruit, 1 000 tonnes mid season and 6 000 tonnes Valencia oranges. Recently fruit has been imported from R.S.A. to supplement local supplies. The processed fruit (i.e. orange segments, grapefruit segments and fruit concentrate) is mostly exported.

10.8.4.5 The limes produced on Ngonini Estates are mainly processed for juice on site for sale in R.S.A. Small quantities are exported fresh to the Middle East.

10.8.4.6 Although demand for citrus on overseas markets is favourable, producer price increases are small. Financial returns from citrus are becoming less attractive compared to other sub-tropical tree crops, so that major expansions to

the existing citrus plantings cannot be recommended. The processing of limes for pure juice could be of interest and further investigation is recommended.

#### 10.8.5 FIG

10.8.5.1 The production of fig in Southern Africa is limited to +/- 300 tonnes, produced annually in R.S.A. Current production is considerably lower than the 2 000 tonnes produced in 1958/59. The average annual increase in prices over the 25 year period was 10,3% and over the last 10 years 13,5%. The perishable nature of the crop limits sales on fresh produce markets, so that most of the crop is processed for jams and small quantities are dried.

10.8.5.2 Using the trends on the R.S.A. market as an indication of overall demand, i.e. decreasing production and producer price increases roughly in line with inflation, commercial production of fig cannot be recommended in Swaziland.

#### 10.8.6 GRANADILLA

10.8.6.1 Granadilla (Passion Fruit) production in Southern Africa is limited by technical factors rather than market constraints. Phytophthora rootrot and inadequate disease control has reduced the average lifespan of plantings to only three or four years. This coupled with the high establishment and trellising costs have reduced returns to farmers so that production volumes have decreased considerably.

10.8.6.2 Commercial production of granadillas is very limited in Swaziland. From available information it appears that small volumes are currently produced by two farmers on ITL, one of whom has small on site processing facilities.

10.8.6.3 Production in R.S.A. currently varies between roughly 600 and 1 500 tonnes annually, in marked contrast to the 5 000 - 7 000 tonnes produced in the mid seventies. Average producer prices have increased dramatically from R119/tonne in 1975/76 to R375/tonne in 1983/84. Producer

prices paid by processor (R470/tonne in 1984) compare favourably to those on the fresh produce market at peak production periods. Only 188 tonnes were processed in 1983/84, the lowest since 1958/59 and almost insignificant in comparison to the 5 351 tonnes processed in 1974/75. Details of production volumes, fresh fruit sales and purchases by processors are included in Appendix 4. The potential for Swaziland producers to supply fresh granadillas to South African fresh produce markets and processors, is affected by high transport costs.

10.8.6.4 R.S.A. processors have expressed the preference to import granadilla pulp, because local producers are inclined to play the fresh and processing markets, depending on relative price levels. Imports are from Brazil (yellow granadilla) Sri Lanka and Taiwan (purple) where efficient international and agent marketing structures exist and offer local processors consistent supplies of good quality pulp. The volume of imports is not known, as granadilla pulp is classified with other fruit in official statistics. Processors in turn sell juice concentrate to the beverage and dairy industries. Small cans of quality pulp are also produced for direct sale to consumers.

10.8.6.5 Granadilla juice is one of the most popular tropical fruit juice on world markets and demand is growing. Juice of the purple granadilla is currently more popular than that of the yellow. The market price has fluctuated violently, e.g. \$1200 to \$2700 per tonne f.o.b. origin in the two years 1980 and 1981. The world production of granadillas is small relative to the more traditional juices so, sudden increases in demand can completely upset the market forcing prices to rise sharply. The beverage industry and other end-users thus reduce or abandon production of granadilla products as soon as existing contracts are honoured so that overall demand decreases. Producers in the meanwhile have expanded production to take advantage of the high prices. The volatility of the market is further accentuated by the short economic lifespan of the plant. Brazil, one of the most important producers, has introduced minimum export

prices (\$1 300 F.O.B. in 1983/84) to help stabilize the market. Further details on the market for fruit juice is included in Section 11.4.

10.8.6.6 Given the existing technical and economic constraints, granadilla production in Swaziland is likely to remain limited. If field trials do, however, prove successful, the potential to produce granadillas for processing into pulp for export, in the longer term should be investigated carefully and thoroughly.

#### 10.8.7 GUAVA

10.8.7.1 Expansion in the Southern Africa guava industry, in terms of both production and market growth, has been very large during the last decade. The production of guava pulp for juice has been the area of greatest interest. The pink guava is the more popular. Despite the suitability of environmental conditions in Swaziland no commercial guava production takes place.

10.8.7.2 R.S.A. guava production has increased from 11 734 tonnes tinned in 1974/75 to 28 747 tonnes in 1983/84. Prices tended to fluctuate with little overall increase prior to 1979/80, and since then producer prices have increased at an average annual rate of 17,4%. Between 60 and 70% of the annual crop is processed. Recently quantities used for guava pulp and juices have exceeded those for the canned product (guavas in syrup). Fresh guavas do not transport well and have a short shelf life thus limiting sales on the local fresh market. Appendix 5 contains details of production, market distribution and prices of the R.S.A. guava crop.

10.8.7.3 Processed guava products have yet to gain popularity on most overseas markets. The greatest interest is currently from Middle East countries where consumption of guava juice is increasing rapidly. Trial shipments have been sent to the Federal Republic of Germany. The overseas market remains largely unexploited and merits further investigation.

10.8.7.4 There is a growing fear amongst local producers that an overproduction of guavas will soon occur. This is shared by processors who do, however, anticipate a continued strong growth in demand. Market demand has tripled during the last decade. In Southern Africa guava juice is particularly well liked by the Black segment of the population.

10.8.7.5 The production of guavas for processing initially by Swazi Fruit Cannery appears to be a promising prospect. In the longer term the establishment of a simple on-site processing plant may be feasible.

10.8.7.6 Trends in the international fruit juice market are analysed in Section 11.4.

#### 10.8.8 LITCHI

10.8.8.1 The major constraint to commercial production in Southern Africa is the highly perishable nature of the crop. To date, post harvest treatment of fruit by smoking with sulphur, has proved unsatisfactory as it adversely affects fruit colour. This coupled with the short harvesting period, i.e. ripens in 4 - 6 weeks in December, when labour is traditionally in short supply, almost certainly rules out production by small commercial farmers at least in the short to medium term.

#### 10.8.9 MANGO

10.8.9.1 The prerequisite for success is the ability to produce high quality fruit to meet overseas market requirements, especially in terms of colour, size and taste. Swaziland producers will face strong competition from Brazil, Peru, Kenya and R.S.A. High air-freight costs will reduce Swaziland's price competitiveness. If the few remaining problems relating to the export of mangoes by sea from Southern Africa can be resolved, Swaziland will be well placed to compete on EEC markets particularly in view of her duty-free access.

10.8.9.2 The market outlook for mangoes is considered in detail in Section 11.5.

10.8.10 PAPAYA

10.8.10.1 Papaya is one of the less well known sub-tropical fruits. The volume traded internationally has increased in recent years because of the availability of good quality fruit from Brazil at reasonable prices. R.S.A. exports of the Hawaiian varieties, in particular, the Papino have been adversely affected. Southern African producers have experienced quality problems due to inadequate winter leaf cover. This coupled with relatively uncompetitive prices will almost certainly rule out the large scale production of papaya for export.

10.8.10.2 R.S.A. papaya production and market volumes have remained relatively static. Recently producer prices have increased significantly which may create a renewed interest. In general papaya sold on local markets are variable in terms of availability, quality, size and appearance and have limited shelf life. Considering the high prices realised for the new Hawaiian varieties (e.g. Papino, Solo) it appears that the unavailability of good quality fruit may limit demand.

10.8.10.3 Returns from papaya production are less favourable than from the other environmentally adopted tree crops. However, the production cycle is short and it is well suited for planting between young avocados and other perennials in order to generate a cash flow in the early years.

10.8.10.4 See Section 11.6 for a more detailed analysis.

10.8.11 PINEAPPLE

10.8.11.1 Pineapple is one of the most important field crops grown in Swaziland and the Southern African region as a whole in which roughly 70% of output is canned and processed for juice primarily for the export market. (+/-90% of output).

10.8.12.2 The outlook for pineapple juice and fresh exports appears more favourable than for the canned fruit products. However, Southern African producers in general find that only 10 to 15% of the crop is suitable for fresh export because of the high quality requirements. Pineapple juice is essentially a by-product, made from canning residues and the small quantity of low quality fruit not suitable for canning, and juice production is not economic in its own right. The three products are thus interdependent.

10.8.13.3 Competition on world markets is likely to increase, and although Swaziland benefits from duty free access to the EEC, high transport costs reduce price competitiveness. Swaziland Fruit Cannery reportedly requires a further 11 000 tonnes to optimise use of existing plant. See Section 11.7 for a detailed analysis of market trends.

#### 10.8.12 STRAWBERRY

10.8.12.1 Recently there has been considerable interest in the potential to produce strawberry in Swaziland essentially for processing into jam for export. The local processor, Swaziland Fruit Cannery, is currently conducting trials.

10.8.12.2 Indications are that world production of strawberry has levelled off during the 1980s after the rapid increases in the late seventies. European countries consistently supply about half of the total production of 1,85 million tonnes (average 1981-1983). Major producers are Poland, Italy, France and Spain. U.S.A. production volumes have expanded to 0,4 million tonnes so that North America (i.e. including Mexico and Canada) accounts for 28% of world production. Asia supplies roughly 16% of which over 65% is from Japan.

10.8.12.3 Swaziland's ability to compete on world markets is severely limited due to the availability of inexpensive quality strawberry products produced within or in close

proximity to the traditionally large import markets, i.e. Europe, U.S.A. and Japan.

10.8.12.4 The sugar price in Swaziland is considerably higher than the world price and in view of the high sugar content of jams (up to 50%) prospects of viable production are uncertain. In addition a sugar levy would be payable for exports to the EEC. The market within R.S.A. is small and currently adequately supplied. A Swaziland based company could expect strong competition from Langeberg Co-op, the dominant force on the R.S.A. market.

10.8.12.5 Although the EEC market for fresh strawberry is large (108 607 tonnes in 1983) consumption is mainly between May and July (77%). Spain and Italy have extended their production season and currently supply an additional 18% of the total market, during the traditional off-season in March. Imports from outside Europe arrive only during the off-season and account for a mere 3% of the annual trade. Major suppliers are Israel, U.S.A. and Mexico. The major constraint to expanding off-season imports is price. 1983 average cif prices/tonne were Israel 4044 ECU, Mexico 4016 ECU, USA 3211 ECU compared to an average of 1698 ECU from all European sources. The R.S.A. exports very small volumes but faces severe competition from Israel. Off-season strawberries are a luxury item and buyers have stringent quality requirements. Varieties with a bright red colour throughout the fruit are preferred.

10.8.12.6 R.S.A. production volumes have fluctuated but shown little increase over the ten year period 1974/75 to 1983/84. Usually slightly more than half of the crop is processed. The producer prices paid by processors have traditionally been between 30% and 40% of fresh produce market prices. Fresh produce market prices have increased significantly over the last four years, so that the average price paid by processors is currently 23% of that received for fresh sales, i.e. R464 relative to R2 182/tonne.

10.8.12.7 In view of the small size of the R.S.A. and export markets, the highly sophisticated production technique to ensure quality standards and the perishability of the fruit, commercial production by smallholders for the fresh export market is not recommended. Production for processing would only be relevant in the long term if the trials currently being conducted prove favourable and increased volumes are required by the local processor at favourable producer prices.

## 10.9. LIVESTOCK AND LIVESTOCK PRODUCTS

### 10.9.1 MILK

10.9.1.1 Demand in Swaziland has traditionally well exceeded local supply and the country imported a large proportion of the milk consumed, as powder, for reconstitution locally by the Swaziland Dairy Board (S.D.B.) Recently falling market volumes and significant increases in local production has reduced S.D.B. imports. The major reasons for falling demand (i.e. 17% decrease from April 1983 - October 1984) for milk sold by S.D.B. is high price increases (i.e. 84% between April 1983 and March 1985) and consumer resistance to so called "tone milk". Indications are that the economic recession did not have a substantial influence on S.D.B. sales as Commercial Imports have increased in line with the decrease in S.D.B. sales. See Table 10.9.1.1. Although fresh milk imports have been banned since 1981 substantial quantities of milk powder and UHT (Long Life) milk are imported.

TABLE: 10.9.1.1.  
ESTIMATED MILK PRODUCTION AND CONSUMPTION 1980 TO 1984  
Million Litres

	1980	1981	1982	1983	1984
Local production (to SDB)	1,6	2,4	2,7	2,6	2,8
Reconstituted milk (1)	3,1	4,0	4,5	3,9	2,0(4)
TOTAL SDB SALES	4,7	6,4	7,2	6,5	4,8
Commercial Imports (2)	3,8	2,9	3,9	4,9	6,0
TOTAL MARKET (3)	8,5	9,3	11,1	11,4	11,0

- (1) From milk powder imported by WFP Assistance to the Dairy Industry Programme and EDC is drought and in 1983 of which an average of 79% has been donated to under privileged groups, hospital patients and school children. The balance (21%) has been used for the tone milk and amasi by the S.D.B.
- (2) Quantities in terms of milk equivalent calculated from officially recorded imports by value.
- (3) Ignoring the direct sales to consumers by producers.
- (4) Estimate.

10.9.1.2 As local supplies to the S.D.B. have increased and the proportion of recombined milk decreased from the average of 63% in 1981 - 1983, S.D.B.'s costs increased so that retail prices which are fixed by the Board, were increased significantly. Producer prices are high-up to 50 cents/litre - depending on quality, which will almost certainly stimulate increased production.

10.9.1.3 Swaziland consumers have found substitutes for fresh pasteurised milk which has become somewhat of a luxury at the current high retail price of 92 cents/litre (compared to +/-72 cents/litre in R.S.A.) Indications are that imported milk powder from Europe will soon be available on the market at a price of 30% lower than the imported R.S.A. product.

10.9.1.4 The imports of milk powder under the WFP and EEC programmes have contributed between 15% and 50% of total consumption of milk over the last four years. It is unlikely that these high consumption levels could be maintained if locally produced milk was offered for sale instead of being received as a gift from WFP. Indications are that a further 2 900 tonnes will be supplied annually over the next three years.

10.9.1.5 The future of the dairy industry in Swaziland depends not only on the successful resolution of current marketing problems, but also on whether WFP will continue to donate large quantities of milk powder. The availability of low priced milk powder could also have an important influence and should be monitored carefully.

#### 10.9.2 POULTRY - BROILERS AND CHICKENS

10.9.2.1 Despite a significant increase in local production Swaziland remains dependant in supplies from R.S.A. to satisfy market demand. From estimates by the Poultry Section of the Ministry of Agriculture, it appears that local production of broilers is limited to less than 10 000 birds/week (+/- 25% of demand) and 3,25 million eggs/annum (+/- 10% of demand). Broilers are mostly sold live. Past attempts by various companies to produce broilers in Swaziland for the local and Mozambique markets have been thwarted by the availability of inexpensive supplies from R.S.A. Indications are that very small broiler production units located in rural areas may prove viable but large scale production would not be economic. The potential to expand the local egg industry appears more favourable and merits further investigation.

10.9.2.2 The largest producers in Swaziland are Tinkhukhu Farm a subsidiary of Delmas Kuikens (+/- 5000 broilers/week) and Swaziland Citrus Estates (+/- 1000/week). The latter plans to expand to 5000/week. Rainbow chickens is the most important R.S.A. supplier of frozen chickens. The wholesale price of eggs is currently E 1,26 - E 1,27/dozer.

10.9.2.3 The Tinkhuku Farm suffered a tremendous setback in the late seventies by a serious outbreak of PPLO which lowered production. The capacity of the farm reportedly amounts to 20 000 broilers, 5000 dozen eggs and 30 000 day old chicks per week. The firm has a processing capacity for slaughtering and deep-freezing 6000-7000 birds/week.

10.10 VEGETABLES (including POTATO)

- 10.10.1 For simplicity the market for potato is considered in this section because of the similarity in production and marketing techniques to those for vegetables.
- 10.10.2 The production of vegetables has increased dramatically in Swaziland in response to the shortages and rapid increases in prices stemming from the ban on the import of all fruit and vegetables, introduced because of the cholera scare in 1982. Prices of vegetables increased by over 150% in the first six months.
- 10.10.3 In general it is not possible to offer continuity in supply of most vegetables produced in Swaziland. The seasonal nature of production creates shortages during the off-season so that it would be possible to regard the market as undersupplied, although a surplus of production may occur during the main production season.
- 10.10.4 As in most African countries, about 80% of vegetables consumed are potato, green maize, cabbage, tomato and to a lesser extent onions. In contrast to the others, green maize is produced mainly for home consumption and only small quantities are traded in urban areas.
- 10.10.5 The current high prices in Swaziland, relative to the Southern African region, indicates that production volumes of most vegetables could be increased and production still remain profitable. Successful production of vegetables in Swaziland would depend on the careful interpretation of market trends on an on going basis, particularly in view of

the artificial conditions prevailing as a result of the ban and the possibility that it will soon be lifted.

10.10.6 The vegetable trade in Swaziland is handled by a small number of producers, wholesalers and large retailers. Relatively small volumes are sold on the fresh produce market stalls at Mbabane and Manzini. (See Appendix 7). No attempt was made to quantify production or market demand during this survey. An indication of market size on the basis of estimates made by Ronco Consulting Corporation is included in Appendix 7.

10.10.7 The problems relating to vegetable marketing in Swaziland appear to stem largely from a lack of on-going information available on market demand, volume and prices rather than from an inadequate marketing system. The efforts of the Marketing Section of the Ministry of Agriculture to establish a marketing information service are commendable. To date the service has covered the Mbabane and Manzini markets and data is published monthly.

## 10.11 MISCELLANEOUS COMMODITIES

### 10.11.1 COTTON

10.11.1.1. Swaziland's cotton industry has suffered severe setbacks in recent years, largely because of unfavourable climatic conditions. Average yields (0,7 - 0,8 tonnes/hectare) have been low and the quality has deteriorated. Of the current +/-21 000 hectares almost all is rain-fed and although most is on SNL, the production from SNL contributes between 55% - 60% of total annual output. In favourable seasons Swaziland has supplied up to 30% of R.S.A.'s requirements. See Appendix 8 for details of production 1973/74 - 1982/83.

10.11.1.2 Roughly 75% of the seed cotton is sold to the local ginnery, the balance is sold to R.S.A., as is the locally processed lint. The producer prices are in line with those in R.S.A. and will soon be increased. (1983 prices ranged from 166,75 c/kg to 197,83 c/kg). In terms of the agreement with the R.S.A. Cotton Board there is a

guaranteed market for all cotton produced in Swaziland providing it meets with the required quality standards. It is understood that a textile factory has recently been established at Masapa by SWAKI. The annual requirements is stated to be 20 000 bales of lint.

### 10.11.2 MAIZE

10.11.2.1 In terms of volumes, produced maize is the second most important crop grown in Swaziland. The crop is produced almost entirely on SNL and mostly under rain-fed conditions. Production has been adversely affected by unfavourable climatic conditions in recent years (see Table 10.11.2.1.) and dependence on supplementary imports from R.S.A. has increased.

TABLE: 10.11.2.1.

#### PRODUCTION OF MAIZE GRAIN IN SWAZILAND

Tonnes

YEAR **	SNL	ITF	TOTAL	%CHANGE
1979/80	96 735	8 819	105 554	-
1980/81	93 691	3 416	97 860	- 7,3
1981/82	63 766	8 000	71 766	-26,7
1982/83	51 049	9 039	60 142	-16,2

\* Figures for 1983/84 not available

\*\* September to August

Source: Swaziland Economic Review 1982 - 1984.

10.11.2.2 Under normal conditions the R.S.A. is self sufficient in maize and it exports significant quantities (up to 40%) mainly to other African countries. The severe drought experienced in the major production areas in recent years has, however, necessitated imports to meet market requirements.

10.11.2.3 The marketing of maize in the most important production areas of R.S.A., as well as in Bophuthutswana, Lebowa, Ciskei and Venda, is controlled by the single channel fixed price scheme of the R.S.A. Maize Board.

Producer prices are based largely on production costs and have shown very favourable increases in recent years.

10.11.2.4 Local demand in Swaziland is such that all maize produced would be marketed. However, inadequacies in parochial storage and transport facilities at present inhibits further production in some places.

10.11.2.5 Swaziland producers have an assured market for maize products both locally and in R.S.A. Maize is likely to remain the most popular crop grown on SNL. In the longer term, as farmers on SNL become more commercially orientated, economic and environmental considerations will have a greater influence on production volumes.

### 10.11.3 PYRETHRUM

10.11.3.1 The pyrethrin containing oil extracted from pyrethrum flowers has insecticidal properties. Pyrethrum has been grown successfully by smallholders in Kenya and Tanzania where it constitutes an important export crop. Reportedly pyrethrum has not been grown in R.S.A. because of technical, rather than market restraints. Imports of pyrethrins for use by the R.S.A. insecticide industry have varied so markedly that it is difficult to estimate demand.

10.11.3.2 Further investigation of both the overseas and local market would be needed if the matter is to be pursued.

### 10.11.4 SUGAR

10.11.4.1 The sugar industry in Swaziland is of major importance to the country as a whole, annually accounting for 38% of total exports (1978 - 1983). The cane is produced under irrigation in the Lowveld areas of Mhlume/Simunye and Big Bend. The rapid increase in production since 1979/80 was largely due to the expansion in the processing capacity and hence production quotas brought about by the establishment of a third sugar mill. All mills are reportedly operating at capacity.

10.11.4.2 Swaziland has become increasingly vulnerable to world market fluctuations. Under the Lome Convention, Swaziland has a fixed annual quota of 120 000 tonnes for export to the EEC at a preferential price. As production volumes have increased, the importance of this market has decreased from 54% in 1979 to 30% in 1984. Similarly the introduction of an import quota system in the U.S.A., in

1981, has reduced export volumes from 51% of production in 1981 to only 9% in 1983.

10.11.4.3 Although Swaziland is a low cost sugar producer, prospects for expansion are not good. The world market is depressed and under current trends the establishment of a fourth mill, cannot be justified on economic grounds.

10.11.4.4 Problems associated with the export of sugar via the sugar terminal at Maputo need to be overcome. In the past sugar has, when necessary, been exported via South African ports. Indications are that existing facilities are inadequate for both the R.S.A. and Swaziland crop. In the longer term, high transport costs will be a serious constraint to regular shipment from Durban.

#### 10.11.5

##### FIRE-CURED TOBACCO

10.11.5.1 In response to a shortfall in supplies of fire-cured tobacco on world markets, the Belgium Company, Casseele Holdings, promoted the establishment of plantings in Swaziland and more recently in Venda. Indications are that tobacco of a sufficiently high quality can be produced in Swaziland. Producer prices range from E2,20 to E2,50/kg.

Although no clear indication of the Company's requirements are available, indications are that substantial plantings should be possible in Swaziland. Further investigations are required on world market trends. No fire-cured tobacco is currently produced or imported into R.S.A.

## 11 THE MARKET FOR SELECTED COMMODITIES

### 11.1 GENERAL INTRODUCTION

11.1.1 A more detailed analysis of market prospects for seven selected commodities is included as follows:

- 11.2 Avocado
- 11.3 Banana
- 11.4 Fruit Juice
- 11.5 Mango
- 11.6 Papaya
- 11.7 Pineapple

### 11.2 AVOCADO

#### 11.2.1 INTRODUCTION

11.2.1.1 The market for avocados has expanded dramatically since the early 1970's and is still growing. Indications are that substantial plantings have, however, taken place during the past five years particularly in Israel, R.S.A., California and Spain. The traditional markets in Western Europe can thus be expected to become increasingly competitive. California is currently trying to develop an export market to Japan.

11.2.1.2 Swaziland, like R.S.A., does have an important seasonal advantage over most of the large Northern Hemisphere producers. However, this is no reason for complacency, especially in view of the potential for other off-season producers, in particular Mexico, to gain a significant share of the traditional markets, and the endeavours of Israel to extend its marketing season.

11.2.1.3 Avocados are currently produced primarily for the fresh market. As avocado is still a relatively expensive fruit the physical appearance and quality is of utmost

importance. Most consumers prefer bright green, pear-shaped fruit of between 270g and 330g, typified by the Fuerte variety. Hass is becoming more popular, particularly on the French market.

11.2.1.4 Indications are that the artificial ripening of avocados could revolutionise the marketing of this fruit in the future. The sale by Israel of so called "ready to eat" fruit, and fruit with a recommended eating date has been very favourably received by both the trade and consumers.

## 11.2.2 BACKGROUND

11.2.2.1 The avocado tree is fastidious in respect of climatic and soil requirements. A major limitation to production has been the relatively widespread incidence of Phytophthora cinnomomi rootrot. However, South African researchers have recently developed the new injection technique which has proved to be effective in the prevention and cure of this disease.

11.2.2.2 Although many different cultivars and seedling trees are grown in southern Africa, only Fuerte, Edrancl, Hass and more recently Ettinger are considered to be export cultivars. Both Fuerte and Ettinger bear green fruit. The Ettinger is usually slightly larger than Fuerte. Hass trees generally bear small black fruit.

11.2.2.3 Avocado yields vary greatly with cultivar, season and age of trees, as well as external physical conditions, (e.g. climate, soils). Recently the importance of avoiding moisture stress has been recognised and most new plantings have at least supplementary irrigation. In R.S.A. approximately 60% of new plantings are now under irrigation.

11.2.2.4 Although parts of Swaziland are well suited to avocado production, commercial plantings have remained small. Reportedly only one producer located near Nhlngano currently exports fruit. According to an article entitled "Swaziland Exports Avocados to the U.K.", 16 000 cartons (64 tonnes)

TABLE 11.2.2.2

APPROXIMATE MARKETING SEASONS OF MAIN AVOCADO CULTIVARS

	PROBABLE SWAZILAND ANALOGUE	CULTIVAR			
		FUERTE		HASS	
		<u>Earliest</u>	<u>Latest</u>	<u>Earliest</u>	<u>Latest</u>
Levubu Mooketse Trichardtsdal		Late Feb	June	Late April	July
Tzaneen basin .....	Malkerns	Early March	Early July	Early May	August
Duiwelskloof Burgershall Schagen Rustenburg White River	Nhlangano	Mid March	June/July	Late May	Mid September
Sabi Brondal Magoebaskloof	Nhlangano	April	August	June	October
Bainsfield Hilton Richmond		End May	August/September	Mid July	Late November
Greytown Louis Trichardt Mountain		May	Late November	Late July	Mid December

Earliest maturing time means the time on which ripening will occur following picking.  
Latest time indicates the latest fruit can be hung on the tree.

were exported in 1983, half of which went to the EEC. The target for 1986 is 40 000 to 50 000 cartons, two thirds to the EEC.

11.2.2.5 According to tree censuses undertaken by the South African Avocado Growers Association (SAAGA), the number of commercial trees in South Africa doubled between 1973 and 1981. About 50% of avocado plantings are concentrated in Letaba but the largest relative increase in tree numbers has been in the Rustenburg area and Natal (Table 11.2.2.5). With 58% of the trees counted in 1981 being aged 1 to 5 years, a dramatic increase in production is anticipated, as most trees begin bearing at 4-5 years of age. No information is available on the number of trees planted since the last tree census in 1981.

11.2.2.6 The Fuerte still remains the most popular tree planted in R.S.A. Although Hass is rapidly gaining popularity, current production remains small relative to Fuerte (Table 11.2.2.6). The plantings of Edranol have shown a smaller increase relative to Hass and Fuerte, i.e. 57% compared to 776% and 109% respectively between 1973 and 1981. There is a definite trend away from the planting of miscellaneous varieties such as Carton, Collinson, Hzamna, Gottfried, Linda, Sharpless, Bennick, Nabal, Dilly, Duke, Zutano, and various West Indian seedlings for commercial purposes. According to SAAGA yield projections (See Appendix 9) based on tree numbers, age and assuming losses caused by Phytophthora would remain similar to those incurred prior to 1981 an annual mean increase of 18% in total production, from an estimated 21 000 tonnes in 1983 (actual was 21 957 tonnes) to 49 400 tonnes in 1989 and 55 007 tonnes in 1994, could be anticipated.

TABLE 11.2.2.6  
RELATIVE IMPORTANCE OF AVOCADO CULTIVARS PLANTED IN R.S.A. AND PREDICTED  
POPULATION

	TREE PLANTINGS				ESTIMATED PRODUCTION		
	1973		1981		TONNES		
	No.	%	No.	%	1983	1989	1994
Fuerte	336 206	71,0	702 557	73	15 973	25 183	19 642
Hass	50 668	10,7	79 661	8	1 797	11 902	20 987
Edranol	13 259	2,8	116 173	12	2 332	7 609	8 018
Other	73 397	15,5	61 007	7	898*	4 721*	6 360*
TOTAL	473 530	100,0	963 594	100,0	21 000	49 415	55 007

\* Relates only to the plantings of Ryan estimated to be 42 963 trees in 1981 which represents 70% of "other" trees planted in 1981.

Source: Avocado Tree Census 1981, SAAGA.

11.2.2.7 Over the past decade *Phytophthora* has severely limited production through reducing yields and the life-span of orchards. An aerial survey covering all the major avocado producing areas in R.S.A. using infra-red photography showed that 81,5% of trees in production in 1980 were under stress, which is generally caused by poor root development. Clearly should the new injection technique prove to be an effective long term method of *Phytophthora* control, the productivity per unit area should improve dramatically and production volumes could far exceed those projected in 1981 (55 000 tonnes by 1984).

11.2.2.8 Avocados are currently almost exclusively consumed fresh. The processing of avocados has proved to be largely unsuccessful because normal cooking methods detract from the appearance and flavour of the fruit. A small demand does exist for avocado oil for the cosmetic industry.

### 11.2.3 THE SOUTHERN AFRICAN MARKET

11.2.3.1 The market for this high value commodity within Swaziland is severely limited, whilst the market within Southern Africa appears to be adequately supplied at current prices. Indications are that commercial production of avocados in Swaziland will need to be geared towards the overseas export markets, particularly in view of the anticipated expansion in production in R.S.A.

11.2.3.2 In an effort to establish the potential for Swaziland producers, the production trends and marketing of R.S.A. avocados are examined in some depth.

11.2.3.3 South African avocado production has increased significantly since the seventies, except in 1981 and 1984 when adverse climatic conditions affected yields. (See Table 11.2.3.3). Exports currently account for 50 - 60% of production.

TABLE 11.2.3.3  
PRODUCTION AND MARKETING OF R.S.A. AVOCADO  
VOLUME IN TONNES

YEAR	PRODUCTION	LOCAL MARKET	EXPORT MARKET
1975	13 547	8 747	4 800
1976	14 761	8 641	6 120
1977	14 324	7 888	6 436
1978	15 350	8 070	7 280
1979	16 425	7 149	9 276
1980	18 259	6 627	11 632
1981	16 974	7 586	9 388
1982	21 333	10 209	11 124
1983	21 957	11 781	10 176
1984	14 900	6 400	8 500

Source: SAAGA

11.2.3.4 Since 1977, local prices were 50 - 70% of the net F.O.B. export prices. However, more recently the gap has

closed considerably and at times the local price has been higher. Table 11.2.3.4 shows local and export prices on a split year basis (i.e. July to June) to 1983/84. From discussions with two leading exporters average nett payouts from exports during the 1984 season were R3,90 and R4,00 per 4 kg carton compared to R2,50 and R2,90 in 1983. Nett returns from exports by sea have tended to be higher than by air during much of the season. Reportedly retail prices received for airfreighted fruit seldom cover more than 50% of the difference in freight cost.

TABLE 11.2.3.4  
TOTAL VALUE AND AVERAGE PRICES OF LOCAL (RSA) SALES RELATIVE TO EXPORTS

YEAR*	TOTAL VALUE (R'000)		AVERAGE PRICE (R/tonne)	
	LOCAL	EXPORT	LOCAL	EXPORT
1974/75	2 147	1 180	262	222
1975/76	2 361	1 606	269	229
1976/77	2 597	2 193	309	263
1977/78	2 711	3 986	329	501
1978/79	2 740	6 920	364	657
1979/80	3 118	8 625	473	730
1980/81	4 328	8 937	593	769
1981/82	5 512	9 669	623	907
1982/83	6 925	10 390	660	960
1983/84	8 221	8 328	781	880

\* July to June.

Source: R.S.A. Abstract of Agricultural Statistics, 1985.

11.2.3.5 The main production season in R.S.A. extends from March through to September. Small quantities are sold between October and February and realise very favourable prices, particularly in November and December. Details of sales volumes and prices on R.S.A. Municipal markets are given in Appendix 10. Over half the locally marketed fruit is sold on the Johannesburg and Pretoria markets.

11.2.3.6 Processing of avocados in R.S.A. is limited mainly to oil extraction. Small quantities are frozen and canned mainly for research purposes. Initially oil was extracted primarily from unmarketable fruit and producer prices tended to just cover transport costs. However, the price has increased substantially in recent years and a record R230/tonne was paid during the 1984 season. The oil is extracted by centrifuge by Northern Cannery and Letaba Co-op. A relatively more efficient method of extraction is the use of a chemical solvent on dehydrated, ripe, milled fruit. The investment in plant is, however, high and only one organisation, A. Lewis and Co., process small quantities in this way and then only as a sideline. It is estimated that about 1 000 tonnes of fresh avocados are processed in R.S.A. for oil annually.

11.2.3.7 The market for avocado oil is relatively limited and currently almost all R.S.A. production is sold as crude oil to France, where it is refined principally for the cosmetic industry. Very small quantities have also been marketed in the U.S.A. South African exports currently total about 300 tonnes per annum. The market for oil is not expected to show a substantial growth in the foreseeable future. The Letaba Co-operative has recently produced a range of avocado oil beauty products but it is yet too early to judge the success of this innovative move.

#### 11.2.4 THE OVERSEAS EXPORT MARKET

11.2.4.1 In world terms only a small fraction of the estimated annual production of 1,55 million tonnes is traded internationally. The major market is Western Europe where the growth in avocado sales has been one of the marketing success stories of recent years. Israel and the R.S.A. have been to the fore as exporters, but the significant expansion in the market can largely be attributed to Israel's strong promotional and advertising campaigns.

11.2.4.2 To date the Middle East market for avocados has reportedly remained small, and no substantial growth is foreseen in the immediate future. The long distance to the Far East from southern Africa is a constraint. However, the U.S.A's efforts to market avocados in Japan should be monitored carefully.

11.2.4.3 France has the highest per capita consumption of avocados in the world, and annually accounts for between 60% and 70% of imports into Western Europe (detailed analysis of French market trends in Section 11.2.5). The United Kingdom, the second largest European importer, annually accounts for 15-20%, and the Federal Republic of Germany 5%, of imports. Per capita consumption in the U.K. is only a fifth of that in France, while the Federal Republic of Germany is only a tenth. The latter is particularly surprising considering the very high imports of other fruit and vegetables. Promotion and advertising campaigns have increased the demand for avocados in the United Kingdom and the Federal Republic of Germany, but the gaps in per capita consumption have not closed, despite relatively little promotion in France in recent years.

11.2.4.4 The rate of expansion in West European imports has slowed since the record levels of the early seventies. However, all markets are growing and each year import volumes increase substantially. French imports increased by an average annual rate of 22% from 10 908 tonnes in 1974 to 50 790 tonnes in 1983. Unfortunately current statistics are not available for all markets. However an indication of relative market sizes can be obtained from Appendices 11 and 12.

11.2.4.5 Prices between different supplying countries and between different markets tend to vary markedly e.g. over a recent five year period, imports from Israel were 13% more expensive than South African supplies on the French market, only 1,5% more expensive on the U.K. market and were 13% cheaper on the German market. From available information it

would appear that Israel and R.S.A. prices are usually within a 15% range of each other.

11.2.4.6 Although avocados are imported into the EEC throughout the year, volumes tend to fluctuate in accordance with the availability of fruit from the major suppliers. Imports generally tend to peak at the height of the Israeli season during November and December and are lowest during July, August and September. The relative abundance of other fruits and vegetables during the summer months could also adversely influence sales volumes. Table 11.2.4.6 gives details of the marketing seasons of the major suppliers during normal climatic conditions. Israel has recently successfully extended its marketing season by a month, but volumes at the beginning and end of their season tend to be relatively low. This results in price levels of 20% to 30% higher than during the rest of the year, and exporters make use of air transport during this time.

TABLE 11.2.4.6  
CURRENT AVOCADO MARKETING SEASONS OF MAJOR EXPORTERS RELATIVE TO SWAZILAND

	M O N T H S											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Swaziland				X	X	X	X	X	X			
Israel	X	X	X	X	X					X	X	X
R.S.A.					X	X	X	X	X			
U.S.A/Mexico	X	X	X	X	X	X	X	X	X	X	X	X
Spain	X	X	X	X	X	X			X	X	X	X
Martinique								X	X	X		
Kenya			X	X	X	X	X	X	X			
Ivory Coast				X	X	X	X	X	X			

11.2.4.7 Importers still tend to prefer Fuerte although other varieties in particular Hass and Ettinger are increasingly accepted. The Fuerte variety generally commands the best price on most markets. The European markets have very strict quality requirements. The fruit is generally

very strict quality requirements. The fruit is generally packed in 4 kg cartons and must be accurately size graded. Avocados of between 270g and 330g are preferred on most markets, although the British trade generally prefers smaller fruit.

11.2.4.8 It is conceivable that as production volumes expand it will become essential to market avocados with a known ripening period. The Californians and more recently the Israelis have achieved very favourable results from artificial ripening. Ripening facilities will need to be centralized for maximum benefit. Current distribution patterns of major suppliers will facilitate this move. Avocados from Israel are usually shipped in containers to Marseille or Trieste, and are taken by road and rail to inland markets in Europe and elsewhere. South African produce is transported by sea in refrigerated containers to Southampton, in the United Kingdom, from where it goes by ferry and road.

11.2.4.9 South Africa has in the past made relatively substantial use of air-freight. Indications are that the importance of air-freight will diminish in the future for the following reasons.

1. The high cost of transport by air relative to sea.
2. Limited availability of air cargo space (about 250 tonnes or 60 000 to 70 000 cartons per week).
3. Developments in shipping that minimise losses, i.e. containerisation, improved handling facilities and the increased availability of cool stores and refrigerated road and rail transport.
4. Greater supplies on world markets resulting in increased competition and a greater need to minimise production and marketing costs.

#### 11.2.5 THE AVOCADO MARKET IN FRANCE

11.2.5.1 France is by far the largest European importer of fresh avocados and increased volumes enter the country every

year. French imports rose by 466% over the ten years 1971-1983 (Table 11.2.5.1). Figures for 1984 are not yet available but import volumes totalled 36 227 tonnes by August. Imports can be taken to roughly represent consumption as only small quantities, usually less than 500 tonnes, are annually re-exported.

TABLE 11.2.5.1  
IMPORTS OF AVOCADOS INTO FRANCE

YEAR	TONNES	% CHANGE
1974	10 908	
1975	14 704	+ 34,8
1976	15 853	+ 7,8
1977	19 773	+ 24,7
1978	23 970	+ 21,2
1979	29 932	+ 24,9
1980	24 030	- 19,7
1981	30 202	+ 25,7
1982	40 141	+ 32,9
1983	50 790	+ 26,5

Source: Statistiques du Commerce Exterieur de la France

11.2.5.2 Israel is by far the largest supplier of avocados to France, accounting for an annual average of 59% of the market in the ten years 1974 to 1983 (Table 11.2.5.2). The R.S.A. the second largest supplier accounted for an average of 18,8% per annum. However, both averages tend to be deflated by low exports during unfavourable climatic conditions in two exporting seasons. If one excludes the 1980 and 1981 seasons the Israel average for the remaining eight years is 67,7%. Similarly if one excludes 1974 and 1983, the R.S.A. average becomes 20,6%.

11.2.5.3 Spain is becoming an increasingly important supplier to France and within 8 years has gained 7,4% of the market. Fruit from the U.S.A. is generally air-freighted to France, but to date has not been price competitive. Imports

TABLE: 11.2.5.2.

FRENCH AVOCADO IMPORTS BY COUNTRY OF ORIGIN  
(TONNES)

	1974	% OF TOTAL	1975	1976	1977	1978	1979	1980	1981	1982	1983	% OF TOTAL
Israel	7 966	73,0	9 996	10 338	13 495	16 265	20 117	11 590	12 504	24 578	35 107	69,1
R.S.A.	1 385	12,7	3 026	3 649	3 880	4 143	5 558	6 869	5 271	7 352	5 465	10,8
Spain	-	-	-	65	146	559	830	1 524	1 713	2 434	3 777	7,4
U.S.A.	-	-	-	-	428	1 142	663	1 706	7 576	1 949	2 544	5,0
Martinique	797	7,3	891	913	-	536	467	*	*	3 153	2 237	4,4
Kenya	12	0,1	70	151	174	582	304	*	*	385	380	0,8
Ivory Coast	332	3,1	239	171	185	243	286	*	*	368	358	0,7
Cameroun U.R.	*	*	368	410	218	206	247	*	*	98	126	0,2
Morocco	*	*	69	88	98	133	140	*	*	56	104	0,2
Other	416	3,8	45	28	1 144	160	118	2 341	3 138	322	692	1,4
TOTAL	10 908	100,0	14 704	15 823	19 768	23 969	28 930	24 030	30 202	40 695	50 790	100,0

\* No details available for individual countries, imports included under other.

Source: Statistiques du Commerce Extérieur de la France

from Martinique and Kenya are apparently of inferior quality and import volumes are small and vary significantly.

11.2.5.4 Indications are that the availability of supplies of good quality fruit has a significant influence on market size during any year. The average annual imports by month over the period 1977 to 1983 are given in percentages in Table 11.2.5.4. Appendix 12 contains details of monthly import volumes from January 1977 to August 1984.

TABLE 11.2.5.4  
MONTHLY IMPORTS AS A PERCENTAGE OF ANNUAL AVOCADO IMPORTS  
INTO FRANCE, 1977 TO 1983

MONTHS	%
January	9,7
February	9,2
March	10,9
April	10,1
May	7,5
June	6,3
July	3,9
August	4,8
September	4,3
October	6,8
November	11,4
December	15,6

11.2.5.5. The fluctuations in imports appear to be of a seasonal nature and related to the availability of supplies of good quality fruit. Import volumes peak during the Israeli season and are lowest during the off-season, particularly towards the end of the R.S.A. season. Table 11.2.5.5. contains details of monthly import volumes by country of origin in 1983.

TABLE 11.2.5.5.

MONTHLY FRENCH AVOCADO IMPORTS BY SUPPLYING COUNTRY, 1997  
TONNES

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Israel	5 798	5 410	6 134	2 909	2 017	-	-	-	-	1 215	4 556	7 048	35 107
R. S. A.	4	-	20	041	1 177	1 650	734	561	115	7	-	-	5 465
Spain	443	278	236	161	58	52	-	-	237	1 019	373	070	3 777
U. S. A.	5	-	15	319	365	010	451	207	94	258	5	7	2 544
Martinique	-	-	-	-	-	-	8	1 167	077	105	-	-	2 237
Mexico	22	16	5	-	-	-	-	-	36	45	267	124	515
Kenya	1	1	14	114	49	123	28	31	13	4	-	-	380
Ivory Coast	-	-	-	28	55	133	75	54	13	-	-	-	358
Cameroon U.R.	-	7	11	22	29	50	7	-	-	-	-	-	126
Morocco	20	16	15	3	-	-	-	-	-	22	4	24	104
Brazil	1	-	4	3	5	3	3	-	13	8	-	-	40
Other	4	-	4	8	2	47	4	40	19	9	-	-	137
TOTAL	6 298	5 730	6 466	4 410	3 777	2 004	1 310	2 100	1 637	2 412	5 205	8 001	50 790

Source: Statistiques du Commerce Extérieur de la France.

11.2.5.6 In contrast to this general trend, fruit from the U.S.A. although available throughout the year, appears to be imported only when alternate supplies are inadequate. During 1983 imports from the U.S.A arrived in April to October because of relative small supplies from R.S.A. and Martinique, while in 1981 imports occurred during the Israeli season. Clearly price rather than availability limits imports from the U.S.A. The continued strength of the dollar can be expected to further limit exports from U.S.A.

11.2.5.7 The wholesale price of R.S.A. avocados in France increased by 30% in the four years 1980 to 1983. (Table 11.2.5.7).

TABLE 11.2.5.7  
WHOLESALE PRICES OF R.S.A. AVOCADOS IN FRANCE

YEAR	FF/4 KG CARTONS		
	LOW	MEAN	HIGH
1980	42,49	45,82	48,15
1981	44,41	48,35	41,46
1982	43,61	47,18	50,21
1983	57,04	59,64	62,67

## 11.2.6 MARKET OUTLOOK

11.2.6.1 The anticipated increase in production will almost certainly result in significant changes in the market. It will be vital to rid the avocado of its reputation as an expensive luxury. Conceivably the marketing approach needs to be concentrated on taking "the prawns/shrimps" out of the avocado and educating the consumers as to how nourishing and enjoyable the fruit can be.

11.2.6.2 The markets of Europe will become more heavily supplied in the coming years and competition between exporting countries will sharpen. Israel's export quota for the 1984/85 season will be +/- 65 000 tonnes, compared to 42 000 tonnes in 1983/84 and an anticipated 100 000 tonnes by 1990. R.S.A.'s production should more than double to 49 000 tonnes by 1989 from +/- 22 000 tonnes in 1983. Martinique's current production of 5 500 tonnes should reach 8 000 tonnes in 1989. A question mark remains as to the possible extent to which Spain may emerge as a competitor to the more established suppliers. Indications are that production should increase to 50 000 tonnes by 1990 from current levels of +/- 8 000 tonnes.

11.2.6.3 Although the U.S.A. has not been a major force on the export market, production levels have increased dramatically. A record crop of over 250 000 tonnes was harvested during the 1980/81 season. The main increase in plantings occurred in the seventies in California. Of the total hectareage of +/- 38 000 hectares in 1982, 75% were planted after 1970 and 15% have yet to bear fruit. In contrast to other major producers Fuerte accounts for 15%, Bacon 10% and Zutano 5%. The U.S.A. has a large internal market which may affect its participation in international trade.

11.2.6.4 The traditional markets for avocados have shown very favourable annual growth rates. Part of this growth rate can, however, be attributable to the successful

lengthening of the harvesting season and a more even distribution of fruit. Israel in particular has extended its growing season by increasing the number of varieties to five - Fuerte, Hass, Nable, Reed and Ettinger - so that its season occupies most of the year outside mid-summer and fluctuations in deliveries are minimised.

11.2.6.5 Israel is currently placing great emphasis on the U.K. market in the hopes that eventually a high volume market will result. Promotion this season is costing £250 000 almost 3% of expected gross returns from the target of 10 000 tonnes. From a report in the Financial Times 02/02/85 it appears that producers and the British trade are currently accepting very small margins - "Avocados have never been as cheap in Britain as in the past few weeks with single fruits retailing for as little as 20p. Five years ago, with sterling worth much more than today, avocados under the Carmel (Israeli) brand cost 50 to 60p each. Prices for no other fruit have moved so defiantly against the current inflation rate".

11.2.6.6 It is difficult to predict what effect increased supplies from Israel and Spain will have on the off-season market which is so important to Swaziland. An expansion in the market during their production months could result in a proportionate increase in off-season demand. Price trends will however be a major determinant. Should competition between Israel and Spain result in real price decreases, it is unlikely that the off-season market would expand significantly without some price adjustment. In addition the similarity in current prices between seasons, despite significantly lower quantities available in the off-season, appears to indicate a lower demand for avocados in the summer, possibly because of the wide range of other products on the market at this time.

11.2.6.7 South African producers have received very attractive returns with virtually no marketing effort. At present many producers play the local fresh market against the export market to the detriment of agent acceptance in

Europe. There is no co-ordinated marketing effort between the many individuals and companies involved in avocado marketing. To date South African exporters have benefited from Israel's marketing and advertising campaigns.

11.2.6.8 The R.S.A. is likely to remain the major off-season supplier. Israel has recently marketed significant quantities during April and May, but R.S.A. has the advantage of marketing young, firm Fuerte against Israel's end of season fruit, which is mainly Hass. According to a SAAGA spokesman, Mexico could pose the greatest threat to Southern African producers.

11.2.6.9 Swaziland is favourably placed to compete with R.S.A. on the traditional overseas export market. Produce from Swaziland is not subject to EEC tariffs which currently cost R.S.A. exporters 15% of gross income. Indications are that many foreign wholesalers would welcome an alternative source of supply of produce. The mounting criticism of South Africa's political policies could result in increasing resistance to South African produce on export markets. On the local Southern African market, Swaziland producers would have no competitive advantage over existing suppliers and nett returns would, under prevailing conditions, be lower than from exports.

11.2.6.10 Although demand for imported avocados in the Middle East is at present limited, Swaziland growers would have a clear advantage over South African producers in this market.

11.2.6.11 In recent times changes in currency exchange rates and the weakening of the Emalangeni and Rand relative to European currencies, have made the export of avocados an

extremely attractive proposition. It is not known how long this enormous benefit will endure and it has been disregarded in arriving at conclusions on future marketing prospects.

#### 11.2.7 CONCLUSION AND RECOMMENDATIONS

11.2.7.1 The volume of avocados traded internationally will increase significantly by the end of this decade. These increases will largely take place outside the Southern African production season. Although production volumes should double in R.S.A. by 1990, Swaziland has a significant competitive advantage on export markets.

11.2.7.2 There are few agricultural products that offer the producer such an important seasonal market advantage. Nett returns to the producer are presently sufficiently high to withstand expected falls and remain profitable.

11.2.7.3 It is the official view in Swaziland that priorities for national economic development are employment creation and the boosting of export earnings. Clearly avocado production for export could make a material contribution to the attainment of these objectives.

11.3 BANANA

11.3.1 INTRODUCTION

11.3.1.1 Despite the growing surplus of bananas on the world market and downward pressure on prices internationally, banana production in Southern Africa continues to offer very lucrative financial returns.

11.3.2 BACKGROUND

11.3.2.1 The banana is a tropical lowland plant produced mainly in countries situated in Central America and the Carribean. Current world production is +/- 1 million tonnes. The major importers are the United States, Japan, West Germany, Spain, Italy and the United Kingdom.

11.3.2.2 Swaziland's annual production of bananas is +/-2000 tonnes, from 80 - 100 hectares in the Mhlosheni and Kabuta areas. The local market for banana tends to be small so that increases in production would be geared towards R.S.A. market requirements.

11.3.3 THE PRODUCTION AND MARKETING OF BANANA IN R.S.A.

11.3.3.1 In R.S.A., the main production areas are the sub-tropical regions of the eastern and north-eastern Transvaal and Natal. The total area planted has increased by 51% between 1976 - 1982, largely because of major expansions in Natal and the Letaba area. The severe droughts, over the last two years, has limited plantings to 9200 hectares, 5% down from 1982.

TABLE: 11.3.3.1  
AREA PLANTED TO BANANA IN R.S.A. 1976 - 1984  
 (HECTARES)

YEAR	REGION						TOTAL
	BURGERSHALL	LETABA	LEVUBU	NATAL	KOMATI	SABIE	R.S.A.
1976	2 181	1 310	1 234	863	803	-	6 391
1977	2 289	1 453	1 382	890	857	-	6 871
1978	2 552	1 452	1 349	1 103	770	-	7 226
1979	2 746	1 711	1 508	1 625	830	-	8 420
1980	2 384	1 929	1 398	1 569	934	187	8 214
1981	2 678	2 172	1 353	1 747	1 050	258	9 258
1982	2 717	2 268	1 302	1 883	1 165	305	9 640
1983	2 614	2 225	1 246	1 938	1 220	269	9 512
1984	2 777	1 939	1 060	1 901	1 228	295	9 200
% 1984	30,2	21,1	11,5	20,7	13,3	3,2	100,0

Source: Banana Board, R.S.A.

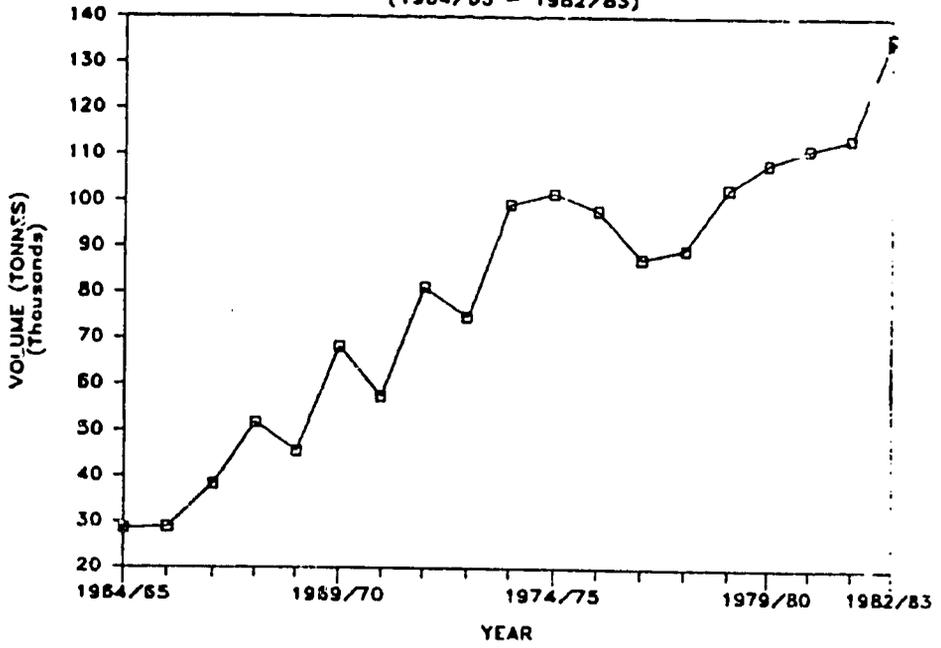
11.3.3.2 The marketing of banana in R.S.A. is controlled by a single channel pool system, administered by the Banana Board. Exceptions are those selling banana within their own production area (+/-15% of total), or those with permits to sell outside their production area (less than 1% of total, and generally confined to the Central Cape Province). The Board thus handles about 85% of total production.

11.3.3.3 Fluctuations in production volumes have been reduced and have shown a steady increase of 4,2% since 1977/78. Prices have increased dramatically from 1973/74 (annual average rate of 14,9%), decreasing only slightly in 1982/83 when a record crop of 135 800 tonnes was produced. Trends in production and producer prices are illustrated in Figure 11.3.3.3. Production surpluses occur typically in the three months October - December.

11.3.3.4 Limited processing of banana (+/-2%) in the form of dehydration, canning and juice extraction has taken place

### R.S.A BANANA PRODUCTION

(1964/65 - 1982/83)



### R.S.A. BANANA PRICES

(1964/65 - 1982/83)

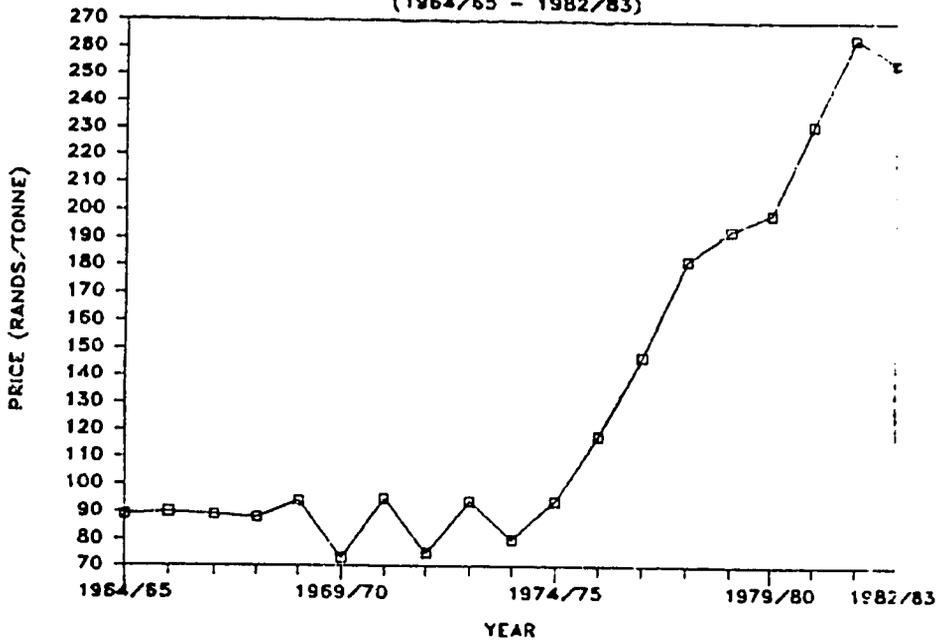


FIGURE 11.3.3.3.

in the past and market expansion opportunities are seen as limited. Fruit is processed mainly during times when a surplus on the fresh market reduces prices.

11.3.3.5 The local fresh market is presently well supplied. The Board negotiates prices with wholesalers and fresh produce markets, but has no control over the retail prices. Producer prices increased dramatically in 1983/84 compared to previous seasons (Table 11.3.3.4). Prices peak in April to June often at levels more than double the price for the rest of the year. See Appendix 13.

TABLE: 11.3.3.4.

VOLUMES MARKETED AND AVERAGE PRODUCER PRICES PAID BY THE BOARD

	<u>1980/81</u>	<u>1981/82</u>	<u>1982/83</u>	<u>1983/84</u>
<u>First Grade Clusters</u>				
Quantity (Tonnes)	83 315	87 890	104 965	92 773
Average Price (Rand/Tonne)	206	229	213	348
<u>Single Banana</u>				
Quantity (Tonnes)	10 223	10 599	12 955	17 931
Average Price (Rand/Tonne)	96	112	105	180

11.3.3.5 No banana are exported from R.S.A. at present. Enquiries have been received from the Middle East, Italy and other Mediterranean countries, but at current world prices bananas would be exported at a loss. A production surplus occurs only during 3 months of the year, and the Board reduces local prices in preference to subsidising exports.

11.3.4 MARKET OUTLOOK

11.3.4.1 The market within Swaziland is small and in the absence of overseas export opportunities, production should be geared towards R.S.A. market requirements. The R.S.A. market appears to be adequately supplied most of the year and future expansions are likely to be from improved

production and management techniques, rather than from new areas planted.

11.3.4.2 It is likely that Swaziland producers could negotiate market outlets with the R.S.A. Banana Board, in view of the Common Customs Union agreement. It is recommended that should technical and economic factors appear favourable, discussions be held with the Board well in advance of planting.

#### 11.3.5 CONCLUSION

11.3.5.1 Given its reasonable share of the market in the Customs Union, the outlook in Swaziland for profitable production and marketing of quality bananas is good.

### 11.4 FRUIT JUICE

#### 11.4.1 INTRODUCTION

11.4.1.1 World trade in fruit and vegetable juices has increased considerably and totalled 1,7 million tonnes, corresponding to about \$2000 million in 1981. Fruit juices account for over 95% of the total. Developing countries provide about half the world's fruit juice import requirements, in the form of bulk-packed fruit juices for utilization as raw material.

11.4.1.2 Citrus juice/concentrate currently accounts for about 50% of the trade in juices. Imports of pineapple juice have increased substantially and currently account for 7%. Trade in other tropical fruit juice is small, probably 50 000 - 60 000 tonnes annually, or roughly 3,5% of world trade. The most important other tropical juices traded are passion fruit, (granadilla), mango and guava.

11.4.1.3 Although the industrialised countries constitute the leading importers, some developing countries are extremely important markets. About 95% of the world's trade is to 25 import markets. In 1981, the five largest importing countries, i.e. United States, Federal Republic of Germany, Canada, United Kingdom and Saudia Arabia, accounted for 65% of total imports.

11.4.1.4 Southern Africa is a nett exporter of fruit juice. The wholesale market for fruit juice in the Republic of South Africa (R.S.A.) is estimated to be +/-200 million litres, valued at +/-R100 million per annum. These figures relate to consumer packed fruit drinks (not necessary 100% fruit juice) and hence are not directly comparable to the world trade in bulk packed juice.

11.4.1.5 The fruit juice industry throughout the world has developed rapidly and significant changes on both technical and marketing aspects have taken place. The success of new and established suppliers of fruit juice depends to a very large extent, on up-to-date marketing information and marketing know-how.

#### 11.4.2 BACKGROUND

11.4.2.1 Over the last decade consumer's attitude towards fruit juice has changed. Traditionally regarded and consumed as a breakfast drink in most countries, fruit juices have gained popularity particular among the young, and are replacing beverages drunk during the rest of the day. The fruit juice industry has also benefited greatly from the increased health consciousness of Western societies.

11.4.2.2 The rapid growth in imports to Middle East markets, particularly Saudia Arabia and the United Arab Emirates, is mainly due to increased oil revenues and the resultant prosperity. The hot climate and general abstinence from beer and other alcoholic drinks, are viewed as important contributing factors.

11.4.2.3 The available literature and foreign trade statistics normally group all fruit juices together, whether concentrated or not. For the purposes of this report fruit juice will be defined as, "fruit juices whether or not containing added sugar, but unfermented and not containing spirit", as classified in all foreign trade statistical

publications. Fruit pulp is also referred to insofar as it is used by the fruit juice industry.

11.4.2.4 The beverage industry is by far the most notable end-user of tropical flavoured fruit juices, concentrates and pulps (hereafter referred to as raw material for simplicity), probably absorbing over 80% of all imports. It uses these products in the manufacture of a wide range of beverages including juices, nectars, fruit juice drinks, fruit drinks, multi-fruit/multi-vitamin drinks, dietetic drinks, diabetic drinks, syrups, liquers, etc. The dairy industry uses about 10% of the imported raw material to blend in yoghurt, ice-cream, desserts, sauces etc. The balance of the raw material (+/-10%), is used by other food processors for jams, jelly, baby food and confectionery.

11.4.2.5 In the beverage sector, orange juice is the most popular flavour on most markets, although many markets in Europe consume large quantities of apple and/or grape juice. Other fruit juices such as grapefruit, other citrus, and pineapple are well accepted world-wide. In contrast demand for tropical fruit juices remains comparatively low, except in Middle East markets where mango and guava are well liked. The flavour preferences in ice-cream are orange, lemon, passion fruit, mango and pineapple. The traditional fruit and berries, e.g. strawberries, are favoured for yoghurts. The growing interest in yoghurts may, however, motivate consumers to try new flavours.

11.4.2.6 The fruit content in the above products varies from market to market, according to national food legislation and industrial practices. On most markets of interest, the following applies.

- i) Fruit juice for sale to consumers must be 100% juice of one or more fruits and contain no additives.
- ii) Fruit nectar is normally composed of 25% to 50% of juice and/or pulp, sugar and water, e.g. in EEC the minimum juice content is 50% for orange and apple, 40% for apricot and 25% for passion fruit and guava.

- iii) Fruit juice drinks have a much lower juice content (usually less than 20%), and may include additives and preservatives and are often carbonated. Although they contain little juice these drinks absorb a considerable amount of raw material as they are sold in large volumes, e.g. "Fanta Orange" has a 10% juice content.
- iv) Multi-fruit/multi-vitamin drinks, introduced into Europe in the last five years are a blend of up to 10 juices. They are normally based on orange, pineapple or apricot juice and most are sold as nectars or drinks.
- v) Fruit yoghurts normally have a fruit content of 10 - 20%.

11.4.2.7 The international trade is almost exclusively in bulk packed raw material. In the industrialised nations only very small quantities of consumer packed items, mainly for delicatessen and speciality shops, are imported. The Middle Eastern markets have in the past imported relatively large quantities of consumer packed juices but a number of bottling plants have been established and bulk packed imports will become increasingly important. The main reasons for the general lack of interest in consumer packs on world markets, are the high costs of transporting bulky, non-concentrated products, and packaging is often more costly in supplying countries. In addition food laws, labelling and packaging regulations pose great difficulties to exporters of consumer packs.

11.4.2.8 An overview of per capita consumption of fruit juice/fruit nectar in different countries can be gained from Table 11.4.2.6. The figures are, however, not directly comparable as the statistical data for some countries include both fruit juice and nectar. It does nevertheless serve to show that a large number of countries should have considerable growth potential.

TABLE 11.4.2.6.

PER CAPITA CONSUMPTION OF FRUIT JUICE/FRUIT NECTAR  
IN VARIOUS MARKETS, 1979 - 1981  
(in litres)

COUNTRY	1979	1980	1981
United States	23,00	24,00	27,00
Canada	-	-	26,00
Saudi Arabia	-	-	24,00
Switzerland	21,00	22,00	21,00
Sweden	20,50	21,00	21,00
Germany, Fed. Rep	16,34	18,53	20,62
Netherlands	16,60	18,30	20,00
Australia	-	-	20,00
United Arab Emirates	-	20,00	-
Finland	13,80	19,50	-
Denmark	15,00	15,00	-
Bahrain	-	13,00	-
Austria	11,50	12,70	-
Kuwait	11,00	-	-
United Kingdom	6,00	7,20	9,70
Belgium	8,30	9,30	-
Norway	7,90	9,10	-
Yemen	-	3,50	-
France	2,50	7,80	3,24
Ireland	2,70	3,10	-
Spain	2,50	2,60	-
Japan	-	-	2,60
Italy	2,20	2,30	-
Portugal	0,90	1,00	-

### 11.4.3. WORLD PRODUCTION AND MARKETING OF FRUIT JUICE

11.4.3.1 Total world trade in fruit and vegetable juices in 1981 was estimated at 1,7 million tonnes valued at about \$2000 million compared to 1,3 million tonnes valued at \$1100 million in 1977. Fruit juices account for over 95% of the total. Developing countries supplied 54% of total world exports in 1981, industrialised countries 44% and European countries with centrally planned economies 3%, in terms of value. There are currently as many as 70 developing countries exporting fruit juice and although half of these export less than \$2 million each, their presence on the market indicates considerable export potential.

11.4.3.2 Details of exports by the 50 major suppliers estimated to represent 95% of world trade, are given in Table 11.4.3.2. Brazil, the largest exporter of fruit juice, has expanded export volumes dramatically in the wake of the widespread frost damage to the United States orange crop.

11.4.3.3 The major suppliers of citrus and tropical juices are as follows :-

- i) Citrus - Brazil, U.S.A., Israel, Argentina, Belize, Morocco, Cuba and Cyprus.
- ii) Pineapple - Brazil, Philippines, Kenya, Thailand, Ivory Coast, United States, Mexico and Swaziland.
- iii) Passion Fruit - Brazil, Kenya, Sri Lanka, Colombia, Peru and Taiwan.
- iv) Mango - India, Brazil, Mexico, Philippines, Ivory Coast, Haiti, Peru and Taiwan.
- v) Guava - Taiwan, India, Philippines, Malaysia, Mexico, R.S.A. and Brazil.
- vi) Papaya - India, Malaysia, Taiwan, Mexico and Brazil.

11.4.3.4 The world trade in juices increased in terms of both volume (76%), and average value (72%), over the five year period 1977 - 1981. In 1981 the twenty five largest import markets accounted for about 95% of the world's trade valued at \$2000 million. Imports by the United States and the

TABLE: 11.4.3.2.

## EXPORTS OF FRUIT AND VEGETABLE JUICE BY MAJOR SUPPLIERS

1977 -1981

	\$ '000					% OF TOTAL **	
	1977	1978	1979	1980	1981	1977	1981
Brazil	180 499	364 318	298 505	364 054	695 169	19,2	35,4
United States	152 178	166 831	188 830	225 157	254 627	16,2	13,0
Italy	78 387	95 361	133 856	126 802	115 806	8,3	5,9
Israel	64 517	79 526	103 885	116 926	115 275	6,9	5,8
Germany Fed Rep	50 999	64 763	82 039	99 425	107 993	5,4	5,5
Netherlands	44 665	53 082	64 279	79 312	90 427	4,7	4,6
Japan	47 148	63 540	67 704	77 586	75 493	5,0	3,8
Argentina	27 702	37 940	49 797	41 998	53 500	3,0	2,7
Austria	27 172	30 584	32 855	37 157	37 492	2,9	1,9
Belgium & Lux	27 845	35 816	33 616	30 884	32 880	3,0	1,7
Greece	36 623	40 349	41 410	38 858	28 511	3,9	1,5
R.S.A.	13 870	18 511	24 797	23 926	28 000	1,5	1,4
Spain	23 946	25 039	32 394	34 245	27 023	2,6	1,4
Philippines	8 808	7 343	13 760	16 168	26 500	0,9	1,4
Yugoslavia	7 726	9 846	11 591	13 950	26 230	0,8	1,3
Other (35 countries)	146 743	139 601	259 194	257 896	251 469	15,6	12,7
TOTAL*	938 828	1196 734	1438 510	1584 344	1966 395	100,0	100,0
% CHANGE		+27,5	+20,2	+10,1	+24,1		

\* Estimated to account for over 95% of world trade

\*\* Percentages may not add up due to rounding

Source: The World Market for Fruit Juices ITC

Federal Republic of Germany, accounted for \$685 million, roughly a third of world imports. The five most important markets including Canada, the United Kingdom and Saudia Arabia together, accounted for over 60% of world trade. Details of imports into the major markets are included in Table 11.4.3.4.

11.4.3.5 During the period under review all markets expanded with the exception of Sweden. Import volumes into the United States increased by 462%, mainly as a result of the dependance on imported orange juice in 1981. Other markets that showed a rapid rise in imports over the five year period were USSR (416%), Italy (383%), Austrailia (334%), Japan (229%) and Ireland (256%). The countries experiencing a relatively low increase in imports compared to the average of 197% were Austria, Denmark and the United Arab Emirates.

11.4.3.6 The size of the world market for individual tropical fruit juice is not known. Most countries publish tropical fruit juices under a general category - other fruit juices - along with a wide range of juices traded in small quantities. A survey conducted by the International Trade Centre, in 1982, estimated the tropical fruit market to be of the order of 50 000 to 60 000 tonnes per annum. The most well known tropical flavours are granadilla, mango, papaya and guava.

11.4.3.7 The markets of most interest as potential outlets for locally produced guava and granadilla juices are the Middle East countries particularly Saudi Arabia. Details of import of fruit and vegetables are included in Appendix 14.

11.4.3.8 The market for tropical fruit juices is characterised by great price fluctuations, particularly of granadilla juice. This is thought to be largely related to the small volumes traded, so that even a small change in demand substantially affects prices in the short run.

TABLE: 11.4.3.4.

## IMPORTS OF FRUIT AND VEGETABLE JUICES INTO MAJOR MARKETS

COUNTRY/AREA	\$ '000					OF TOTAL		% Increase from 1977-1981
	1977	1978	1979	1980	1981	1977	1981	
United States	88 941	220 339	256 927	165 046	411 220	9,3	21,7	462
Germany, Fed. Rep.	162 763	200 127	233 241	256 538	273 859	17,0	14,5	170
Canada	93 783	130 661	153 915	159 329	193 842	9,8	10,2	207
United Kingdom	91 075	107 548	151 149	158 305	182 955	9,5	9,7	201
Saudi Arabi	108 644	160 790	172 655	182 812	161 824	11,2	8,6	149
Netherlands	77 610	94 278	117 585	136 674	145 075	8,1	7,7	187
France	68 650	89 445	97 463	111 962	98 817	7,2	5,2	144
Belgium - Luxembourg	29 898	37 864	46 031	50 709	54 057	3,1	2,9	180
Sweden	50 745	53 831	53 653	52 476	47 695	5,3	2,5	(6)
Switzerland	19 508	27 614	33 610	34 193	34 504	2,0	1,8	177
Libyan Arab Jamahiriya	17 596	25 104	31 398	33 491	34 500	1,8	1,8	196
Austria	22 665	26 404	26 488	28 813	27 880	2,4	1,5	123
Japan	8 980	11 547	24 501	25 741	26 818	0,9	1,4	299
Denmark	22 419	21 146	21 797	21 689	26 030	2,3	1,4	116
Finland	12 851	16 197	16 714	24 267	20 245	1,3	1,1	158
Israel	9 272	14 721	24 348	15 875	18 227	1,0	1,0	197
Hong Kung	8 493	12 210	16 239	23 153	17 761	0,9	0,9	209
Norway	10 903	12 869	14 014	16 343	17 664	1,1	0,9	162
Yemen	10 000	21 668	14 552	16 303	17 500	1,0	0,9	175
Australia	4 794	11 275	10 796	19 889	16 000	0,5	0,8	334
USSR	3 621	4 505	6 249	10 535	15 067	0,4	0,8	416
Italy	3 743	6 179	9 945	14 374	14 351	0,4	0,8	383
Kuwait	15 857	7 366	12 218	12 071	13 000	1,7	0,7	82
Ireland	4 438	6 425	8 665	10 022	11 352	0,5	0,6	256
United Arab Emirates	10 176	5 668	9 464	13 829	11 000	1,1	0,6	108
TOTAL IMPORTS INTO THE 25 MAJOR MARKETS	957 425	1325 481	1563 617	1604 439	1891 243	100,0	100,0	197

\* Increase in Value

\*\* May not add up to 100% because of rounding

Source: The World Market for Fruit Juices ITC.

#### 11.4.4 MARKET OUTLOOK

11.4.4.1 The market for fruit juices is showing favourable growth, both locally and overseas. Although tropical fruit juices constitute a very small portion of the overall market, the volumes traded as compared to the likely scale of production in Swaziland are large. The market is, however, likely to become increasingly competitive.

#### 11.4.5 CONCLUSION

11.4.5.1 Although growth in the market is very favourable in respect of both volumes traded and prices, a more detailed investigation of the market for fruit juices is required, in order to accurately assess trends in the industry and their significance for Swaziland.

### 11.5 MANGO

#### 11.5.1 INTRODUCTION

11.5.1.1 Mangoes are grown widely in most suitable tropical and sub-tropical regions of the world. Very large quantities are produced in East Asia. Reportedly more mangoes are consumed fresh in the world than any other fruit. No single supplying country dominates the international market as the production period for high quality mangoes is generally short. Peru and Brazil are becoming increasingly important suppliers to the major markets of Europe and the Middle East, during the Southern African production season. A wide range of varieties is currently produced.

11.5.1.2 To date importers and consumers have not been unduly variety conscious but are well aware of their requirements in terms of colour, size and taste. There is a marked preference for well coloured, sweet but slightly acidic fruit of 300-400 grammes.

11.5.1.3 Mango trees are unpredictable, irregular bearers and are extremely sensitive to climate conditions. This is currently well illustrated in the Republic of South Africa (R.S.A) where production volumes have shown little increase since 1977 despite substantial plantings which should have ensured a four-fold increase in production between 1980 and 1985.

11.5.2.1 Mango production in southern Africa is thought to have commenced as early as the 17th Century. Modern commercial production began in the Ofcolaco and Malelane areas of the Transvaal around 1920. The local unimproved cultivars which typically produce fibrous, unattractive, turpentine flavoured fruit with a short shelf life are being replaced to an increasing extent by improved tropical and sub-tropical fibreless cultivars.

11.5.2.2 Substantial strides have been made in cultivar selection in Southern Africa. However, cultivar recommendations will remain fluid at least in the short to medium term. Some cultivars which were recommended only a few years ago are now being "topworked" to better cultivars. Few cultivars are well suited to both local environmental conditions and market requirements. The main cultivars currently recommended in R.S.A. are Zill, Haden, Tommy Atkins, Irwin, Kent, Sensation, Keitt and Pahari. (Described briefly in Appendix 15). Other promising cultivars which are as yet grown only in small quantities are Hood, Sheil and Isis. The cultivars Peach, Smith Fascell and Anderson are not recommended for export.

11.5.2.3 The mango harvesting season in most production areas of Southern Africa lasts for approximately 6 - 8 weeks. The onset of ripening does, however, vary in different areas, e.g. in R.S.A. the harvesting season commences as follows:

Malelane - Kaapmuden: from mid-December

Nelspruit: from end of December

Northern Transvaal: from mid-January

In the potential mango growing areas of Swaziland harvesting should commence during December.

11.5.2.4 The commencement of harvest is often delayed by unfavourable climatic conditions resulting in very limited sales prior to Christmas.

11.5.2.5 Mango production in Swaziland has remained relatively small despite a substantial expansion in the South African industry. According to G.B.R. Dixie, the largest producer of mangoes in Swaziland is Tambuti Estates with annual yields fluctuating between 40 - 150 tonnes. The Swaziland Irrigation Scheme is currently topworking Peach mangoes which should increase their current annual production of +/- 10 tonnes, to 100 tonnes by the end of the decade.

11.5.2.6 The major R.S.A. production area is the Transvaal, particularly the districts of Tshipise, Hoedspruit, Nelspruit and Letaba. No reliable statistics are available on current plantings. However, results from the 1981 tree census, which covered 80-85% of the tree population, clearly indicates a tremendous expansion in plantings.

i.e. i) 1 million trees planted

ii) 40% less than 5 years old

iii) 63% fibreless varieties (6% in 1960, 41% in 1970)

See Appendix 16 for details.

11.5.2.7 In general the fresh market is dominated by fibreless mango varieties and the processing market fibrous varieties but they are to some extent interchangeable. Fresh market prices are usually more than treble the producer prices paid by processors, so that volumes processed are essentially a function of production levels.

### 11.5.3 THE SOUTH AFRICAN MARKET

11.5.3.1 Historically most mangoes produced have been sold fresh. Mangoes are well liked by the Black population so that the market in Southern Africa should show a favourable growth as disposable income levels increase. Processing opportunities tend to be limited. The producer prices offered by processors are relatively unattractive so that only poor quality fruit is currently supplied. Recently significant quantities have been processed for achar (mango pickle) in R.S.A., but the market is currently oversupplied.

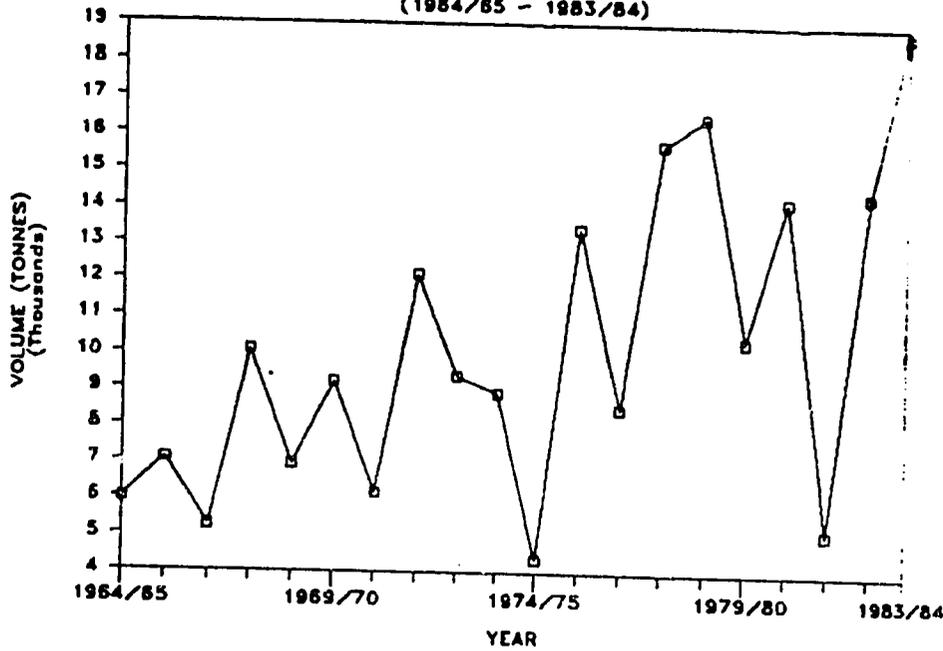
11.5.3.2 Although mangoes are a very popular fruit in Swaziland, overall demand is limited by the relatively low population and the generally low income levels. The commercial production of mangoes will, as in the case of avocados, almost certainly need to be export orientated. The small quantities of mangoes currently produced (+/-100 tonnes/annum) are sold locally as producers have reportedly had low and variable returns from exports.

11.5.3.3 The market for mangoes in southern African countries with the exception of R.S.A. is small. In an effort to establish the potential for Swaziland producers to compete with the already established South African producers, R.S.A. production and marketing trends are examined in some detail.

11.5.3.4 Production volumes in the R.S.A. have fluctuated but overall, have increased significantly since the mid-seventies. Increases in the eighties have, however, been far below 1980 projections. Much of the crop is grown without supplementary irrigation and is hence particularly susceptible to drought conditions. Variations in temperatures and rainfall during critical periods and inadequate disease and pest control have also reduced yields. Many of the main production areas are susceptible to blossom malformation. Producer prices have increased considerably in the eighties but have been so variable that no clear trends are evident. Production volumes and prices from 1964/65 to 1983/84 are illustrated in Figure 11.5.3.4.

11.5.3.5 As in Swaziland, the South African crop is primarily sold fresh. Local fresh produce sales tend to fluctuate below 11 000 tonnes per annum. Exports have varied markedly over the last five seasons (Table 11.5.3.5). Until recently nett returns from exports were often up to three times higher than those on the local market. As a result the volumes sold on the local market were related not only to total production volumes but also to export sales.

### R.S.A. MANGO PRODUCTION (1984/85 - 1983/84)



### R.S.A. MANGO PRICES (1984/85 - 1983/84)

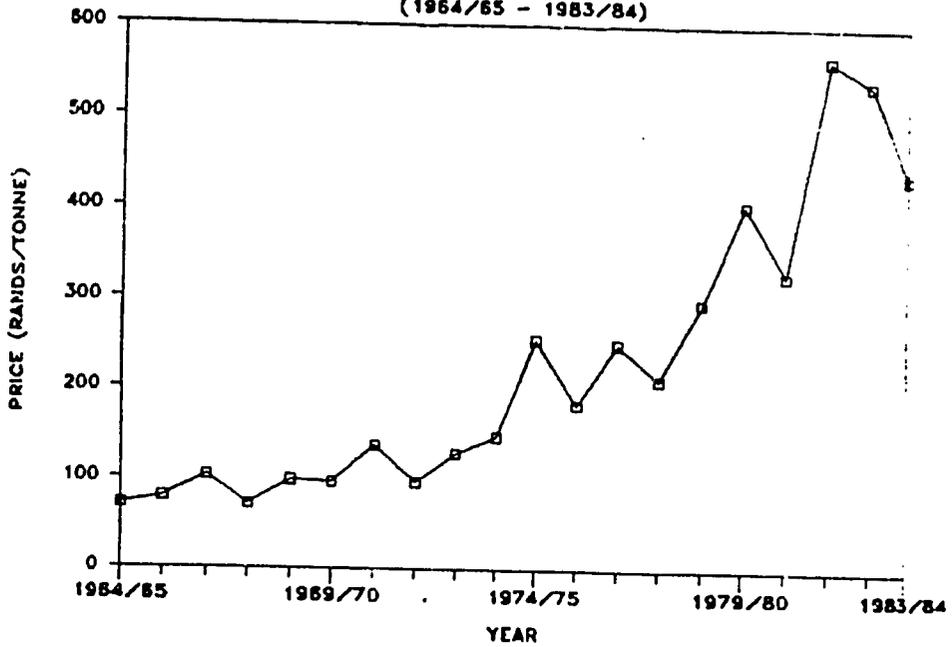


FIGURE: 11.5.3.4.

TABLE 11.5.3.5  
LOCAL SALES AND EXPORTS OF R.S.A. MANGOES

	TONNES PER SEASON*				
	79/80	80/81	81/82	82/83	83/84
Local Sales	5 559	10 240	4 876	10 637	10 000
Export Sales	1 145	545	129	1 560	834

\* Annual statistics as presented in Figure 11.5.3.4

have been recalculated in terms of production seasons.

Source: South African Mango Growers Association (S.A.M.G.A)

11.5.3.6 R.S.A.'s overseas exports have varied both in volume and quality. Despite the rapid expansion in the European mango market, R.S.A.'s share has declined markedly. Production volumes in 1981/82 were the lowest since 1974/75 due to extremely cold weather in August and September. Inadequate rainfall limited the production of good quality fruit in 1982/83 and 1983/84, while the 1980/81 crop was ruined by a particularly wet summer. Export volumes during December have been negligible in past seasons thus allowing competitors to establish themselves on the market. During 1983/84 local prices were very favourable so that many producers chose to sell locally. Export volumes during 1983/84 were further limited as almost 30% of the 834 tonnes offered for export were rejected, by the official inspection service ,mainly because of weevil damage. Discussions with a leading exporter revealed that nett producer prices F.O.B. Jan Smuts Airport increased from R2,91 to R3,30/4½-5 kg tray from 1978/79 to 1983/84.

11.5.3.7 Southern African markets are likely to come under increased pressure until such time as the bulk of exports can be seafreighted. Despite the Government's current rebate of 22c/kg on airfreight charges, the high costs of airfreight considerably reduces R.S.A.'s price competitiveness on overseas markets. Considerable research has gone into pre-harvest spraying programmes to control post-harvest

diseases, into post-harvest treatments and into bulk transport with ripening and packaging overseas to increase the success of seafreighting. Results have been favourable and successful export by sea is now almost possible.

11.5.3.8 The main Southern African production season extends from December to the end of March. Prices tend to peak on both the local and export markets before Christmas and in the middle of February. Small quantities are sold locally during the rest of the year and realise high prices. Monthly sales of mangoes (i.e. volumes and prices) on R.S.A. fresh produce markets from 1975 - 1984 are given in Appendix 17.

11.5.3.9 The R.S.A. mango processing industry is dominated by achar production. Only fibrous, immature green mangoes are used for achar. Processors tend to be secretive, but from available data it is estimated that intake volumes grew from a mere 1 770 tonnes in 1979/80 to a record 16 000 tonnes in 1982/83. However, this resulted in an oversupply situation and a large build up of stocks so that the 1983/84 intake volumes totalled only 6 000 tonnes, 75% down from the previous season. The market for achar is entirely locally concentrated in Natal and the Transvaal. The South African product cannot compete successfully on overseas markets with the cheap high quality Indian achar.

11.5.3.10 Other forms of processing include canning, dehydration and juice production. Commercial production has so far been limited. R.S.A. intake volumes have been +/-500 tonnes in 1982/83 and 1983/84, up from only 129 tonnes the previous season mainly as a result of research being carried out by three co-operatives into the production of consistently flavoured mango products. The processing industry is new and cannot be evaluated fully, but greatest success is expected to be with mango juice, which is covered in more detail in section 11.4.

#### 11.5.4 THE OVERSEAS EXPORT MARKET

11.5.4.1 Europe is rapidly acquiring a taste for the mango and the market, a late starter relative to avocado and pineapple, has shown considerable growth over the last decade. Mangoes are no longer a rare and exotic fruit seen only in the better restaurants and speciality shops. Mangoes are also apparently very well received on Middle East markets and a favourable growth in demand there is anticipated. No statistical data is readily available.

11.5.4.2 The United Kingdom is the largest European importer of mangoes mainly because its Asian and West Indian immigrant populations consume large quantities of this fruit. France has the second largest imports followed by the Netherlands and the Federal Republic of Germany. Imports into the Netherlands often exceed French imports but up to a third is re-exported to neighbouring countries. Small quantities are also imported into Belgium and Switzerland. Imports into other individual European countries are negligible, usually less than 100 tonnes per annum.

11.5.4.3 The rate of expansion in West European imports has reached record levels in recent years. Imports of mangoes by France increased by an annual average rate of 22% from 1975-1983 while imports into the Federal Republic of Germany fluctuated, but overall showed a five fold increase. Unfortunately, current statistics are not available for all markets. However, an indication of relative market sizes can be obtained from Appendix 18.

11.5.4.4 The development of the mango market has benefitted all producers. However those countries able to supply well coloured, correct sized, good flavoured fruit with regularity have earned premium prices and have expanded their market share. Although mangoes are imported throughout the year in most countries, import volumes peak during the summer months from May to August, but also in December. No single supplying country dominates the European market as the production period for high quality mangoes in most countries is short. Table 11.5.4.4 gives the approximate marketing seasons of the more important suppliers during normal climatic conditions relative to Swaziland.

TABLE: 11.5.4.4.

CURRENT MANGO MARKETING SEASONS OF MAJOR PRODUCERS RELATIVE TO SWAZILAND

COUNTRY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Swaziland	X	X	X									
Mali			X	X	X	X	X					
Upper Volta			X	X	X	X	X					
Ivory Coast				X	X	X	X					
Mexico				X	X	X	X	X	X			
R.S.A.	X	X	X	X								X
Brazil	X									X	X	X
Peru	X	X									X	X
Israel								X	X			
U.S.A.						X	X	X	X			
Senegal					X	X	X					
Kenya	X	X	X	X	X	X			X	X	X	X
Congo	X										X	X
India					X	X	X	X	X			
West Indies					X	X	X	X	X			
Venezuela					X	X	X					

11.5.4.5 The U.K. market is supplied mainly by India, Mexico, Venezuela and the Dominican Republic, the French market mainly by French-speaking African countries. Thus, owing to seasonal differences in these supplying areas, imports into the U.K. are greatest in the May - September period whilst the French imports attain a high level in April - May.

11.5.4.6 South African exporters have experienced growing competition on most markets particularly in December and January. The following quote is taken from the article "The European Market for Mangoes" by Chris Shepherd published in the S.A.M.G.A. 1983/84 Annual Report.

"During the South African season (nominally December - April) our sizeable competitors are Kenya, Peru and Brazil. These sources are consistently increasing their exports and these increased volumes are meeting a rising demand in the consumer markets. However, as we have stated before, these producers (particularly Peru and Brazil) appear able to supply well-sized, well coloured fruits with regularity. Not only do the specifications comply with European tastes, but the combination of the specification and the reliability and predictability of supply is conducive to successful multiple business. I am not saying that South African fruit is poor: generally speaking it is on a par with Brazil. However, the multiplicity of varieties produced in South Africa, resulting in variances of size and colour from one week to the next, does pose marketing problems".

11.5.4.7 Although South African exporters have improved the standard of export fruit, South Africa's superiority has diminished against a background of generally rising standards. Size, colour and condition are becoming increasingly important to consumers, so that any variance away from the norm results in heavily discounted prices, e.g. prices varied from FRS 8,00/kg to FRS 20,00/kg in Paris last year.

11.5.4.8 Rapidly escalating costs in R.S.A. and high airfreight charges have severely reduced R.S.A.'s price competitiveness compared to Peru, Brazil and Kenya. An indication of price trends can be gained from import data for the Netherlands and the Federal Republic of Germany in Appendix 19. Care should, however, be taken in the interpretation of these figures as prices vary between different supplying countries on different markets, and prices are a function of demand and competition at the time of export e.g. Brazil and Peru have dominated the traditionally high priced market prior to Christmas, which has increased their overall average price. In view of the short marketing period of most suppliers. Exchange rate fluctuations can also seriously affect import price during the year.

11.5.4.9 Statistical data relating to foreign trade in the U.K. is not readily available as mangoes are grouped together with other tropical fruits in official publications. An analysis of the market for mangoes in France, the second largest importer is therefore included in Section 11.5.5.

#### 11.5.5 THE MANGO MARKET IN FRANCE

11.5.5.1 French imports of mangoes showed an almost five fold increase between 1975 and 1983. Re-exports remained below 200 tonnes at roughly 5% of annual imports. Mali has been the major supplier accounting for 21% of imports over the 9 year period. Imports from Upper Volta have increased dramatically in the eighties and during 1983 accounted for

TABLE: 11.5.5.1.

FRENCH HANGO IMPORTS BY COUNTRY OF ORIGIN  
(TONNES)

COUNTRY	1975	OF TOTAL	1976	1977	1978	1979	1980	1981	1982	1983	OF TOTAL
Upper Volta	117	19,3	89	60	129	-	182	484	950	889	21,7
Mali	111	18,3	176	234	345	456	488	412	549	794	19,4
Ivory Coast	54	8,9	48	25	108	170	263	159	24	429	10,5
Mexico	-	-	32	77	174	170	224	127	181	387	9,4
R.S.A.	6	1,0	50	64	140	349	248	48	35	296	7,2
Brazil	35	5,8	6	21	-	46	79	109	150	281	6,9
Peru	*	*	*	*	*	49	225	569	389	208	5,1
Israel	15	2,5	28	38	49	-	-	72	82	141	3,4
Guinea	*	*	*	*	*	108	67	83	50	124	3,0
U.S.A.	*	*	*	*	*	*	98	47	92	119	2,9
Senegal	44	7,2	44	107	146	161	78	89	151	111	2,7
Kenya	88	14,5	104	134	95	132	73	202	70	109	2,6
Congo	67	11,0	52	58	61	-	77	27	57	81	2,0
Other	70	11,5	104	95	140	218	114	107	126	130	3,2
TOTAL	607	100,0	733	913	1387	1859	2268	2535	2906	4099	100,0
% CHANGE			+20,1	+24,6	+51,2	+34,0	+22,0	+5,3	+16,5	+4,5	

\* Insignificant volumes may have been exported by these individual countries that were included under "Other".

Source: Statistiques du Commerce Exterieur de la France.

22% of the market. Peru was the third largest supplier followed closely by Mexico, both relatively new suppliers to the French market. Imports from R.S.A. increased from relatively insignificant quantities to 349 tonnes in 1979, almost 19% of total imports, only to decrease to a mere 1% by 1982. By 1983 R.S.A. had regained 7% of the total market. (Table 11.5.5.1).

11.5.5.2 From 1981-1983 55% of imports arrived from March to July and a further 10% in December. These fluctuations in imports over the year are related to the availability of supplies. See Table 11.5.5.2. During 1983 the R.S.A. dominated the market in January (59%) and February (91%), but volumes in March and December were low hence reducing R.S.A.'s overall market share for the 4 months to 32%. Imports from Brazil and Peru peaked in December giving Brazil 40% and Peru 35% of the market in that month. Figures for December 1984 indicated that once again R.S.A.'s marketing season commenced late so that of the 425 tonnes sold, R.S.A. supplied only 31, Peru 142 and Brazil 251 tonnes.

#### 11.5.6 MARKET OUTLOOK

11.5.6.1 The outlook for mangoes is good and it is reasonable to assume that demand will continue to expand relatively quickly. Some importers have even compared it to the market for avocados, which developed considerably in the 1970's. This may well be optimistic but considerable opportunities do exist for much larger exports of this fruit to both Europe and the Middle East in the future.

11.5.6.2 From a position of strength on overseas markets in 1979, particularly in France and the United Kingdom, the R.S.A.'s significance has now been almost totally eclipsed by Peru and to a lesser extent Brazil and Kenya. Competition has become fiercer in terms of quality, size (almost exclusively count 12's and 14's now), quantity and continuity and will continue to do so. This coupled with R.S.A.'s loss of influence in the market means that she is now in an even weaker position to impose her own specifications than in the

TABLE 11.5.5.2.

## MONTHLY FRENCH MANGO IMPORTS BY SUPPLYING COUNTRY, 1983

(TONNES)

COUNTRY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Upper Volta	-	-	21	308	419	120	1	-	-	-	-	-	889
Mali	-	-	78	280	344	75	15	2	-	-	-	-	794
Ivory Coast	-	-	1	43	175	135	60	1	-	-	-	14	429
Mexico	-	-	10	15	6	82	122	120	25	7	-	-	387
R.S.A.	117	124	34	-	-	-	-	-	-	-	-	21	296
Brazil	2	-	-	-	-	-	-	-	1	38	76	164	281
Peru	55	6	-	-	-	-	-	-	-	-	1	146	208
Israel	-	1	2	-	-	-	-	3	134	1	-	-	141
Guinea	-	-	-	10	45	56	13	-	-	-	-	-	124
U.S.A.	-	-	-	-	-	2	29	32	56	-	-	-	119
Senegal	-	-	-	-	8	85	17	-	1	-	-	-	111
Kenya	13	2	2	3	-	-	-	-	-	8	64	17	109
Congo	7	-	-	-	-	-	-	-	-	-	35	39	81
Other	3	3	40	5	17	11	9	3	20	2	6	11	130
TOTAL 1983	197	136	188	664	1034	566	266	161	237	56	182	412	4099
TOTAL 1982*	130	119	116	502	794	397	187	128	89	54	75	190	2781
TOTAL 1981*	133	105	144	326	592	274	123	69	91	106	94	331	2388
% OF TOTAL (AVE)	5,0	4,0	4,9	16,0	26,2	13,2	6,1	3,8	4,2	2,6	3,7	10,3	100,0

\* Nett of re-exports, i.e. 125 tonnes in 1982 and 145 tonnes in 1981

Source : Statistiques du Commerce Exterieur de la France.

past. It would be foolish to assume that South African exporters could recoup their market share without some drastic changes in the supply profile and price/cost structure. The successful export of mangoes by sea could give the South African industry the edge, but would not be a long term solution.

11.5.6.3 Prospects for mango production in Swaziland appear very favourable. Cultivar selection to meet the market requirements will be crucial. Based on current trends, demand for mangoes tends to be slow in January and producers would be well advised to select cultivars for marketing from late January to mid-March, after which heavy competition from Mali on overseas markets can be expected.

11.5.6.4 Swaziland will have a distinct advantage over South African producers whose reputation has to some extent become tarnished, because:

- i) EEC import tariffs do not apply.
- ii) Swaziland currently markets citrus to Middle East and is hence well placed should that market expand.
- iii) Potential production areas are closer to ports than the source areas in R.S.A.
- iv) Environmental conditions favour the marketing of mangoes in February when competition from other suppliers is limited.

#### 11.5.7 CONCLUSION AND RECOMMENDATIONS

11.5.7.1 The projected increase in production in R.S.A. based on tree population increases is not sufficient proof that local mango markets will become limited in the future. Swaziland producers should be price competitive on overseas markets and where there is free movement of goods, should be able to compete well on the local southern African market.

11.5.7.2 The choice of sites and cultivars, as well as adequate disease and pest control, will be important for economic success.

## 11.6 PAPAYA

### 11.6.1 Introduction

11.6.1.1. This fruit is variously known by the names of pawpaw, papaya, papaia and papia. The first name is commonly used in Southern Africa.

11.6.1.2 World production is currently around 2 million tonnes, which is equivalent to roughly 10% of world banana production. The papaya is, however, one of the less well known tropical fruits as world trade has remained limited (e.g. † 1 250 tonnes imported into E.E.C. during 1983). The major exporters on world markets are Brazil, Mexico, India, Indonesia and Philippines.

11.6.1.3 There is an increasing movement away from plantings derived from open-pollinated seed and the new improved cultivars such as the Hawaii and Ceylon lines could stimulate demand. The fruit is produced primarily for the fresh market. The demand for the pure canned product and juice is relatively low. Papaya production is only economic in tropical regions.

### 11.6.2 BACKGROUND

11.6.2.1 The papaya tree is indigenous to the tropical parts of Central America, but to-day is cultivated in most tropical and sub-tropical regions of developing countries albeit to a limited extent in many areas. Papaya production in Southern Africa has shown little increase over the last 3 - 4 decades. Most local plantings are derived from

open-pollinated seed, so that the fruit is variable, i.e. in terms of colour, size, internal quality and shelf life. Papaya producers have been slow to improve post-harvest handling and packing. In short demand has remained limited so that prices have not been sufficiently high to encourage increased production. In addition the environmental requirements of the papaya are similar to that of the banana, which has to-date been far more profitable.

- 11.6.2.2 The availability of improved cultivars in R.S.A. since the late seventies should however change this trend. Already there has been a substantial improvement in producer prices, i.e. R317/tonne in 1983/84 compared to only R113/tonne in 1976/77. Producer prices of the papino, the most well known of the new cultivars, are up to twice those of ordinary papaya. In general the higher returns far outweigh the increase in production costs caused by the relatively high plant population of the new cultivars.
- 11.6.2.3 Although papaya grows well in Swaziland no large commercial plantings are evident. Most existing plantings are for home consumption.
- 11.6.2.4 World production has increased by 37% from 1974/76 to 1983/84 largely because of the significant expansion in plantings in Brazil (Table 11.6.2.4.). The five largest producers accounted for over 70% of production in 1983, i.e. Brazil, 23,2%, Indonesia 15,6%, India 13,6%, Mexico 11,6% and Zaïre 7,9%.

TABLE: 11.6.2.4

## ESTIMATED WORLD PRODUCTION OF PAWPAW

COUNTRY	1000 TONNES				% CHANGE FROM 1974/76-1983	% OF TOTAL *	
	1974/76	1981	1982	1983		1974/86	1983
Brazil	129	450	460	460	+357	8,9	23,2
Indonesia	220	312	300	310	+ 41	15,3	15,6
India	257	270	270	270	+ 5	17,8	13,6
Mexico	220	226	201	230	+ 5	15,3	11,6
Zaire	165	156	156	156	- 6	11,4	7,9
Philippines	64	104	105	110	+ 72	4,4	5,5
China	36	75	70	75	+208	2,5	3,8
Peru	64	47	48	49	- 23	4,4	2,5
Mozambique	35	38	38	40	+ 14	2,4	2,0
Cuba	27	32	35	38	+ 41	1,9	1,9
Veneauala	32	33	33	34	+ 6	2,2	1,7
USA	19	43	38	33	+ 74	1,3	1,7
Columbia	43	27	30	31	- 28	3,0	1,6
R.S.A.**	20	25	25	25	+ 25	1,4	1,3
Ecuador	20	24	24	25	- 14	2,0	1,3
Bangladesh	19	25	25	25	+ 32	1,3	1,3
Other	63	70	72	71	+ 13	4,4	3,6
TOTAL	1 442	1 956	1 928	1 982	+ 37	100,0	100,0

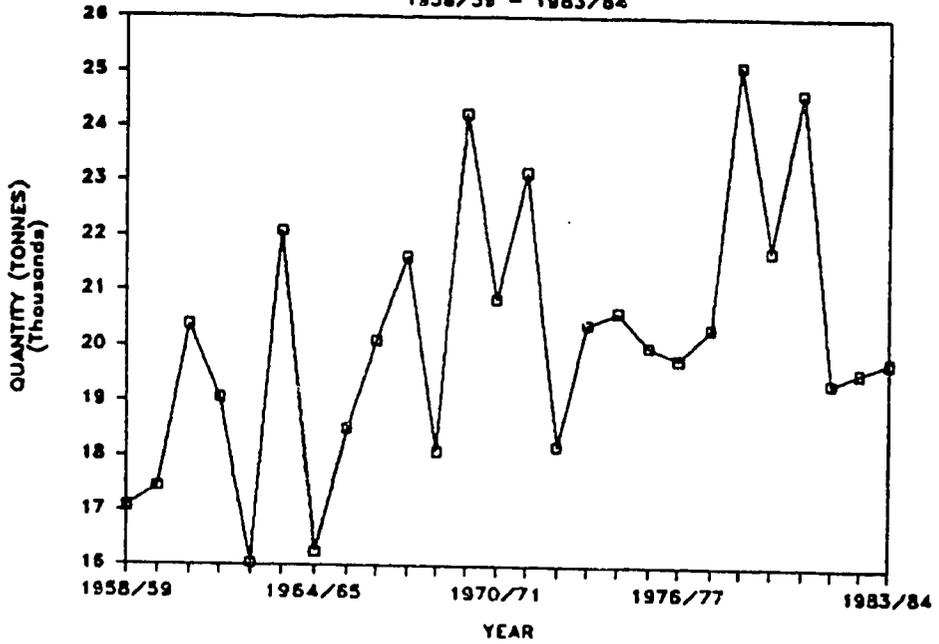
\* May not add up due to rounding

\*\* Figures for 1981 -1983 are slightly different according to R.S.A. sources.

- 11.6.2.5 Papayas are produced primarily for the fresh market. The demand for the canned product is small and although the demand for tropical fruit juices is growing, returns are low so that only poor quality papayas have been processed to-date.
- 11.6.2.5 Although papayas are available throughout the year, production in Southern Africa is much lower during the colder months. If papayas are being picked selectively at the correct stage of maturity and effectively treated against post harvest diseases, the fruit can be kept in good condition in cold storage for up to a month.
- 11.6.2.5 PRODUCTION AND MARKETING OF PAPAYA IN R.S.A.
- 11.6.3.1 In R.S.A. the papaya is mainly cultivated in the eastern and north-eastern Transvaal Lowveld and to a lesser extent in Natal and the Eastern Cape. Production volumes have remained relatively static. According to the Agricultural Census there were 1 097 trees planted in 1946, roughly the same as to-day. Over the last 26 years production volumes have ranged from 16 044 - 25 135 tonnes. The annual average is 20 180 tonnes. The relatively small variations in production are largely cyclical in nature and related to the short production cycle. Average producer prices have shown a more than 4 fold increase since the early seventies, in marked contrast to the very small increase of the sixties. Trends in production volumes and producer prices are illustrated in Figure 11.6.3.1.

### R.S.A. PAPAYA PRODUCTION

1958/59 - 1983/84



### R.S.A. PAPAYA PRICES

1958/59 - 1983/84

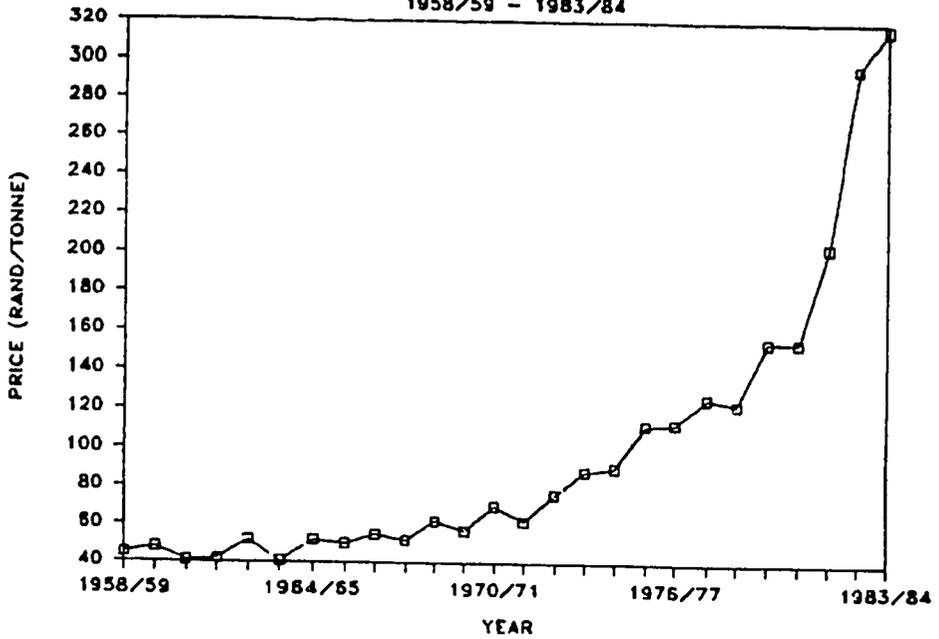


Figure 11.6.3.1

11.6.3.2 The market distribution of locally produced papaya is typically :

Fresh Market - local 98 %

Fresh Market - Export 1 %

Processors - Local 1%

11.6.3.3 The main production season extends from May to December. Volumes peak in September - November. Usually 73% of the annual crop is sold on municipal fresh produce markets. The Johannesburg and Pretoria markets together account for  $\pm$  70% of volumes traded. Quantities and average prices of fruit sold on the 14 markets for 1975 - 1984 are included in Appendix 20. Relatively significant quantities of papaya are sold directly to wholesalers, retailers and consumers, especially in Natal.

11.6.3.4 The proportion of papinos and other new cultivars exported is dependant on the quality of the fruit and the price level on the local market relative to nett returns from exports. In general 8-20% of the annual papino crop of  $\pm$  2 000 tonnes is exported. The loss of winter leaf cover has increased the incidence of sun blemishes on locally produced fruit rendering them suitable for export. A recent development is the appearance of Brazilian papaya on the European market at prices generally below those of South African fruit.

#### 11.6.4 THE OVERSEAS MARKET FOR PAPAYA

11.6.4.1 World trade in papayas is severely limited, but E.E.C. markets are importing increasing quantities i.e. 1 249 tonnes in 1983 compared to 566 tonnes in

1980. The tremendous expansion in production in Brazil and Israel's current efforts to promote exports could result in a dramatic increase in trade over the next decade.

11.6.4.2 The United Kingdom is the major E.E.C. importer of papayas accounting for more than 30% of imports from 1981 - 1983, followed by France (23%), West Germany (17%), Italy (9%), and the Netherlands (8%). Average prices increased by 61% between 1980 and 1983. The major supplying country is Brazil which accounted for 96% of total E.E.C. imports in 1983, compared to 42% in 1980. Details of the quantity and value of E.E.C. imports (1980-1983) are given by importing country and supplier : - Appendix 21.

11.6.4.3 The market for papaya in the Middle-East and Far East needs further investigation.

#### 11.6.5 MARKET OUTLOOK

11.6.5.1 The Southern African market and overseas markets for papayas are small, but growing. Good potential exists for the supply of consistently high quality papayas. The favourable increases in producer prices could stimulate increased interest and larger production.

#### 11.6.6 CONCLUSION:

11.6.6.1 The future of the Southern African papaya industry depends largely on the ability of producers to overcome the current technical production problems and the profitability of papaya production relative to other subtropical fruits. Papayas, like bananas, are well suited to planting between young avocado and nut trees.

11.7. PINEAPPLE

11.7.1. INTRODUCTION

11.7.1.1. Pineapple, a proven crop in Swaziland, is produced primarily for canning. The industry is export based and contributes significantly to foreign exchange earnings.

11.7.1.2. Competition on world markets is likely to increase. Swaziland benefits from duty free access to the EEC, but high transport costs are a serious disadvantage. Swaziland does not have a seasonal advantage as pineapple is produced throughout the year in most supplying countries.

11.7.2. BACKGROUND

11.7.2.1. Production began in Southern Africa as early as 1860 when the first pineapples from Ceylon were planted in Natal and shortly after in Bathurst in the Eastern Cape. The export of fresh pineapples to England began in 1907 and canned products in 1945. Today more than 20 000 hectares are planted, 7% of which is in the Malkerns Valley, Swaziland.

11.7.2.2. Pineapples are mainly canned (+ 70% ) in the form of rings, chunks, bits and pieces or crush. Fruit juice is essentially a by-product of the canning process. The market for pineapple juice has been covered in Section 11.4. Pineapples are also sold fresh but the market is relatively small compared to that for the canned product.

11.7.2.3. Only two cultivars are currently grown on a commercial scale in Southern Africa. The Smooth Cayenne pineapple is grown principally for canning, but because of its good keeping quality and the preference for it abroad, small quantities are also exported as fresh fruit. Queen pineapples are exclusively produced for the local fresh fruit market as its small size renders it unsuitable for canning.

11.7.3. PINEAPPLE PRODUCTION AND MARKETING IN SWAZILAND

11.7.3.1. Swaziland's production of pineapple has increased significantly in recent years largely as a result of higher yields from improved management practices and in 1984 higher rainfall. See Table 11.7.3.1. The bulk ( $\pm$  90%) of the crop is produced on 1296 hectares by Swaziland Fruit Cannery (Swazican) and 146 hectares on a smallholder Pineapple Settlement Scheme.

TABLE 11.7.3.1.

PINEAPPLE PRODUCTION IN SWAZILAND

<u>YEAR</u>	<u>TONNES</u>	<u>% CHANGE</u>
1976/77	20 842	
1977/78	23 355	+ 12,1%
1978/79	29 869	+ 27,9%
1979/80	27 553	- 7,8%
1980/81	29 334	+ 6,5%
1981/82	35 150	+ 19,8%
1982/83	37 327	+ 5,9%
1983/84	44 279	+ 18,6%

Source: Swaziland Annual Statistical Bulletin 1979 and Swaziland Economic Review 1982 - 1984.

11.7.3.2. Almost all pineapple produced in Swaziland is processed by Swazican (44 000 tonnes in 1984). The local market for canned pineapples is limited so that the canned products are exported - typically 80% to the EEC, 15% to other European Countries and 5% to the U.S.A. The most important EEC markets are the United Kingdom and the Federal Republic of Germany.

11.7.4. PINEAPPLE PRODUCTION AND MARKETING IN THE REPUBLIC OF SOUTH AFRICA (R.S.A.) AND CISKEI

11.7.4.1. The major pineapple production area is along the coastal belt of the Eastern Cape and Ciskei. Together these two adjacent areas account for 84% of Smooth Cayenne plantings and 9% of the Queen plantings (Table 11.7.4.1). Queen pineapples are produced mainly in the Umkomaas, Empangeni and Hluhluwe areas in Natal and to a lesser extent in the Levubu area of the Northern Transvaal.

TABLE: 11.7.4.1.

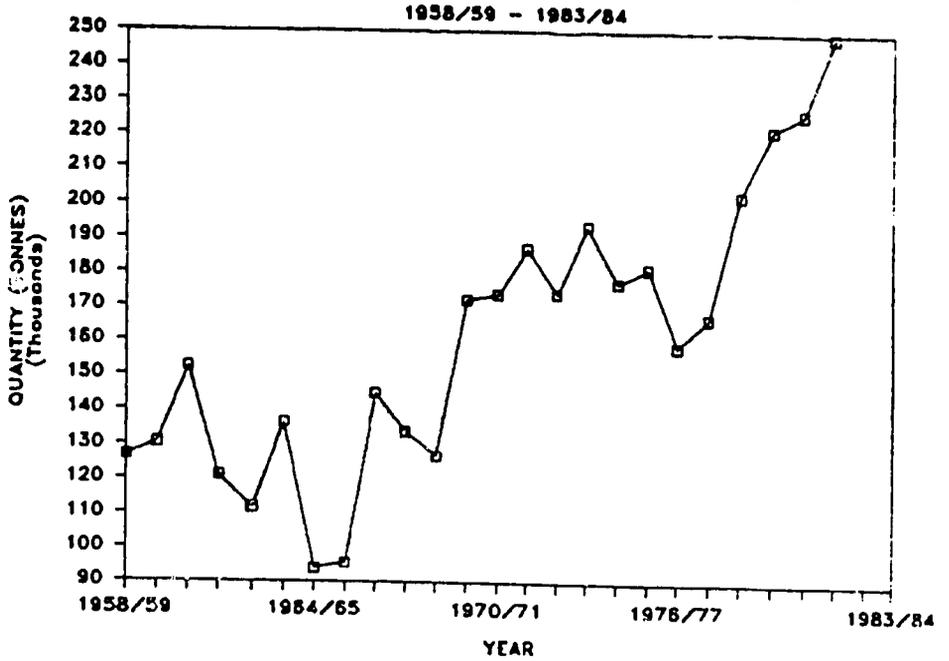
AREAS PLANTED TO PINEAPPLES IN R.S.A AND CISKEI, 1984

REGION	Nett Area (hectares) by Cultivar		
	Cayenne	Queen	TOTAL
<u>R.S.A.</u>			
Eastern Cape	8 320	250	8 570
Natal	2 500	2 500	5 000
Northern Transvaal	20	250	270
Sub Total	10 840	3 000	13 840
Ciskei	4 788	15	4 803
TOTAL R.S.A. & Ciskei	15 628	3 015	18 643
% OF TOTAL	84	16	100

11.7.4.2. Production volumes have doubled over the last twenty years. The major increase (57%) occurred between 1976/77 and 1981/82. The severe drought in 1983/84 reduced yields to the lowest level in 15 seasons. Producer prices increased little prior to the mid seventies, but have shown an average annual increase of 12% over the last ten seasons. Trends in production volumes and prices are depicted in Figure 11.7.4.2.

11.7.4.3. Producer prices on fresh produce markets are four to five times higher than those paid by processors. The fresh market is, however, small so that the bulk of the crop is canned. Table 11.7.4.3. contains details of the market distribution and producer prices of the R.S.A. and Ciskei production. During a normal season the distribution is typically 75% canned, 20% local fresh market, and 3% juice and concentrate. Dehydrated and frozen pineapple form only a very small part of overall production and a little growth is anticipated in the foreseeable future.

### R.S.A. PINEAPPLE PRODUCTION



### R.S.A. PINEAPPLE PRICES

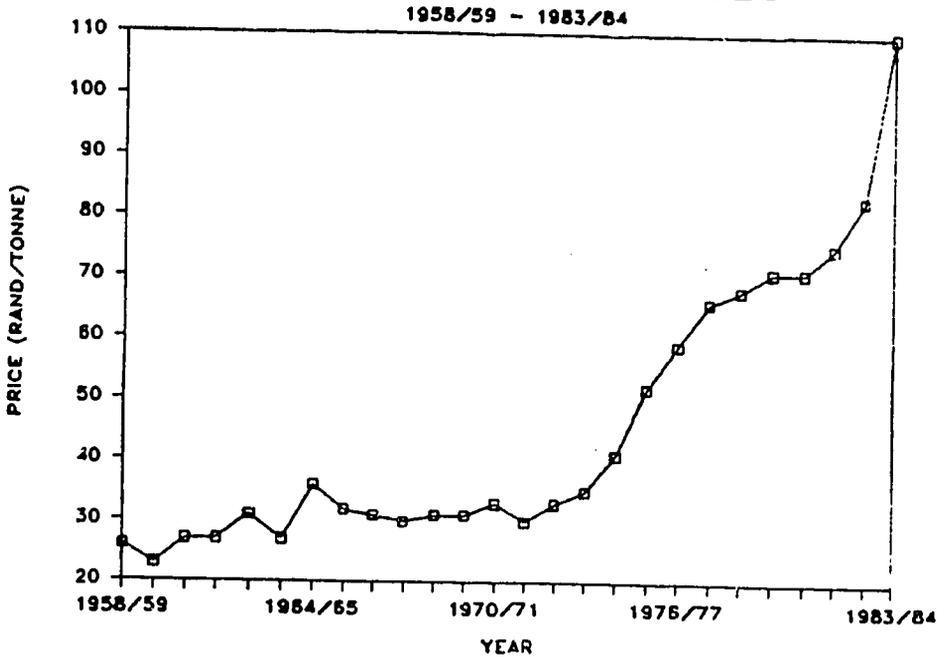


FIGURE 11.7.4.2.

TABLE: 11.7.4.3.

DISTRIBUTION OF R.S.A. AND CISKEI PINEAPPLE PRODUCTION

	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84
<u>QUANTITY</u> (tonnes)							
Canned	126714	150913	167484	166908	187149	161453	104933
Fresh Market-local*	33305	41907	43994	49576	51792	33372	38930
Fresh Market-export	2058	3358	3576	3719	3455	3264	2813
Juiced	5179	6484	6512	6523	6792	10906	4956
Dehydrated		35**	21	7	27	8	-
Frozen			292**	-	-	-	-
Concentrate						597**	1683
<b>TOTAL</b>	<b>167256</b>	<b>202697</b>	<b>221879</b>	<b>226733</b>	<b>249215</b>	<b>209600</b>	<b>153315</b>
<u>AVERAGE PRICE</u> (R/tonnes)							
Canned	42	44	48	44	46	51	65
Fresh Market-local	155	141	145	155	171	228	225
Fresh Market-export	223	317	331	276	330	367	377
Juiced	26	25	26	16	27	23	43
Dehydrated		116	130	127	121	177	-
Frozen			30	-	-	-	-
Concentrate						4	27
<b>WEIGHTED AVERAGE</b>	<b>66</b>	<b>68</b>	<b>71</b>	<b>71</b>	<b>75</b>	<b>83</b>	<b>110</b>

\* This includes produce sold on the Municipal markets, plus commercial and farm usage

\*\* Details prior to this date are unavailable

Source: Department of Agriculture: Economics and Marketing, Pretoria

11.7.4.4. There are six pineapple canneries in R.S.A., four situated in the Eastern Cape and two smaller ones in Natal. It is estimated that with a more even flow of pineapples the existing factories could process up to twice their current intake volumes with existing plant. Ciskei is currently investigating the potential to double production to 120 000 tonnes per annum.

11.7.4.5 Roughly 90% of canned pineapple processed in R.S.A. are exported annually. Canned pineapple is the most important segment of the export market. The production and distribution by members of the S.A. Fruit and Vegetable Canners Association is detailed in Table 11.7.4.5. These figures can be taken to approximate sales as only one small pineapple canner's figures are excluded. Pineapple products are sold in cartons containing 24x A½ cans with a nett mass of 20,41 kg, commonly known as basic cartons.

TABLE: 11.7.4.5.

R.S.A. PRODUCTION AND DISTRIBUTION OF CANNED PINEAPPLE FRUIT

Tonnes

	1981/82	1982/83	1983/84
<u>Production</u>	54 999	52 999	51 999
Distribution - local	4 453	5 332	5 867
export	62 022	49 163	42 455

Source: S.A. Fruit and Vegetable Canners Association (Pty) Ltd

11.7.4.6. The market destination of the canned pineapple exports during the 1983/84 season was:-

	<u>%</u>
Europe	42,1
North America	36,1
United Kingdom	17,3
African Continent	2,5
Other	2,0

11.7.4.7. The processing of pineapples for juice is not economically viable. The canning industry regards juice as a by-product extracted from the juice grade fruit, canning waste and pineapple skins. Almost 95% of the juice produced locally is exported. R.S.A.'s major market is the United Kingdom, e.g. during 1983/84, 66% of the 5000 tonnes of juice and 40% of the 2000 tonnes of concentrate was exported to the United Kingdom.

11.7.4.8. Fresh pineapple sales currently account for 22% of total production. The local market currently absorbs  $\pm$  20% annually, 70% of which are the Queen cultivar. Volumes traded locally have fluctuated largely as a result of changing production levels so that no clear trend in demand is evident. Trade sources report that the local fresh produce markets are currently well supplied and that only limited growth can be anticipated in the future. Producer prices have increased by only 45% over the last 7 seasons, which represents a significant decrease in real terms. Details of monthly volumes and prices for 1975-1984 on the 14 markets are included in Appendix 22. The Johannesburg and Pretoria markets together handle almost 60% of this trade.

11.7.4.9. Fresh fruit exports are small, averaging 3178 tonnes/annum since 1977/78. Exports during 1983/84 were low partly due to a fire in the packhouse of one of the two companies currently exporting fresh pineapples. Most pineapples are sea freighted for the so called popular market. The major markets are the United Kingdom, Federal Republic of Germany and Netherlands. Air transport provides a superior product commanding higher prices as it allows selection of more mature pineapples. This so called luxury market is normally supplied by Kenya although R.S.A. airfreights small quantities, normally during November and January to Switzerland, Italy and Belgium. In addition R.S.A. is reportedly a well established, year around supplier of airfreighted pineapples direct to Austria.

11.7.4.10. The market distribution of R.S.A. fresh pineapple exports over the last three seasons were:-

	<u>%</u>
United Kingdom	77,4
Switzerland	8,0
Germany Federal Republic	7,1
Netherlands	3,8
Italy	1,7
Austria	1,5
Belgium	0,5

Source: S.A. Fruit and Vegetable Cannery Association (Pty) Ltd

11.7.5. WORLD PINEAPPLE PRODUCTION

11.7.5.1. World production increased by 44,3% to almost 9 million tonnes from 1974/76 to 1982, largely due to increased production in Asia and South America. Asia is the largest producing region accounting for 54% of total production in 1981- 1983 . Details of production by region are included in Table 11.7.5.1. and a breakdown by country in Appendix 23 During 1982 the most important pineapple producing countries were:-

	<u>%</u>
Thailand	20,6
Philippines	9,8
Brazil	7,5
India	6,9
Indonesia	6,2
Mexico	6,2
U.S.A.	6,2
Ivory Coast	3,9
South Africa	2,6
Kenya	1,8

Source: FAO Production Yearbook

TABLE: 11.7.5.1.  
WORLD PINEAPPLE PRODUCTION BY REGION  
'000 Tonnes

REGION	1974-76	% OF TOTAL	1980	1981	1982	% OF TOTAL
Asia	2 818	45,9	4 098	4 729	4 974	56,1
North & Central America	1 271	20,7	1 381	1 387	1 355	15,3
Africa	1 034	16,8	1 205	1 246	1 258	14,2
South America	895	14,6	1 016	1 078	1 142	12,9
Oceania	125	2,0	141	151	133	1,5
Europe	2	*	2	2	2	*
WORLD TOTAL	6 145	100,0	7 843	8 593	8 864	100,0

\* Less than 0,1%

Source: FAO Production Yearbook

11.7.6. THE OVERSEAS MARKET FOR CANNED PINEAPPLE

(Excluding Pineapple juice and concentrates which are covered in Section 11.4)

11.7.6.1. In 1979 the world trade in pineapples peaked at 1,3 million tonnes (64 million basic cartons) By 1983 the volume had decreased to 1 million tonnes but is expected to rise to 1,2 million tonnes by 1988. The major suppliers are the Phillipines which produces roughly 325 000 tonnes and Thailand which is expanding production from the current 184 000 tonnes to 265 000 tonnes. Other important producers are the Ivory Coast, R.S.A., Hawaii, Brazil and Malaysia. The R.S.A. currently exports 88 000 tonnes which represents about 8% of the market.

11.7.6.2. The Federal Republic of Germany is the largest European importer of canned pineapple accounting for 34% of total imports annually, followed by the United Kingdom (20%) and France (15%). The imports into Japan are slightly higher than into the Netherlands the fourth largest European importer (6%). See Table 11.7.6.2. Import volumes into 12 of the 14 countries studied decreased between 1981-1983. Imports do however tend to fluctuate from year to year so that although there appears to have been a stagnation in demand overall import volumes are not expected to decrease significantly in the long term.

11.7.6.3. The major supplying countries to Western Europe during 1983 were Thailand (21,1%), Philippines (19,2%), Kenya (19,2%), R.S.A. (10,5%), Ivory Coast (6,5%), Martinique (5,2%), Swaziland (4,7%), Malaysia (4,6%) and Taiwan (3,2%). See Appendix 24 The Japanese market is supplied mainly by the Philippines and Thailand. Details of import volumes into 14 markets by country of origin are given in Appendix 25.

TABLE: 11.7.6.2.

IMPORTS OF CANNED PINEAPPLE\* INTO WESTERN EUROPE AND JAPAN

Country	T O N N E S			% OF Europe's 1983 TOTAL
	1981	1982	1983	
Germany Fed.Rep	84 896	81 775	75 220	33,9
United Kingdom	47 845	52 759	44 509	20,0
France	40 878	39 917	33 109	14,9
Netherlands	16 598	15 370	13 228	6,0
Italy	10 239	12 944	12 648	5,7
Switzerland	8 753	9 673	8 603	3,9
Belgium/Luxembourg	9 821	9 499	8 144	3,7
Sweden	7 831	6 999	7 414	3,3
Austria	6 768	7 227	6 104	2,8
Einland	4 576	6 241	5 664	2,5
Denmark	3 863	3 200	3 441	1,5
Norway	3 493	3 603	3 115	1,4
Irish Republic	1 224	1 374	971	0,4
Sub Total	246 785	250 581	222 170	100,0
Japan	17 337	18 717	15 045	
TOTAL EUROPE & JAPAN	264 122	269 298	237 215	-

\* In syrup and natural juice

11.7.7. THE OVERSEAS MARKET FOR FRESH PINEAPPLES

11.7.7.1. The largest fresh pineapple "consumers" are in order of importance, the United States of America, Japan and France. The market in Western Europe and the Middle East is of most interest to Swaziland. The long distance and associated high transport costs to the U.S.A. and Japan will be a serious constraint as is the very stringent health regulations applied by the Japanese Government. No statistical data is currently on hand to analyse trends in the U.S.A. or Japan.

11.7.7.2. In Europe the comparative per capita consumption of fresh pineapples is currently

	<u>Grammes/annum</u>
France	900
Belgium	560
Germany Fed Rep (also U.S.A.)	313
Denmark	273
United Kingdom	137
Italy	84
Holland	68
Ireland	30

Source: World Pineapple Production and Marketing Aspects  
in France - D Aldrich

- 11.7.7.3 In terms of volumes France is by far the largest importer of fresh pineapples accounting for almost 40% of imports into the 12 major countries \* of Western Europe. The Federal Republic of Germany is the second largest importer followed by Italy, Spain, the United Kingdom, Belgium and the Netherlands. At times the Netherlands' imports have exceeded those into both the United Kingdom and Belgium, but up to 50% is re-exported annually. Unfortunately current statistics are not available for all markets but an indication of relative market sizes can be gained from Appendix 26. Roughly 15% of imports are airfreighted for the luxury markets.
- 11.7.7.4 The Ivory Coast is the dominant supplier of fresh pineapple to Western Europe (74,4% in 1979), followed by the United Republic of Cameroon (7,5%), Honduras (3,7%), R.S.A. (3,4%) and Kenya (2,0%). During 1978 and 1979 the record crops of the Ivory Coast flooded most European markets. Total import volumes were up by over 50% relative to the 1976 and 1977 seasons. The R.S.A. has a declining market share, particularly in her major export market, the United Kingdom, where her market share decreased from 76% in 1973 to 25% in 1979. This downward trend is likely to continue because of increased competition from the Ivory Coast.
- 11.7.7.5 Imports have tended to level off in the eighties, particularly in France. It has been suggested that the major cause is a stagnation in supplies rather than a saturated market. Average import prices increased by 9,3% in Europe between 1980 and 1983. See Appendix 27 for details. The Ivory Coast is well placed to supply the major markets and prices are currently up to 30% lower than similar produce from R.S.A.

\* United Kingdom, Federal Republic of Germany, Netherlands, Belgium, France, Switzerland, Sweden, Denmark, Norway, Austria, Italy and Spain.

11.7.7.6. The most commonly accepted variety in Europe is Smooth Cayenne. Very small quantities of Queen, Red, Spanish and Abacaxis are also marketed. The colour, weight and condition of the crown are the leading quality characteristics. On most markets there is a preference for fully mature fruit of a deep yellow or coppery orange shade. However, some countries notably the United Kingdom prefer pineapple to be two thirds coloured to allow for distribution time. Pineapples should weigh between 0,7kg and 1,5kg. In order to reduce sea-freight costs, which are based on volume, the crowns are often trimmed and a plastic plug is used to replace the missing portion. The pineapples for the popular or mass markets are packed 10,12,15 or 20 to a fibreboard container. The "luxury market" fruit is packed 4, 6 or 8 to a carton.

11.7.7.7. Pineapple imports are concentrated in the period October to May and peak in December. During the summer months, when the supply of cheap domestic fruit is abundant, the demand is significantly reduced. The exporting seasons of the major suppliers are given in Table 11.7.7.7. Although the Ivory Coast exports throughout the year, relatively small quantities are sold in July-September.

TABLE: 11.7.7.7.

THE EXPORTING SEASONS OF MAJOR PINEAPPLE EXPORTING COUNTRIES

<u>Country</u>	<u>M O N T H S</u>											
	J	F	M	A	M	J	J	A	S	O	N	D
Ivory Coast	X	X	X	X	X	X	X	X	X	X	X	X
Cameroon, U.R.	X	X	X	X	X						X	X
Honduros				X	X	X	X	X	X	X	X	X
R.S.A.										X	X	X
Kenya	X	X	X	X	X	X	X	X	X	X	X	X
Martinique				X	X	X	X	X	X	X	X	X
Guinea				X	X							

Source: Selected European Markets for Tropical and Off-Season Fresh Fruit and Vegetables - ITC UNCTAD/GATT

11.7.8. MARKET OUTLOOK

11.7.8.1. Projections on future market trends and the potential to expand production in Swaziland is compounded by the inter-relationship between the different market segments brought about by the physical nature of production. Only a small portion of the annual crop would be suitable for the fresh export market because of the strict quality requirements. The balance of the crop would be canned, and pineapple juice would be produced as a by-product.

11.7.8.2. Internationally the market for canned pineapple is uncertain. Some developing countries are increasing production substantially which in view of the low growth in demand could result in a surplus by 1988. Swaziland's current share of the EEC markets is ± 5%. Swaziland should experience little difficulty in maintaining this share in view of the important advantage of duty free access to the EEC.

11.7.8.3. Southern African exports of fresh pineapples face severe competition from the Ivory Coast during most of the year. Distance to the market from the Ivory Coast is half that from Southern Africa so that locally produced fruit costs up to 30% more. The luxury market for pineapples is small.

11.7.8.4. The local fresh produce markets are well supplied. An increase in consumption could occur with market promotion and a change in eating habits of a more affluent society.

11.7.9 CONCLUSION AND RECOMMENDATIONS

11.7.9.1 The overall market appears well supplied and can be expected to become increasingly competitive. However, Swaziland has a well established industry and a plant with surplus production capacity and subject to more detailed consultation with the owners it would seem that there is a good case for expanding field production as a facet of an overall fruit development project.

11.7.9.2. The feasibility of producing the additional 11 000 tonnes of Cayenne pineapples required by the existing canning factory, will depend largely on the economics of production relative to other climatically adapted enterprises. Pineapples are high bulk low value products so that plantings would need to be limited to the immediate vicinity of the cannery.

## 12. OTHER DETERMINANTS IN PROJECT IDENTIFICATION

### 12.1 NATIONAL AND DONOR POLICIES

- 12.1.1 It has been mentioned that the broad objectives of the study as set by U.S.A.I.D. are in full accord with the policies and priorities of the Government of Swaziland, i.e. to assist more Swazi smallholders to enter markets for lucrative agricultural projects.
- 12.1.2 In considering what type of project would best accord with national policies the most important criteria are probably :
- a) number of beneficiaries
  - b) contribution to forex exports
  - c) labour intensity.
- 12.1.3 It is considered that a project to further develop the smallholder role in the well established cotton industry would probably affect the largest number of farmers but various factors tend to operate against this option, namely :
- a) Assistance in this direction is not favoured by U.S.A.I.D. inter alia because of the international cotton over-supply situation.
  - b) The cotton industry is well established and is already the subject of assistance from the E.E.C.
  - c) The multi-dimensional needs of the industry (seed breeding improved extension, more credit, pest control, etc) are such that an aid project would be rather diffuse and it could be difficult to assess benefits relative to costs.
  - d) Whilst cotton is exported it is marketed exclusively within the Rand monetary area and exports from Swaziland do not contribute to forex earnings.
- 12.1.4 Similar considerations apply to the maize industry, which in any event is the subject of assistance from U.S.A.I.D. through research programs. \*
- 12.1.5 A tobacco project is not favoured by U.S.A.I.D., particularly in the light of the world over-supply situation.
- 12.1.6 Projects orientated towards the production of milk, poultry, eggs and sugar, would benefit few participants.

\* Post Script: The estimated gross margin for maize anticipated an increase in the 1985 price in R.S.A. which would affect the Swaziland price. This increase did not eventuate.

- 12.1.7 Considerations of capital intensity and the limited number of participants rule out the development of an irrigation scheme as an aid target.
- 12.1.8 The terms of reference place specific emphasis on market oriented production. Therefore broad spectrum integrated rural development is not an option.
- 12.1.9 A vegetable project that would benefit many farmers could be devised, but the consultants are of firm conviction that this is such a difficult field, fraught with so many hazards, that the success potential would be low. They do not recommend involvement in the vegetable arena. This is a somewhat emotional issue in Swaziland and the matter receives active attention under 12.7.
- 12.1.10 A project for the involvement of more smallholders in the production of subtropical fruit could benefit many people and contribute significantly to exports. This is the field favoured for more detailed investigation.

## 12.2 LABOUR INTENSITY

- 12.2.1 With regard to labour intensity the following summary highlights the relative labour intensity of various enterprises.

<u>ENTERPRISE</u>	<u>LABOUR INTENSITY</u>	
	Commerical Production	Smallholder Production
Avocado	H	H*
Banana	H	H*
Barley	L	L
Bean common	L	L
Beetroot	M	M
Black Wattle	L	L
Butternut	M	M
Cashew Nut	H	H
Cabbage, Caul., Kole, etc.	M	H
Chillies	M	M
Chicory	M	M
Citrus (eg Grapefruit)	H	H
Citrus (eg Naval)	H	H
Coffee Arabica	H	H
Coffee Robusta	H	H
Carrot	M	H
Cotton	M	M

ENTERPRISE	LABOUR INTENSITY		contd.
	Commercial Production	Smallholder Production	
Cassava	M	M	
Cape Gooseberry	H	H *	
Groundnut	L	M	
Green Pepper	M	M	
Granadilla Purple	H	H *	
Granadilla Yellow	H	H *	
Guava	H	H *	
Lettuce	M	M	
Lentil	L	L	
Lucerne	L	M	
Macadamia	H	H	
Mango	H	H *	
Maize	L	L	
Onions, leeks etc	M	H	
Papaya	H	H *	
Pineapple	H	H *	
Pyrethrum	H	H	
Potato	H	H	
Rice	M	H	
Sisal	L	L	
Strawberry	H	H *	
Soya	L	L	
Sunflower	L	L	
Sweet Potato	L	M	
Sugarcane	L	L	
Sorghum Grain	L	L	
Tung Nut	H	H	
Tea	H	H	
Tobacco	H	H	
Wheat	L	L	

H = High ( 100 labour days/ha)

M = Moderate (50 - 100 labour days/ha)

L = Low ( 50 labour days/ha)

\* = Favoured fruit crops.

12.2.2 It will be noted that the fruit crops are all rated high in terms of labour intensity. They therefore offer good potential for employment opportunity creation.

### 12.3 SOCIAL ACCEPTABILITY

12.3.1 None of the enterprises considered above is socially unacceptable to the mass of the rural people though, as stated, there are fundamental constraints to the commercialisation of livestock farming. With regard to fruit production, this is a well established practice throughout the country, albeit on a petty domestic scale, with casual local marketing.

12.3.2 In the opinion of the consultants the weight of land tenure and socio-economic constraints is such that an aid project directed towards the commercialisation of the Swazi small-holder cattle industry would not be a success. The consultants recommend noninvolvement in this sector of the agricultural industry.

### 12.4 INFRASTRUCTURE

12.4.1 Swaziland has a well developed regional infrastructure and such considerations as regional roads, power supplies and telephone systems are not seen as a constraint. The availability of a fruit cannery is an obvious advantage from the point of view of a fruit project but distance to export airport (Johannesburg) and possible deficiencies in harbour facilities and services at Maputo are matters which will require further investigation.

12.4.2 Depending on its final form and dimension a fruit production project may well have to feature the construction of minor rural roads and small earth dams but this is not regarded as a problem because the M.O.A.C. is well equipped to attend to any such requirement.

### 12.5 MANAGEMENT FACTORS

12.5.1 At the producer level there should be no problem in attracting as participants sufficient people interested in improving their income. A good response to training could be anticipated. As is always the case, it would be vitally important to involve the chieftainship and whole local communities in initial exploratory discussions and subsequent on-going consultations.

12.5.2 At project management level it would be necessary to make use of some expatriate specialists initially but firm plans would be adopted to provide for training for localisation.

12.6 INSTITUTIONAL FACTORS

12.6.1 This issue to be reviewed subsequently in the light of the specific proposals.

## 12.7 THE CASE AGAINST VEGETABLES

12.7.1 It is as the largest producer in southern Africa of five vegetable crops and with initiate knowledge of the history of vegetable production in Swaziland that the consultants advise U.S.A.I.D. against commitment to a major vegetable project, taking into account the considerations set out below.

12.7.2 The Need for Objectivity. The quest for self sufficiency in vegetable production is laudable and understandable but the matter appears to have become an almost emotional issue and certainly one on which there is much wishful thinking. The history of so many aid projects demonstrates the need for cool, objective appraisal in project formulation.

12.7.3 Some History. It would be possible to provide many examples of the collapse of vegetable growing industries in south-east Africa. For the purposes of this review let the following suffice:

12.7.3.1 Eastern Transvaal. There was once a very large and thriving fresh vegetable industry in the eastern Transvaal along the Crocodile river (Nelspruit - Kaapmuiden - Malelane - Komatipoort). This region supplied P.W.V. markets and was and is far better placed to do so than Swaziland (doorstep road and rail). Today vegetable production is a minor enterprise there, having been displaced by perennial crop production.

12.7.3.2 Vuvulane. When the Vuvulane scheme in north-east Swaziland was started vegetables were important on all settlement farms. Today this is not the case.

12.7.3.3 Middleveld. At one time many I.T.L. farmers in the Middleveld produced vegetables and potatoes for the South African market but one after the other they dropped this enterprise after burning their fingers.

12.7.3.4 Malkerns. Older residents will remember the large tomato industry in Malkerns based on production for processing. Today not a vestige of this remains.

12.7.4 Problems in Vegetable Production. Commercial vegetable production is technically complex, it is subject to many marketing problems and it is a high risk venture.

12.7.4.1 Complexity. Pest and disease problems and other production complexities militate against success for large numbers of producers in the long term. Vegetable production is one of the most complex agricultural enterprises.

12.7.4.2 Marketing problems. Here one may consider the factors of variable supply, market demand, transport economics and trade practices, which are all inter-related. Variability in supplies - gluts and shortages - pose frightening problems for producers and have knocked many valiant attempts to make a success of vegetable production. Production controls are ruled out and market intelligence services are a palliative. It is only in the context of alternative large markets that the problem becomes tolerable. This is not the situation in Swaziland, where market demand is modest and where markets can easily be flooded. Penetration of the large South African markets as a means of achieving a measure of assured demand might appear to offer a solution to the problem but on closer examination this is found to be not the case. Table 12.7.5 portrays the effects of transport costs on producer margins in the case of marketing to the Johannesburg fresh producer market. The Table does not reflect the variability in prices that occur even in that large market, and it demonstrates that only tomato is likely to yield a reasonable positive margin. In practice, however, Swaziland producers would find it difficult to compete with R.S.A. farmers in that market.

Vegetable processing would not solve the problem. This is a field outside the terms of reference of this study but it may be accepted that vegetable dehydration, freezing and canning are not viable propositions in Swaziland.

TABLE 12.7.5

## U.S.A.I.O. PROJECT SWAZILAND

TRANSPORT COSTS FOR SELECTED VEGETABLES FROM MANZINI TO THE JOHANNESBURG MUNICIPAL MARKET, AND ASSOCIATED GROSS-MARGINS AT SMALL HOLDER SCALE

CROP	RAIL TRANSP	RAIL TRANSP	TOTAL	TRANSP COSTS		EST	AVE TOTAL		EST(e)	EST
	TARIFF(a)	TARIFF(b)	TRANSPORT	TARGET	PER HA	LONG TERM	AVE GROSS	VARIABLE	GROSS MARGIN	GROSS MARGIN
	MANZINI-	BREYTON-	COST	CROP	YIELD	JOHANNESBURG	INCOME	COST(d)	PER HA	PER HA
	BREYTON	JOHANNESBURG	PER TONNE	YIELD	TRANSPORTED	MARKET PRICE	PER HA	PER HA		FOR SALE
	(E/t)	(E/t)	(E/t)	(t/ha)	(E/ha)	(E/t)	(E/ha)	(E/ha)	(E/ha)	WITHIN
										SWAZILAND
Cabbage(I) : Small Quantities	39,50	30,70	70,2	40	2 808	65	2 600	6 244	(3 644)	889
: Full Truck (10t min)	36,80	23,90	60,7	40	2 428	65	2 600	5 864	(5 864)	-
Onion (I) : Small Quantities	39,50	30,70	70,2	15	1 053	240	3 600	3 417	183	936
: Full Truck (10t min)	36,80	23,90	60,7	15	911	240	3 600	3 275	325	-
Potato (I) : Small Quantities	39,50	30,70	70,2	28	1 966	190	5 320	7 066	(1 746)	1 165
: Full Truck (20t min)	36,80	24,70	61,5	28	1 722	190	5 320	6 822	(1 502)	-
Potato (R) : Small Quantities	39,50	30,70	70,2	21	1 474	190	3 990	5 683	(1 693)	490
: Full Truck (20t min)	36,80	24,70	61,5	21	1 291	190	3 990	5 500	(1 510)	-
Tomato (I) : Small Quantities	39,50	30,70	70,2	20	1 404	378	7 560	6 290	1 270	2 990
: Full Truck (12t min)	36,80	24,70	61,5	20	1 230	378	7 560	6 116	1 444	-
Tomato (R) : Small Quantities	39,50	30,70	70,2	12	842	378	4 536	4 180	356	1 393
: Full Truck (12t min)	36,80	24,70	61,5	12	738	378	4 536	4 076	460	-
Tomato (I) : Full Truck	83,70(c)	-	83,70	20	1 674	378	7 560	6 560	1 000	2 990
Tomato (R) : Full Truck	83,70(c)	-	83,70	12	1 004	378	4 536	4 342	194	1 393

Notes : (I) - Irrigated, (R) - Raingrown

Transport costs are for unrefrigerated trucks. Johannesburg market prices are for superior quality vegetables.

(a) - Distance of 174 km.

(b) - Distance of 237 km to Kaserne siding in Johannesburg.

(c) - Road transport of 450 km to Johannesburg. Most likely form of transport for tomato which requires a short time period in transit.

(d) - Includes production input costs, market levy of 12,5% of income, and transport costs.

(e) - ( ) indicates negative value.

Trade practices complicate the issue. The trade needs continuity of supplies which climatic and other factors virtually rule out (IFAD project notwithstanding) and it prefers single source arrangements for the traded range of fruit and vegetables. This is difficult to achieve within Swaziland.

There will always be a place for a few specialist small producers within economic distance of the main towns but even they will experience vicissitudes stemming from the complexity of vegetable production (watch the black rot problem grow) and periodic gluts in the market place.

12.7.4.3 Risk. The considerations outlined above plus others such as hazards posed by hail and frost make commercial vegetable production a high risk venture. The odds would be stacked against success in an aid project in this field.

#### 12.7.5 Vegetable Transport Costs

For all annual crops, a transport allowance of 100 km has been included in the gross margin estimates, to cater for the sale of produce in towns and other potential selling points not in the immediate vicinity of the producer. As specific production areas have not been pinpointed at this preliminary study stage, transport costs cannot be more exact. The transport rate within Swaziland used as a cost provision is 25c/t/km. Exceptions to this rate are for transport of milk, where private transport is assumed at a rate of 1,26c/ℓ for a distance of 50 km. The other exception is the transport of fruit, where applicable, to Jan Smuts airport and the Johannesburg Municipal Market. In this case the variable cost estimates provide for a distance of 450 km at a transport rate of 17,33c/t/km, as quoted by certain fruit growers for a comparable distance. For vegetables transported by the South African Transport Services to the Johannesburg Municipal Market, the route would be from Manzini to Breyten in R.S.A. by road, then rail from Breyton to Kaserne siding in Johannesburg. For large

loads, the relevant road transport cost from Manzini to Breyton is R36,80/t at a distance of 174 km, then by rail to Kaserne R24,70 for 237 km. Should the crop necessitate road transport all the way due to perishability, the cost would be R83,70/t for 450 km. All rates quoted for South African Transport Services account for handling fees.

12.7.6 Comparison of Prices used in Swaziland and Johannesburg  
(Table 12.7.5)

CROP	SWAZILAND PRICE	JOHANNESBURG PRICE
	(R/t)	(E/t)
Cabbage	100	65
Onion	190	240
Potato	200	190
Tomato	347	378

Appendix 7 gives an indication of prices received on Mbabane and Manzini markets. The Swaziland prices used in the gross-margin estimates represent conservative estimates from these, since the Manzini and Mbabane markets are very small. The low price on the Johannesburg market for cabbage is probably due to a lack of demand from the white portion of the population. The high price of tomato on the Johannesburg market is likely to be due in part to superior quality tomatoes, and also to the concentration of affluent society willing to pay a higher price for tomatoes. It should be noted though, that the monthly variation in price for tomato is high, and hence although it shows high gross-margins it is a high risk crop.

12.7.7 Economic Impact. Vegetable production is labour intensive and it does and will create a useful volume of employment on the land - especially self employment - but it cannot contribute to forex earnings and the import substitution will merely be Emalangenis for Rands. In the opinion of the consultants other agricultural enterprises provide better opportunities for a well disposed United States of America to help Swaziland develop its economy.

following:

- (a) Fruit crops are perennial. Investment in a long term enterprise on land where there is formally no security of tenure may be regarded as unsatisfactory. However, the consultants do not see this as a serious problem. Land tenure on SNL is de facto fairly secure and where, as is proposed, many members of local communities become involved in fruit production there is unlikely to be any risk attached to security of tenure. In any event, in terms of Swazi law and custom, fruit trees per se are the property of the owner, even if the land is not.
- (b) Production must be export orientated. This implies high quality standards which in turn necessitates attention to detail and use of pest control and prophylactic treatments in appropriate cases. The answer lies in careful planning, selection of participants, training and farmer servicing as necessary, especially in the early years. If these requirements are satisfied there is no reason why smallholders should not produce quality products. Indeed proximity of small orchards to the homestead will allow of much more care of crops than is possible on a large estate. When the pineapple smallholder scheme was started 20 years ago it was a prevalent view that smallholders would not achieve the necessary quality standards. The history of the project indicates otherwise.
- (c) Most fruit crops will benefit from irrigation and water is not always available for the purpose. The other side of this coin is that most of the crops of interest can be profitable when grown on a rain-fed basis and that for some crops inefficient irrigation can be dangerous through the promotion of root rot diseases. There is considerable potential on S.N.L. for the development of small low cost dams for local small scale irrigation.

### 13.2 IMPLICATIONS OF COMMERCIAL PRODUCTION:

- 13.2.1 The fact that the objective is to assist smallholders to make profits from high quality products for export has, in the opinion of the consultants, certain basic implications and sets

certain prerequisites for success. One of these is the institutional factor, which is reviewed subsequently. The other is the farmer training and servicing requirement.

- 13.2.2 To promote the participation of a significant number of smallholders in production of export crops would be a bold and innovative move and it would be imperative to nurture and assist pioneer producers to ensure that the majority of them make a success of their fruit production enterprises. This implies an intensive programme of farmer training and servicing, both input and output. To merely provide planting material and advice would be to invite failure. Services to farmers must be comprehensive, commercially orientated and sustained in the early years. Among the requirements that will arise are:
- (a) good tertiary roads
  - (b) careful community preparation
  - (c) careful site selection
  - (d) organisation of credit facilities
  - (e) assistance with land preparation
  - (f) provision of quality planting material
  - (g) subsequent regular advisory assistance
  - (h) periodic training courses
  - (i) provision of input requisites
  - (j) organisation of harvest collection
  - (k) grading and packaging as necessary
  - (l) exporting
- 13.2.3 Significantly, the terms of reference of this study apply the words "organised and co-ordinated basis" to the project to be identified. This is construed as reflecting appreciation by U.S.A.I.D. of the need for farmer servicing.
- 13.2.4 The commercial orientation of the project also implies significant links between the producers and one or more commercial production units having facilities and staff for farmer servicing. This is regarded as a keystone feature.

13.2.5 A well devised project and the availability of high quality fruit trees at the central nursery would almost certainly also stimulate production of fruit by many large scale ITL farmers. This would boost national exports substantially.

13.2.6 The pineapple industry is well established but this is not the case with avocado and mango. Under these circumstances it would be necessary to ensure a volume of production at an early date sufficient for the development of markets. To achieve significant production at an early date would also be important to the economics of the project. These are further good reasons for including a commercial production facet in the project.

### 13.3 CONCEPTS:

13.3.1 The consultants envisage two main field components for the project:

- (a) A central unit - the hub of the wheel to undertake farmer training and servicing, input, and output. This is hereafter referred to as the Fruit Industry Development Unit (FIDU).
- (b) Groups of smallholders involved in commercial production on an organised basis, in various places. These are referred to as Outgrower Production Areas (O.P.A.'s) some of which could be settlement schemes.

13.3.2 The main crops of interest are pineapple, avocados and mango, all of which will yield satisfactorily under rain-fed conditions on appropriate sites and all of which would respond well to irrigation where available.

13.3.3 It is envisaged that the project would be initiated in the central Middleveld and subsequently expanded mainly to the southern (cooler) Middleveld, the Lowveld and possibly elsewhere. A further expansion phase in the future might embrace such crops as strawberry, banana, papaya and guava in appropriate localities. Pineapple would be canned at the Malkerns factory for export and avocado and mango would be marketed partly locally and regionally and partly overseas.

- 13.3.4 Further investigation might identify Individual Tenure land owned by the Government or by the Swazi Nation on which small-holders could be settled for the production of food and fruit crops. Such a scheme would certainly represent effective use of I.T.L. farm land, some of which is currently under utilized.
- 13.3.5 A horticultural nursery of high standard would be essential. This would form part of the FIDU. The nursery would produce young trees and other planting material for sale to the producers. It could almost certainly also market orchard material to private sector estates in Swaziland and elsewhere in southern Africa, thereby spreading the beneficial impact of the project.
- 13.3.6 Phasing of implementation would, it is envisaged, follow the sequence:
- (1) Fruit Industry Development Unit (FIDU) including a nursery
  - (2) Pineapple Production
  - (3) Tree fruit production
- The spatial phasing would be:
- (1) Central Middleveld
  - (2) Southern Middleveld
  - (3) Lowveld
  - (4) Elsewhere
- 13.3.7 A project would involve a number of institutions on a co-ordinated basis, thus:
- (a) U.S.A.I.D. Mission (U.S.A.i.D.)  
Selective financing. Monitoring. Participation in co-ordination. Liaison with one or more U.S.A. institutions such as the agricultural faculty of a university. Assistance with training and research.
  - (b) Ministry of Agriculture and Co-operation (MOAC)  
Development of rural infrastructure such as tertiary roads, small dams and conservation works. Assistance with community and farmer motivation and extension work. Participation in co-ordination.

(c) Swaziland Development and Savings Bank (SD&SB)

Provision of credit

(d) Tibiyo Taka Ngwane (Tibiyo)

Provision of land for the FIDU and for settlement.

Participation in co-ordination. Tibiyo might also undertake fruit production in its own right, outside the framework of this project.

(e) A Management Agent (M.A.)

There are various possibilities which are considered subsequently.

(f) Swaziland Cannery (Swazican)

Provision of planting material, participation in co-ordination, purchase of fruit for processing.

13.4 FRUIT INDUSTRY DEVELOPMENT UNIT (FIDU)

13.4.1 The establishment of a Fruit Industry Development Unit in Malkerns Valley is proposed. In terms of size this should constitute a viable commercial unit. A supply of irrigation water would be necessary and it should also include a small site, not subject to surface water runoff from elsewhere, for use as a nursery. Small sub-centres may be needed at Nhlangoane and in the lowveld.

13.4.2 Commercial production at FIDU would be based on pineapple, avocado and guava mainly, but small orchards of other fruit crops would be established at Malkerns, Nhlangoane and in the lowveld for trial and training purposes and as sources of budwood and planting material.

13.4.3 FIDU would be operated as a joint venture with Tibiyo, on land owned by Tibiyo and made available for the purpose. See also Chapter 14.

13.4.4 FIDU components would comprise :

- (a) Nursery
- (b) Commercial orchards
- (c) Trial and training orchards
- (d) Farmer Servicing Unit
- (e) Packhouse
- (f) Administrative offices

- 13.4.5 Nursery: About 2 ha would be needed and a supply of borehole water would be essential. Facilities would be very modest but would include a shade cloth shelter.
- 13.4.6 Commercial Orchards: These would be orthodox orchards. The tree crop orchards would be under irrigation.
- 13.4.7 Trial and Training Orchards: As stated these would comprise small plantings of a range of species.
- 13.4.8 Farmer Servicing Unit: Facilities and equipment would include a requisites store, one or more tractor units to assist smallholders with mechanisation, and vehicles for the transportation of inputs and harvested fruit. The latter function might be privatised at an early date.
- 13.4.9 Packhouse: This would be an orthodox farm shed which at a later stage would have to be expanded and equipped with fruit conveying and grading equipment. In the initial years packaging would be done by hand.
- 13.4.10 Administrative Offices: A small office building would be needed. This could advantageously be associated with a multi-purpose training room.
- 13.5 PINEAPPLE PRODUCTION:
- 13.5.1 Pineapple growing by smallholders would be promoted on:
- (a) Swazi Nation land in the Malkerns and Manzini areas and especially in the Rural Development Area (RDA) to the north-west of Manzini.
  - (b) One or more settlement schemes on land owned by the Swazi Nation (probably land owned by Tibiyo).
- 13.5.2 Production on a larger scale would take place:
- (a) On FIDU
  - (b) On other land owned or to be acquired by the Swazi Nation. This would be incidental, and not an integral part of the U.S.A.I.D. project.
  - (c) On ITL farms.

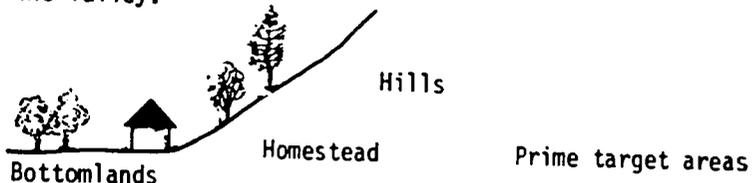
- 13.5.3 The settlement scheme(s) might be similar to the existing project at Malkerns but individual holdings should include land to be used for food crop production in the early years and planning should provide for some farmers who prove to be better entrepreneurs to acquire larger holdings. The setting aside of land for food production is regarded as important. It satisfies an in-built demand that the first call on resources should be for meeting subsistence requirements. In later years, as the farmers become more commercially orientated, much of this land would inevitably be converted to fruit production.
- 13.5.4 Pineapple production on SNL including the R.D.A. would be promoted by community mobilisation with the support of the Chieftanship and through contact with individual farmers. A standard package would be devised in respect of a standard size production unit but some farmers might operate more than one such unit. A servicing package would include land preparation, provision of credit, provision of planting material and assistance with planting, provision of input requisites, on-going advice and periodic training, organisation of fruit transport to factory and unit accounting. The pattern of production would vary from place to place but the attempt would be made to get several smallholders in any one place to go in for pineapple production. Concurrent inclusion of a standard maize package should also be considered because this might make it easier for a smallholder to enter into a commitment to the production of a perennial crop. It would also accord with Government policy on food self sufficiency.
- 13.5.5 At a later stage, when pineapple growing becomes more widespread, Swazican might start providing services on a managing agent basis to some more concentrated groups of growers. This sort of arrangement is common among Zulu smallholder sugarcane growers in Natal, where the sugar milling companies manage much Zulu owned land on behalf of the owners.

13.5.6 It would be necessary to have a long term agreement with Swazican in respect of principles relating to the purchase of fruit, quality standards, prices, and so on.

13.5.7 Such aspects as project structure, the location of production areas, size and number of production units, economic models, modus operandi, infrastructure requirements, phasing of development, costs and social and economic evaluation would feature in a subsequent planning and design phase.

### 13.6 AVOCADO PRODUCTION.

13.6.1 The prime target areas for avocado production would be along and immediately above the line of the slope break between bottomlands and hills in the Central and Southern (cool) Middleveld. A typical and well known site would be below the hills, parallel to the Mbabane - Manzini road, on the opposite side of the valley.



One therefore conceives of a ribbon or necklace pattern of development, with production units strung out in a line and linked by new tertiary roads constructed for the purpose.

- 13.6.2 Apart from the intrinsic suitability of this type of site it has the further advantages of:
- (a) using land not usually used for production of annual crops, and
  - (b) offering many possibilities for the construction of small dams that would allow of supplementary irrigation.

13.6.3 Prime sites in the southern Middleveld are particularly attractive for avocado production because of the cooler climate in that region, making for later harvests at times of higher prices and, possibly, also improved tree longevity. It is of interest to note that a trial avocado orchard containing several cultivars established by a member of the consultants' team near Nhalngano nearly 20 years ago still survives and

continues to bear well. Also very few trees in this orchard have died of Phytophthora. It is rare to see such large non-seedling avocado trees of this age in southern Africa. This orchard is a most significant pointer to the importance of using disease-free planting material on a carefully chosen and well prepared site. The orchard has been sadly neglected but still produces well. This is a pointer to the exciting potential of avocados.

- 13.6.4 Production would not be confined to this type of site but could take place anywhere where:
- (a) There is no frost
  - (b) Soils are deep and well drained
  - (c) Mean annual rainfall exceeds 900 mm or,
  - (d) Water for irrigation is available
- 13.6.5 Again, a standard development package would be devised for a standard production unit but some farmers might opt for more than one such unit. A standard unit might be 0,5 ha, providing a nett income in excess of E1 000 p.a.
- 13.6.6 Young grafted trees would be produced on the central nursery of FIDU and sold to farmers in terms of the standard package agreement.
- 13.6.7 Fruit would be transported to the packhouse on the FIDU for grading, treatment as necessary and sale on regional and overseas markets.
- 13.6.8 Production would also take place on the FIDU, and possibly, on a commercial scale on other land owned by Tibiyo (but outside the framework of the U.S.A.I.D. project). Furthermore once the profit potential of avocado production comes home to large scale farmers, one could expect many of them to enter the field. The project would therefore not only assist small-holders to enter commercial agriculture but would also, as previously mentioned, be the stimulus for a major new industry in Swaziland which would contribute materially to export earnings. There is no reason why avocados should not become to the economy of Swaziland what they are to the economy of Israel.

13.7 MANGO PRODUCTION:

13.7.1 Mango production would be promoted on suitable soils in the Lowveld. The availability of irrigation water would be highly advantageous and the development program would therefore be associated in places by the construction of small earth dams.

13.7.2 Furthermore detailed investigation would be necessary to choose the most appropriate areas for initiating the project. At this time there would appear to be merit in concentrating initially on areas around the Lowveld Research Station at Big Bend in the south and around Balegane in north, both of which have irrigation available and both of which might include a commercial production unit.

13.7.3 Mango production would be promoted along lines similar to those applicable to avocado but farmer servicing could be less intensive.

13.8 DIMENSION:

13.8.1 The phasing and planned dimension of the project will require further investigation but the first phase should aim to establish successful nuclei of fruit growing communities in areas of interest. The longer term objectives should be to make fruit production a major national industry.

13.9 MARKETING

13.9.1 Pineapple would be sold to Swazican. Avocado and Mango would be marketed locally, in R.S.A. and in Europe. The trade in Europe is concentrated in three countries and marketing would be directed accordingly.

	PERCENT OF CURRENT EUROPEAN IMPORTS	
	<u>Avocado</u>	<u>Mango</u>
France (Paris)	70	25
United Kingdom (London)	20	38
West Germany (Frankfurt/Hamburg)	5	3

- 13.9.2 About 85% of the fruit imported into Europe is sold by import agents on commission. One would therefore negotiate directly with suitable agents such as Azoulony and Helfer in France, Fyfes and Poupart in the U.K. and Seipio in West Germany. The channels for marketing avocado in the Middle East would require further investigation.
- 13.9.3 With fruit handled by reputable agents it would not be necessary to undertake any promotional work.
- 13.9.4 Exporting would initially be by both air and sea freight but sea transport in bulk for artificial ripening and packaging at destination is likely to become increasingly important as volumes rise.

14. INSTITUTIONAL AND MANAGEMENT FACTORS :

- 14.1 An outline has been given of the envisaged role of various government Departments and other institutions but it remains to consider what body should be the main executive authority for the project. In this regard the consultants wish to record that (a) the following are preliminary views for discussion and (b) they have not been discussed with MOAC and Tibiyo.
- 14.2 Possible executive authorities include :
- (a) MOAC
  - (b) Tibiyo
  - (c) An existing private sector agricultural business
  - (d) A new body created for the purpose
- 14.3 MOAC is not regarded as a suitable executive agency for a project that is strictly commercially orientated. The Ministry would have a most important role to play in the mounting of the project and in ensuring its long term success but it is not a suitable management instrument. This view is no reflection on the Ministry as such. It relates purely to the unsuitability of government financial and other administrative procedures for project management.
- 14.4 Tibiyo would have a key role to play in the project but it is unlikely to be regarded as a suitable direct recipient of aid by a foreign government. Most such aid is provided on a government to government basis in the first instance. as such is not seen to be a suitable executive authority for the project as envisaged, but Tibiyo, being the owner of land needed for the project, would play a vital part, as suggested in 14.7 below.

- 14.5 Existing private sector companies could certainly assist in the project but their involvement, except as a buyer or marketer of fruit, would probably become more important at a later stage when, conceivably, the management of selected production areas might be taken over, e.g. by Swazican. However, the private sector could not be expected to provide the substantial "subsidies" that will be involved in mounting a new development project in a third world context.
- 14.6 Were there an established general purpose Agricultural Development Corporation in Swaziland this might be a suitable executive instrument but there is no such body and the creation of one for this project is not regarded as the best answer. It could be said that there are already too many state and parastatal organisations in Swaziland and that because of the small size and diversity of the country, overhead type costs such as those represented by staff and staff related costs are already too heavy a burden on the national economy. This appears to be implied in the recent review by the Department of Economic Planning. Furthermore the track record of many general purpose parastatals elsewhere in developing countries does not give confidence in the approach. Specialist bodies representative of particular industries and with strong commercial orientation can be but are not always more effective. For example, in the opinion of the consultants, whilst they are suitable and appropriate for overall industrial rationalisation and direction, such bodies as a Dairy Board and a Cotton Board are not suitable management instruments for a dairy farm or a cotton farm. It is the consultant's view that because of the commercial orientation of the project a private sector structure should be created for initial launch purposes, it being anticipated that at a later date, when the project has grown to constitute an important new national industry, it would probably be necessary for Government to create a new statutory authority to promote the interests of that industry. e.g. a Fruit Board.

- 14.7 It is recommended that Tibiyo register a new company for the purposes of the project, so structured that :
- (a) equity participation by other parties is feasible - in other words so that it could become a multi-participant joint venture;
  - (b) whilst being profit orientated, all profits are committed to be ploughed back into the purposes of the company (and therefore of the development programme for which it is responsible);
  - (c) the Board of Directors be representative of interested parties such as Tibiyo, MOAC, U.S.A.I.D., Swaziland Cannery and the producers;
  - (d) it would be an acceptable vehicle for the receipt and management of Government funds including, therefore, aid funds provided inter-alia by U.S.A.I.D.;
  - (e) Specialist staff, from the U.S.A. and elsewhere could be seconded to it.
- 14.8 This company, designated for reference purposes Swaziland Fruit Development Corporation (Pty.) Ltd. - FRUITCOR - would lease from Tibiyo the land needed for the FIDU and for settlement schemes. It might also be given responsibility for certain fruit orchards on MOAC land at Balegane, Big Bend and elsewhere.
- 14.9 It is envisaged that in the early years U.S.A.I.D. might second or arrange for the secondment to FRUITCOR of selected key personnel such as a qualified horticultural nurseryman. It would also make arrangements in terms of which specialist assistance would be available from time to time from, say, a university in the U.S.A. An example of where such assistance might be needed is in the field of plant pathology, relating both to fruit production and the keeping quality of fruit whilst en route to overseas markets.
- 14.10 Financial Structure of Project. At this stage, in the absence of in-depth discussions with other parties, it is not possible to outline a financial structure for the project. A crude concept in this regard has been supplied to U.S.A.I.D. under separate cover. A U.S.A.I.D. input of about E16 million over the first five years is envisaged.

- (5) The consultants are not familiar with U.S.A.I.D. project design procedures but presumably the project itself would pass through more than one phase. The procedures involved in finalising and obtaining approval of a project are outside the terms of reference of this study.

16. CONCLUSION

- 16.1 It is with considerable experience of agricultural development, at all levels from the grass roots to the top, in Swaziland and elsewhere in Africa, that the consultants record their conviction that, assuming skilled consultation, planning, design and implementation, the proposed project could grow to give Swaziland, in the medium term, the substantial economic boost that it so badly needs. Indeed, unless its potential is seen in this perspective there would seem to be little point in proceeding with it.
- 16.2 In the absence of new mineral discoveries the main thrust of economic development must lie in agriculture. The capital constraint coupled with the capital intensity of new large irrigation projects precludes them from providing the needed economic boost and from benefiting large numbers of people in the foreseeable future. By contrast the project as envisaged, wherein beneficial irrigation can derive from many small low cost local water sources and wherein production based on rain-fed systems is viable, could benefit many "small" people in many places whilst also resulting in very substantial production in the aggregate, mostly for export. Furthermore the project would almost certainly stimulate substantial new investment in fruit production on larger ITL farms, and it is likely to have a substantial multiplier effect. (Indeed, by way of example, assuming the availability of a nursery of high standard and back-up research support, the consultants could probably mobilize a new multi-million Rand private sector investment in fruit production in Swaziland.
- 16.3 Having regard to the fortunate circumstance of significant sunk costs, - in roads, power supplies, a cannery, land purchase and so on - the consultants at this stage "guestimate" that the project yet to be designed would yield an economic I.R.R. well in excess of 15%.
- 16.4 It is recommended that U.S.A.I.D. proceed with the preparation of a detailed Development Plan for the project.

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APPENDIX 1

EEC COMMON EXTERNAL TARIFF (CET) ON SELECTED PRODUCTS

Rates in percentage ad valorem

<u>PRODUCT</u>	<u>CET</u>
Avocado	8
Mango	6
Pineapples	9
Strawberry (1 May - 31 July)	16*
(1 Aug - 30 April)	14*
Pineapple	19 - 20
Tropical Fruit Juice/Pulp	19,3 - 23

\* Swaziland ( and other ACP and GSP countries) are not exempt in the case of strawberries and pay the same CET tariff.

Source: ITC

APPENDIX: 1 (a)

AVOCADO IMPORTS BY SELECTED WEST EUROPEAN COUNTRIES 1975-1983

TONNES

COUNTRY	1975	1976	1977	1978	1979	1980	1981	1982	1983
United Kingdom	4 331	3 441	4 222	4 937	6 633	6 535			
Germany, Fed Rep	1 297	1 241	1 749	2 230	2 421	1 612	1 880	2 470	3956
Netherlands	511	586	905	818	944				
Belguim	501	555	805	850	940				
France	14 704	15 853	19 773	23 970	28 932	24 030	30 202	40 141	50 790
Switzerland	570	520	770	865	1 010				
Sweden	628	560	767	714	921				
Denmark	221	*	407	417	606				
Norway	54	*	69	60	68				
Austria	N/A	*	*	136	283				
TOTAL	22 817	24 732	34 874	34 997	42 758				

\* Not Available

Source: Tropical and Off-season Fresh Fruit and Vegetables - I.T.C.

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## AVOCADO IMPORTS INTO THE FEDERAL REPUBLIC OF GERMANY

AVERAGE C.F. PRICE (DM/tonne)	1975	1976	1977	1978	1979	1980	1981	1982	1983
Israel	2 360	2 788	2 499	2 373	2 587	3 280	3 784	3 368	3 156
R.S.A.	2 968	3 444	2 990	2 520	2 777	3 182	3 722	3 893	4 046
Kenya	3 108	3 179	3 140	3 251	3 798	3 993	3 478	4 046	3 636
Martinique	3 800	3 875	3 771	3 125	2 650	4 152	3 622	4 595	3 156
France	-	3 600	3 329	-	2 744	3 729	-	-	-
Spain (incl Canary Islands)	-	-	-	-	-	3 885	4 350	-	-
England	*	*	*	-	-	-	-	-	-
U.S.A.	-	-	-	-	-	3 045	3 503	3 550	-
Brazil	-	-	-	-	-	-	3 425	3 373	3 899
Others	2 909	4 937	4 021	3 867	3 814	3 017	4 213	3 497	3 449
TOTAL	2 511	3 050	2 688	2 517	2 700	3 337	3 774	3 556	3 299
Quantity (Tonne)									
Israel	995	826	1 146	1 384	1 561	480	830	1 700	2 903
R.S.A.	190	270	398	620	633	574	487	721	789
Kenya	74	78	114	138	119	121	122	135	80
Martinique	5	8	35	40	40	58	44	30	35
France	-	10	34	-	39	35	-	-	-
Spain (incl Canary Islands)	-	-	-	-	-	40	94	-	-
England	*	*	*	35	40	36	20	39	31
U.S.A.	-	-	-	-	-	208	110	34	-
Brazil	-	-	-	-	-	-	37	42	51
Others	33	49	22	11	9	60	72	54	67
TOTAL	1 297	1 241	1 749	2 230	2 421	1 612	1 816	2 755	3 956

Source: Statistisches Bundesamt Wiesbaden

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SWAZILAND CITRUS PRODUCTION\* UNDER NORMAL CONDITIONS

APPENDIX 3

TONNES

TYPE AND VARIETY	HARVESTING SEASON	TOTAL PRODUCTION	MARKET DISTRIBUTION			
			FRESH		PROCESSED	NON MARKETABLE
			EXPORT	LOCAL		
<u>GRAPEFRUIT</u>						
Marsh	April/July	26 000	18 500	1 500	6 000	-
Rosé	May/June	5 900	4 500	1 200	-	200
Star Ruby	June	1 000	720	250	-	30
TOTAL		32 900	23 720	2 950	6 000	230
<u>ORANGES</u>						
Valencia	July/Sept	23 800	15 700	2 100	6 000	-
Tomangos	May	2 500	1 400	100	1 000	-
Shamouti	June	730	680	25	25	-
Clanors	June	260	210	25	25	-
TOTAL		27 290	17 990	2 250	7 050	-
<u>SOFT CITRUS (EXOTICS)</u>						
Tambor	July	3 000	2 700	300	-	-
Minneola	June	1 410	1 200	210	-	-
Clementine	April	55	5	50	-	-
Ellendale	July	39	26	13	-	-
TOTAL		4 504	3 931	573	-	-
TOTAL CITRUS		64 694	4 561	5 773	13 050	230

\* The 6 producers are Ngonini Estates and Tambuti Estate (United Plantation Group), Inyoni Yami Swaziland Irrigation Scheme (Commonwealth Development Corporation), Tambankulu Estates, Crookes Plantations and S.D. Citrus Estates.

Source: Swaziland Citrus Board

APPENDIX 4

(Section 10.8.6.3)

R.S.A. GRANADILLA PRODUCTION AND MARKET DISTRIBUTION \*

YEAR **	TOTAL PRODUCTION		SALES ON MARKETS ***		PURCHASES FOR PROCESSING	
	TONNES	R1 000	TONNES	R/t	TONNES	R/t
1969/70	1 564	222	759	182	605	121
1970/71	2 462	337	917	182	1 309	121
1971/72	3 665	487	754	172	2 712	125
1972/73	3 277	477	749	173	2 334	145
1973/74	5 774	812	1 030	169	4 493	140
1974/75	6 815	954	1 181	164	5 351	140
1975/76	3 675	438	1 370	153	1 988	110
1976/77	1 560	212	604	245	810	70
1977/78	997	220	542	305	322	140
1978/79	686	219	421	408	166	220
1979/80	895	302	546	428	226	250
1980/81	1 008	398	508	499	374	340
1981/82	884	369	532	499	225	390
1982/83	1 354	489	919	405	240	430
1983/84	1 146	430	790	419	188	470

\* Excluding home consumption and direct sales by producers

\*\*\* Sales on 9 Municipal Fresh Produce Markets to 1972/73 and thereafter on all 14.

\*\* July to June

SOURCE : R.S.A. ABSTRACT OF AGRICULTURAL STATISTICS

APPENDIX 5

(Section 10.8.7.2)

R.S.A. GUAVA PRODUCTION AND MARKET DISTRIBUTION \*

YEAR **	TOTAL PRODUCTION		SALES ON MARKETS ***		PURCHASES FOR PROCESSING	
	TONNES	R1 000	TONNES	R/E	TONNES	R/E
1969/70	9 972	537	3 615	91	5 602	36
1970/71	11 164	609	2 575	105	8 063	41
1971/72	12 939	659	3 453	85	8 771	41
1972/73	12 709	619	4 471	73	7 309	39
1973/74	11 631	796	4 028	100	6 870	58
1974/75	11 734	858	4 060	103	6 982	64
1975/76	12 925	867	5 090	92	6 974	60
1976/77	13 769	877	5 080	92	7 798	54
1977/78	20 716	1 410	5 848	102	13 876	60
1978/79	20 409	1 500	7 616	103	11 397	64
1979/80	23 146	1 787	7 900	108	13 789	69
1980/81	20 546	1 927	6 453	152	12 923	75
1981/82	25 754	3 093	6 513	188	17 958	103
1982/83	28 249	4 124	7 151	206	19 777	133
1983/84	28 747	4 111	7 767	217	19 548	124

\* Ignoring home consumption and direct sales by producers to consumers.

\*\* July to June

\*\*\* Sales in 9 National Fresh Produce Markets to 1972/73 thereafter on all 14 Markets

SOURCE : R.S.A. ABSTRACT OF AGRICULTURAL STATISTICS, 1985

SWAZILAND VEGETABLE CONSUMPTION 1979/80 AND PROJECTIONS FOR 1985

	1979/80					1985	
	TOTAL PRODUCTION t	EXPORTS t	IMPORTS t	TOTAL* CONSUMPTION t	PER CAPITA CONSUMPTION kg	PER CAPITA CONSUMPTION kg	TOTAL** CONSUMPTION t
Cabbages	3 598	456	927	4 069	7,4	8,2	5 192
Potatoes	3 062	1 971	3 883	4 974	9,0	10,0	6 347
Tomatoes	4 505	1 199	2 496	5 802	10,5	11,7	7 403
Onions	440	-	1 292	1 732	1,1	3,5	2 210
Green Maize	1 670	417	-	1 253	2,3	2,5	1 599
Other	547	-	-	547	1,0	1,1	698
<b>TOTAL</b>	<b>13 822</b>	<b>4 043</b>	<b>8 598</b>	<b>18 377</b>	<b>33,3</b>	<b>37,0</b>	<b>23 450</b>

\* Estimated to be total production - exports + imports

\*\* Based on a population estimate of 632 000

Source: An Assessment of the Market for Swazi Nation Land Farmers - Ronco Consulting Corporation.

QUANTITY AND AVERAGE PRICE OF VEGETABLES SOLD ON MANZINI AND MBABANE FRESH PRODUCE MARKETS

	YEAR+	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL*
<b>POTATO</b>														
Quantity (tonnes)	1982	10,5	16,8	18,5	22,1	16,6	11,7	15,1	11,6	16,5	16,1	14,6	36,3	202,6
	1983	13,8	12,0	14,9	8,9	5,4	7,3	9,8	22,2	17,7	21,2	18,8	23,0	175,4
	1984	7,2*	21,7	5,7	18,3	14,0**	7,9**	10,9**	5,3**	22,6	23,4*	12,9*	8,3*	158,2
Ave Producer Price	1982	280	240	230	250	310	350	340	330	280	290	290	330	290
(Emalangeni/tonne)	1983	340	360	340	370	380	400	460	380	350	350	340	350	370
	1984	375*	305	305	310	230**	210**	240**	250**	235	250*	250*	230*	266
<b>TOMATO</b>														
Quantity (tonnes)	1982	3,2	2,6	2,2	3,1	7,6	5,6	10,9	8,9	16,2	18,5	12,1	12,3	103,4
	1983	9,5	9,2	8,2	9,4	7,9	5,8	7,8	11,9	15,4	12,8	10,4	5,6	114,8
Ave Producer Price	1982	620	650	500	530	590	590	450	360	260	290	410	500	480
(Emalangeni/tonne)	1983	500	530	580	510	520	490	500	370	330	350	370	390	450
<b>CABBAGE</b>														
Quantity (tonnes)	1982	3,0	3,3	1,9	4,9	6,6	10,3	5,2	4,8	10,5	13,0	16,9	8,4	86,0
	1983	4,9	1,1	4,5	8,6	8,3	15,8	7,1	5,4	10,1	23,7	10,0	6,7	106,2
Ave Producer Price	1982	130	140	140	150	170	190	190	180	160	170	140	160	160
(Emalangeni/tonne)	1983	180	150	210	150	160	160	150	200	140	200	190	160	170

\* Mbabane market only

\*\* Manzini market only

+ Complete details are not available for 1984 for tomatoes and cabbage

Note : As indicated by quantities sold, Mbabane and Manzini markets are small.

Source : Ministry of Agriculture

SWAZILAND SEED COTTON PRODUCTIONTONNES

<u>YEAR</u>	<u>ITF</u>	<u>SNL</u>	<u>TOTAL</u>
1973/74	11 449	6 195	17 644
1974/75	11 578	11 040	22 618
1975/76	6 145	6 013	12 158
1976/77	7 255	7 400	14 655
1977/78	10 414	11 866	22 280
1978/79	6 529	9 505	16 097
1979/80	9 255	13 981	23 236
1980/81	9 961	14 922	24 883
1981/82	5 810	8 445	14 255
1982/83	4 107	5 020	9 127

Source: Swaziland Cotton Board

SAAGA's ESTIMATED YIELDS AND TREE NUMBERS

Estimated production (kg/ha) for each respective cultivar taking into account the current health status of orchards

CULTIVAR	AGE (YRS)					
	4	5	6	7-10	11-15	15+
Fuerte	1 200	2 500	4 000	6 000	5 000	2 000
Hass	1 600	3 500	5 000	8 500	6 500	3 000
Edranol	1 600	3 500	6 500	8 000	6 000	3 000
Ryan	1 000	2 200	4 000	5 500	4 500	2 000

No. of trees/ha for each respective cultivar

CULTIVAR	AGE		
	1 Yr	7-15 Yrs	15+ Yrs
Fuerte	180	140	80
Hass	180	160	100
Edranol	200	160	100
Ryan	180	120	80

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QUANTITIES AND PRICES OF AVOCADOS SOLD ON 14 R.S.A.  
FRESH PRODUCE MARKETS 1975-1984

APPENDIX : 10

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1975 TONNE	200,95	506,30	772,05	1215,12	972,56	885,27	1056,49	854,28	1083,59	560,50	375,27	253,46	8747,84
R/TON	407,36	272,91	192,76	195,85	204,41	212,43	245,70	256,38	282,78	365,07	417,61	438,14	257,60
1976 TONNE	157,72	403,86	975,14	1015,24	1002,80	1034,25	778,94	1075,83	822,10	628,62	500,18	250,66	8641,34
R/TON	451,35	290,16	222,86	214,64	216,44	254,63	289,68	285,47	322,84	396,33	468,26	499,91	290,14
1977 TONNE	123,81	285,58	930,57	897,99	1199,85	914,35	778,98	1020,47	769,41	509,47	350,71	101,23	7888,42
R/TON	569,16	396,21	256,17	249,07	252,18	265,90	303,82	357,09	383,41	510,00	594,98	629,87	329,70
1978 TONNE	167,09	478,73	839,96	1024,22	1282,03	919,06	810,26	1123,12	680,81	453,32	170,81	120,94	8070,35
R/TON	504,19	334,29	252,69	250,85	259,49	279,37	298,09	326,16	422,30	593,22	674,65	657,92	329,85
1979 TONNE	170,24	398,09	767,10	926,56	1015,50	884,83	987,57	656,50	555,20	479,97	209,43	102,97	7149,96
R/TON	527,95	375,48	322,28	287,47	331,72	327,75	358,44	477,53	598,75	720,19	796,31	886,01	417,06
1980 TONNE	64,04	293,17	579,41	1025,02	873,82	772,38	741,87	696,15	812,55	330,73	269,97	168,40	6627,51
R/TON	1050,89	543,40	429,57	395,07	369,83	404,65	543,62	642,65	670,89	919,07	1041,43	962,63	552,12
1981 TONNE	97,23	327,61	1008,97	897,99	919,66	999,01	741,67	754,28	862,45	508,88	308,37	160,21	7586,33
R/TON	1048,26	632,21	447,02	445,74	488,77	557,91	642,93	705,74	754,85	1041,12	1180,28	1523,54	654,50
1982 TONNE	64,19	311,50	1126,14	1213,39	1338,84	1494,31	878,67	1423,37	981,03	659,80	459,90	258,23	10209,37
R/TON	1718,86	797,41	512,38	437,77	433,23	490,27	638,85	621,57	751,52	974,58	1151,37	1210,17	631,57
1983 TONNE	65,08	257,45	957,55	1051,78	1948,88	1538,42	1293,03	1555,45	1093,78	1024,78	716,11	278,88	11781,19
R/TON	1745,16	1031,86	611,24	583,39	468,28	492,45	547,40	633,75	766,06	835,89	1100,70	1317,40	661,40
1984 TONNE	135,97	339,49	681,40	960,33	1477,34	935,83	1059,47	788,87	688,47	491,92	243,45	209,87	8012,41
R/TON	1676,02	1044,07	879,14	746,75	669,48	808,30	884,55	1045,07	1172,87	1613,79	1835,52	1663,03	973,95

AVOCADO IMPORTS BY SELECTED WEST EUROPEAN COUNTRIES 1975 - 1983  
(TONNES)

COUNTRY	1975	1976	1977	1978	1979	1980	1981	1982	1983
United Kingdom	4 331	3 441	4 222	4 937	6 633	6 535	10 674	9 310	10 709
Germany Fed Republic	1 297	1 241	1 749	2 230	2 421	1 612	1 880	2 470	3 956
Netherlands	511	586	905	818	944	1 277	1 737	1 485	2 044
Belgium	501	555	805	850	940	969	1 307	1 205	1 437
France	14 704	15 853	19 773	23 970	28 932	24 030	30 202	40 141	50 790
Switzerland	570	520	770	865	1 010	+	+	+	+
Sweden	628	560	767	714	921	+	+	+	+
Denmark	221	+	407	417	606	481	698	794	709
Norway	54	+	69	60	68	+	+	+	+
Austria	N/A	+	+	136	283	+	+	+	+
TOTAL	22 817	24 732	34 874	34 997	42 758	34 904	46 498	55 405	69 645

## MONTHLY IMPORTS OF AVOCADOS INTO FRANCE 1977-1984

(TONNES)

	1977	1978	1979	1980	1981	1982	1983	1984
JANUARY	1 951	2 217	2 455	3 386	1 946	3 047	6 298	2 800
FEBRUARY	2 103	2 278	2 075	2 352	2 614	2 987	5 730	4 655
MARCH	2 490	2 220	3 383	2 513	1 860	5 849	6 466	4 929
APRIL	2 221	2 591	3 683	2 348	2 408	4 023	4 410	3 885
MAY	1 292	1 627	2 659	1 979	2 401	2 548	3 777	4 520
JUNE	1 218	1 324	1 543	1 937	2 130	2 613	2 884	2 825
JULY	731	795	1 622	1 405	1 286	979	1 310	1 865
AUGUST	739	1 042	1 298	872	1 575	1 276	2 180	2 350
SEPTEMBER	1 119	944	987	1 145	1 066	2 186	1 637	N/A
OCTOBER	910	2 137	2 769	944	2 136	3 705	2 812	N/A
NOVEMBER	2 681	2 381	2 194	1 852	4 421	6 517	5 205	N/A
DECEMBER	2 318	4 413	5 264	3 297	6 358	4 411	8 081	8 398
TOTAL	19 773	23 970	29 932	24 030	30 202	40 141	50 790	36 227*

\* Nine months only

Source: Statistiques du Commerce Extérieur de la France

BANANA - AVERAGE PRODUCER PRICES PAID BY THE R.S.A. BANANA BOARD

Rand/Tonne

APPENDIX: 13

POOL (4 WEEKLY)	1981/82		1982/83		1983/84	
	1st Grade	Singles	1st Grade	Singles	1st Grade	Singles
1 July	232	167	215	116	249	161
2	210	136	214	117	255	176
3	178	91	186	90	295	183
4	178	86	148	85	267	135
5	155	78	149	82	348	187
6	114	66	151	98	374	183
7	169	82	151	89	351	158
8	223	65	246	89	357	174
9	263	148	232	98	351	193
10	316	173	407	164	374	196
11	431	208	372	177	430	194
12	466	229	202	134	452	216
13	366	234	297	149	481	225
WEIGHTED AVERAGE	229	113	213	105	348	180

APPENDIX : 13

SANDIA ARABIA - IMPORTS OF FRUIT AND VEGETABLE JUICE, 1977 -1981

APPENDIX: 14

QUANTITY (QTY.) : TONNE  
 VALUE (V) : SP's '000

PRODUCT	1977			1978		1979		1980		1981		
	QTY	VALUE	OF V*	QTY	VALUE	QTY	VALUE	QTY	VALUE	QTY	VALUE	OF V*
Apple Juice	9 968	23 482	6,1	10 427	24 077	10 952	21 710	11 940	24 733	6 425	13 931	2,5
Orange,lemon, and other citrus fruit juices	56 588	159 544	41,7	89 659	194 231	101 253	228 907	100 717	229 819	83 470	208 435	38,1
Mango and guava juice	18 762	42 899	11,2	22 237	50 558	26 443	62 164	15 975	43 030	16 127	50 600	9,2
Grape juice	3 567	8 985	2,3	2 867	7 466	2 778	7 400	3 678	9 153	4 016	9 141	1,7
Fruit and vegetable juices prepared for baby food	3 121	6 280	1,6	2 169	5 252	1 245	3 681	3 210	8 673	2 663	8 142	1,5
Date Molasses	2 291	5 234	1,4	2 346	4 687	978	2 582	1 863	4 248	375	1 083	0,2
Other fruit juices	33 477	80 620	2,0	88 986	204 601	81 427	191 992	87 629	204 141	68 444	170 852	31,2
Tomato juice	12 568	28 418	7,4	8 331	17 997	13 315	26 673	9 714	20 721	9 475	21 112	3,9
Other vegetable juices	4 776	11 038	2,5	4 031	8 796	4 817	10 410	6 058	14 157	2 230	5 249	1,0
Fruit and vegetable juices concentrated or powdered	5 671	16 434	4,1	9 174	26 934	8 171	24 818	11 167	49 328	12 055	59 226	10,4
TOTAL	160 789	382 934	100,0	240 227	544 589	251 379	580 337	251 951	608 003	205 280	547 771	100,0
TOTAL VALUE IN \$'000		108 631			160 192		172 678		182 765		161 938	

Source: The World Market for Fruit Juices ITC

\* May not add up to 100,0 because of rounding

BRIEF DESCRIPTIONS OF MANGO CULTIVARS CURRENTLY RECOMMENDED  
IN R.S.A.

1. Zill good colour, acceptable flavour and a high proportion of fruit within the required size range. Available from mid December to mid January.
2. Haden generally well coloured fruit of the required size. Fruit can however be variable and those consumers who dislike the taste tend to dislike it violently. Yields also tend to be variable under local conditions. Haden is the most important variety grown in Brazil and Peru.
3. Tommy Atkins. An early variety mostly available in December, with superb colour. The early colouration of fruit can however be misleading resulting in poorly flavoured immature fruit being rushed onto the pre-Christmas market. Locally produced fruit tends to be slightly fibrous. It is a major U.S./ Mexican variety, but as yet only small volumes are produced in southern Africa.
4. Irwin. A very good mid season variety with excellent colour characteristics. The taste is well balanced being slightly acidic.
5. Kent. A middle/late variety with excellent flavour, which is reported to handle well and store well. The high proportion of large fruit is a serious disadvantage. The colour characteristics, i.e. often being predominantly dark green even when ripe, are likely to become less acceptable over time.
6. Sensation. Well coloured but relatively small fruit which needs to be eaten slightly firm. The flavour tends to be disappointing and if eaten when soft leaves a distinct off-taste. Sensation has however recently become more acceptable on the export markets.
7. Keitt. As yet a relatively minor late variety but shows promise because of good colour, size and taste.
8. Paheri. Considered by many to be the mango of the connoisseur. The flesh is juicy, dark and fibreless, the taste rich and sweet with a slight acid tang. However the fruit tends to be small with a relatively poor keeping quality. The colour is reportedly not outstanding being green to yellowish with a slight red blush. India is a major supplier. To date, although produced in the R.S.A. no exports have been recorded.

NUMBER OF MANGO TREES IN R.S.A.

YEAR	NO. ESTABLISHED			CUMULATIVE TOTAL		
	FIBRELESS	FIBROUS	TOTAL	FIBRELESS	FIBROUS	TOTAL
<1960	3 960	66 844	70 804	3 960	66 844	70 804
1961-1965	51 957	39 545	91 502	55 917	106 389	162 306
1966-1970	59 091	60 544	119 635	115 008	166 933	281 941
1971	16 211	5 071	21 282	131 219	172 004	303 223
1972	113 812	34 290	148 102	245 031	206 294	451 325
1973	28 988	28 208	57 196	274 019	234 502	508 521
1974	50 335	38 105	88 440	324 354	272 607	596 961
1975	28 253	5 668	33 921	352 607	278 275	630 882
1976	25 748	7 321	33 069	378 355	285 596	663 951
1977	26 270	11 909	38 179	404 103	297 505	702 130
1978	30 782	18 479	49 261	434 885	315 984	751 391
1979	90 086	37 546	127 732	524 971	353 630	879 123
1980	77 631	14 600	92 231	602 602	368 230	971 354
1981*	78 000	28 100	106 100	680 602	396 330	1077 454

\* Estimates

Source: South African Mango Growers Association (S.A.M.G.A.)

APPENDIX : 17

QUANTITIES AND PRICES OF MANGOES SOLD ON 14 R.S.A. FRESH PRODUCE MARKETS

( 1975 - 1984 )

	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
1975 TONNE	1058,77	389,58	38,85	9,70	,45		,38	,05	12,62	125,59	495,47	1399,24	3530,30
R/TON	346,97	409,73	418,62	401,50	315,22		498,68	470,00	212,22	149,32	160,07	274,35	292,91
1976 TONNE	4364,55	2663,61	674,68	41,76	,11			,01	,36	88,48	441,29	1405,46	9680,31
R/TON	195,97	240,04	350,79	478,94	375,91			180,00	343,33	109,12	136,69	313,96	233,75
1977 TONNE	2963,34	1549,27	111,12	6,12	2,60		,02	,09	18,16	144,13	902,83	3099,48	8601,16
R/TON	288,93	357,82	43,51	694,46	320,70	350,02		288,89	146,39	101,66	210,36	244,90	277,16
1978 TONNE	5994,38	1350,22	137,71	2,68	,22				15,46	235,59	652,30	2801,19	11189,75
R/TON	266,12	353,33	512,34	688,34	738,64				255,09	120,76	228,72	258,62	240,50
1979 TONNE	6168,54	2105,98	168,29	18,98	2,94	2,20	5,51	1,54	5,40	106,70	293,23	1509,47	10388,78
R/TON	272,96	401,27	551,29	365,88	360,14	337,27	721,98	563,83	252,31	196,33	243,92	348,96	313,40
1980 TONNE	3602,08	1583,70	325,99	34,94	2,20	9,81	1,28	,78	3,30	46,58	531,68	1923,98	8066,32
R/TON	354,30	478,13	595,23	733,22	720,36	472,48	483,58	753,21	232,02	203,42	181,14	368,40	381,32
1981 TONNE	4576,80	3251,92	559,89	6,51	,43	4,35	,45		,20	51,33	185,75	1291,46	9929,09
R/TON	344,78	394,72	610,53	540,14	1034,91	336,12	350,78		375,00	220,41	239,61	499,94	390,57
1982 TONNE	1535,31	607,10	287,47	13,70		2,64		,95	44,13	330,74	790,16	3182,38	6794,58
R/TON	679,48	958,34	1098,16	730,46		249,59		1131,58	1153,04	402,79	487,38	552,60	629,95
1983 TONNE	3871,20	2039,83	403,53	15,91	3,49	,01	,63	2,13	9,02	178,63	597,94	2410,64	9532,95
R/TON	498,89	688,47	1096,21	1287,16	881,21	300,00	444,44	340,38	206,15	210,08	318,41	584,95	570,91
1984 TONNE	7054,32	2100,56	389,20	13,49	4,81	2,43	,05	,52	10,22	105,76	539,13	1975,22	12195,71
R/TON	457,01	754,40	1133,37	1637,64	2236,38	808,64	1480,00	2186,54	971,82	364,30	442,72	769,20	581,53

MANGO IMPORTS INTO SELECTED WEST EUROPEAN COUNTRIES  
1975 - 1983

COUNTRY	1975	% OF TOTAL	1976	1977	1978	1979	1980	1981	1982	1983	% OF TOTAL
United Kingdom	1 347	46,1	1 211	1 162	1 893	2 768					
France	507	20,8	733	913	1 387	1 859	2 268	2 388	2 781	2 906	
Netherlands	539	18,4	673	831	1 569	1 534	1 660	1 324	1 597	1 960	
Germany Fed.Rep	231	7,9	213	294	678	947	968	742	746	1 136	
Belgium	86	2,9	94	215	309	322					
Switzerland	71	2,4	70	107	173	237					
Sweden	27	0,9	27	50	38	44					
Denmark	14	0,5	*	34	14	13					
TOTAL	2 922		3 021	3 606	6 061	7 724					

NOTES 1. Above statistics include imports of guavas and mango steens (usually 1 -2% of total) with the exception of the Federal Republic of Germany, which relates only to mangoes.

2. Statistics for Norway and Austria are grouped with avocados, guava and mango steens in trade publications and are not included above. Combined imports are small - usually less than 100 tonnes to Norway and 400 tonnes to Austria.

\* Not available

Source: Selected European Markets for Tropical and Off-Season Fresh Fruit and Vegetables I.T.C.

QUANTITY AND VALUE OF MANGO\* IMPORTS INTO THE  
FEDERAL REPUBLIC OF GERMANY

	1978	1979	1980	1981	1982	1983
<u>QUANTITY (tonnes)</u>						
Mali	46,2	137,3	73,9	55,8	106,6	146,1
Kenya	155,8	157,1	196,8	213,6	152,0	127,2
R.S.A.	115,4	234,3	218,5	97,1	73,1	216,6
Mexico	222,2	245,2	47,7	35,0	104,7	235,7
Israel	37,3	25,1	43,6	74,9	51,6	64,5
U.S.A.	-	45,0	147,4	46,9	36,7	34,5
Venezuela	-	20,1	32,8	20,0	-	-
Senegal	-	-	26,2	-	-	-
Brazil	-	-	68,5	98,0	92,4	160,0
France	9,0	-	5,5	27,6	95,3	-
Other E.E.C.	21,6	8,1	40,6	6,7	16,6	25,1
Other	70,4	75,0	66,8	65,9	16,9	126,6
<b>TOTAL</b>	<b>677,9</b>	<b>947,2</b>	<b>968,3</b>	<b>741,5</b>	<b>745,9</b>	<b>136,3</b>
<u>AVERAGE VALUE (DM/tonne)</u>						
Mali	2 662	3 358	3 816	3 441	5 094	5 133
Kenya	3 415	3 921	4 035	4 316	5 276	5 039
R.S.A.	2 634	2 889	2 787	2 719	5 486	4 954
Mexico	2 232	3 067	3 732	3 600	4 565	4 671
Israel	2 359	3 227	3 188	2 657	4 535	4 791
U.S.A.	-	3 644	3 467	3 326	4 768	4 493
Venezuela	-	4 095	3 719	5 050	-	-
Senegal	-	-	3 359	-	-	-
Brazil	-	-	3 562	4 214	5 422	4 869
France	8 889	-	5 961	7 645	7 101	-
Other E.E.C.	3 194	5 432	6 404	10 448	18 072	6 614
Other	3 309	4 787	4 641	5 266	5 194	5 632
<b>WEIGHTED AVERAGE</b>	<b>2 840</b>	<b>3 421</b>	<b>3 661</b>	<b>3 976</b>	<b>5 066</b>	<b>5 005</b>

\* Includes very small quantities of mangosteens and guava, estimated to be less than 5%.

Source : Statistisches Bundesamt, Wiesbaden

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QUANTITY AND VALUE OF MANGO\* IMPORTS INTO THE NETHERLANDS

<u>BY SUPPLYING COUNTRY</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>QUANTITY (tonnes)</u>				
Mali	350	397	631	830
Upper Volta	23	118	216	84
Senegal	68	40	45	48
Ivory Coast	33	15	-	26
Kenya	67	66	43	38
R.S.A.	106	58	19	93
U.S.A.	505	132	17	155
Mexico	57	116	111	235
Venezuela	138	64	35	-
Brazil	33	52	68	55
Israel	45	54	56	43
Peru	**	21	60	36
Thailand	**	11	67	54
France	90	102	109	118
Other	145	78	120	263
TOTAL	<u>1 660</u>	<u>1 324</u>	<u>1 597</u>	<u>1 960</u>
<u>AVERAGE VALUE (gld/tonne)</u>				
Mali	3 026	2 980	5 377	5 651
Upper Volta	2 870	1 941	5 231	5 702
Senegal	2 676	2 600	4 889	6 063
Ivory Coast	3 515	3 533	-	5 425
Kenya	4 194	4 833	5 674	5 526
R.S.A.	3 594	4 207	6 105	5 269
U.S.A.	2 267	3 795	6 118	3 232
Mexico	3 158	3 241	5 234	4 336
Venezuela	2 522	4 656	4 057	-
Brazil	4 788	4 942	6 338	5 564
Israel	4 755	4 593	4 625	5 233
Peru	**	4 429	5 217	1 895
Thailand	**	7 182	6 463	6 537
France	4 622	5 186	4 211	4 390
Other	<u>3 579</u>	<u>3 756</u>	<u>3 867</u>	<u>3 648</u>
<u>WEIGHTED AVERAGE</u>	<u>3 051</u>	<u>3 630</u>	<u>5 190</u>	<u>5 170</u>

\* Includes small quantities of mangosteens and guavas

\*\* Small quantities may have been included under other .

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QUANTITIES AND PRICES OF PAPAYA SOLD ON 14 R.S.A.  
FRESH PRODUCE MARKETS 1975 - 1984

APPENDIX : 20

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1975 TONNE	354,33	94,06	167,46	429,59	1035,32	1095,08	1596,15	1438,88	2826,70	1922,72	2037,12	2011,68	15009,09
R/TON	157,54	214,47	251,25	203,74	127,86	133,86	128,38	144,93	113,03	135,69	123,70	55,01	128,01
1976 TONNE	781,75	132,57	498,97	471,16	484,01	723,72	775,54	1468,78	2426,53	2925,37	2890,26	1427,29	15005,95
R/TON	113,48	221,71	211,35	205,17	210,76	205,51	188,44	158,45	116,84	97,03	109,30	114,56	133,06
1977 TONNE	522,76	72,42	206,95	513,73	835,08	552,82	545,13	1027,21	1362,19	2698,65	3979,93	1759,28	14076,15
R/TON	153,54	220,45	247,01	205,01	200,44	239,55	254,21	231,72	191,91	119,46	105,60	100,41	149,89
1978 TONNE	707,84	108,33	237,95	700,27	1179,72	989,82	1020,07	2077,22	2446,64	4058,23	2430,97	1565,69	17522,75
R/TON	133,67	251,15	268,46	213,54	182,48	174,40	182,63	168,48	129,58	113,65	122,72	127,20	144,68
1979 TONNE	667,46	113,15	455,18	950,33	1654,39	1236,68	1226,69	1084,58	1261,81	2090,22	1867,74	1544,94	14153,17
R/TON	163,97	318,33	248,00	202,89	168,20	145,34	195,98	227,61	240,18	229,28	189,98	137,10	193,98
1980 TONNE	1111,04	240,76	385,88	1319,20	2155,84	1890,57	2307,09	2177,94	2887,76	2302,20	2096,92	1786,17	20661,37
R/TON	165,78	264,14	287,46	222,26	132,21	128,69	135,44	148,44	150,40	179,96	179,56	142,30	159,49
1981 TONNE	457,18	75,35	322,93	707,37	1244,08	1738,68	1422,44	1574,22	2540,16	2114,01	2509,30	1948,70	16652,42
R/TON	230,98	401,26	416,87	353,33	263,04	216,85	235,62	236,77	200,85	217,23	204,44	298,98	228,34
1982 TONNE	563,74	90,27	53,25	239,92	503,41	862,64	856,77	1927,56	2229,68	2074,14	2503,81	1392,50	13397,69
R/TON	256,90	446,21	637,53	538,37	421,17	412,35	386,56	317,97	313,64	352,09	287,31	303,67	333,88
1983 TONNE	460,31	161,92	419,36	632,76	1299,37	914,62	548,72	1000,74	1788,01	2127,19	2891,39	1568,20	13812,59
R/TON	357,88	456,54	535,18	463,35	402,78	423,25	644,01	579,95	390,65	339,29	289,25	291,38	384,72
1984 TONNE	721,96	179,20	178,08	372,15	1878,50	1778,43	2026,64	1692,77	1760,58	2406,63	1451,29	1133,71	15579,94
R/TON	414,17	617,29	794,15	660,02	337,61	289,54	321,65	382,23	397,17	409,15	432,00	394,90	385,80

QUANTITY \* AND VALUE OF PAPAYA IMPORTS INTO THE EEC

1980 - 1983

APPENDIX : 21

QUANTITY (QTY.) : TONNES  
PRICE : ECU

IMPORTING COUNTRY	1980		1981		1982		1993	
	QTY	PRICE/t	QTY	PRICE/t	QTY	PRICE/t	QTY	PRICE/t
West Germany	105	1 486	103	2 068	250	2 080	121	1 347
France	175	2 280	216	1 907	235	2 328	139	1 492
Italy	48	2 500	57	2 158	126	2 325	57	1 306
Netherlands	64	1 703	65	1 923	96	1 927	47	1 596
Belgium/Luxembourg	39	1 821	41	1 732	67	1 388	107	803
United Kingdom	218	1 716	300	2 117	474	2 192	94	1 543
Ireland	-	-	-	-	-	-	-	-
Denmark	1	2 000	1	1 000	1	2 000	1	2 000
TOTAL	650	1 894	783	2 018	1249	2 145	566	1 336
COUNTRY OF ORIGIN	QTY	PRICE/t	QTY	PRICE/t	QTY	PRICE/t	QTY	PRICE/t
Brazil	237	1 565	436	1 790	621	2 147	1203	2 130
U.S.A.	147	1 061	107	1 925	-	-	-	-
Ivory Coast	104	1 221	68	2 676	-	-	-	-
Other	78	1 308	39	1 718	162	1 525	46	1 330
TOTAL	566	1 336	650	1 894	783	2 018	1249	2 145

\* Excludes re- exports within EEC

Source: EUROSTAT - ANALYTICAL TABLES OF FOREIGN TRADE

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(Figures in basic cartons equivalent 24 x A21)

APPENDIX: 25  
2 of 4

<u>SWITZERLAND</u>	1981	1982	1983
Philippines	204 676	218 720	195 934
South Africa	118 867	160 111	119 376
Thailand	40 104	48 875	40 468
USA	6 642	26 719	26 537
Kenya	9 532	3 600	15 273
Malaysia	5 932	5 526	14 024
Other countries	23 121	10 385	9 903
<b>TOTAL</b>	<b>428 874</b>	<b>473 936</b>	<b>421 515</b>
<u>AUSTRIA</u>			
South Africa	205 487	233 879	218 187
Thailand	86 444	56 936	41 924
Philippines	23 981	35 693	21 527
Kenya	-	-	13 760
Other countries	15 666	27 581	3 682
<b>TOTAL</b>	<b>331 578</b>	<b>354 089</b>	<b>299 080</b>
<u>ITALY</u>			
Kenya	111 702	129 265	264 370
Ivory Coast	257 840	260 558	147 292
Philippines	69 175	101 101	78 955
Swaziland	12 160	20 727	38 290
Thailand	20 858	43 587	36 539
South Africa	21 193	21 117	28 750
Malaysia	831	24 209	11 323
Other countries	7 894	17 642	14 104
<b>TOTAL</b>	<b>501 661</b>	<b>634 206</b>	<b>619 623</b>
<u>BELGIUM/LUXEMBOURG</u>			
Philippines	134 051	101 278	126 491
Kenya	61 499	89 729	75 234
Thailand	41 929	50 792	36 022
Swaziland	45 427	31 214	32 641
South Africa	20 990	27 317	26 754
Ivory Coast	100 944	57 261	26 054
Other countries	76 354	89 794	75 813
<b>TOTAL</b>	<b>481 194</b>	<b>465 385</b>	<b>399 019</b>

(Figures in basic cartons equivalent 24 x A2)

<u>THE NETHERLANDS</u>	1981	1982	1983
Philippines	194 080	173 330	176 262
Kenya	152 861	191 938	115 730
Thailand	167 209	125 345	94 957
Ivory Coast	164 826	95 514	53 561
USA	25 516	28 775	26 951
Other countries	108 736	138 145	180 658
<b>TOTAL</b>	<b>813 228</b>	<b>753 047</b>	<b>648 120</b>
<u>REPUBLIC OF IRELAND</u>			
Swaziland	8 103	18 607	15 490
South Africa	11 864	16 325	11 621
Malaysia	5 925	4 157	4 209
Kenya	12 130	9 836	2 902
Philippines	11 275	11 509	2 245
Other countries	10 659	6 896	11 090
<b>TOTAL</b>	<b>59 956</b>	<b>67 330</b>	<b>47 557</b>
<u>DENMARK</u>			
Thailand	44 611	75 690	79 702
Philippines	52 804	20 300	30 100
Kenya	28 899	22 040	24 231
Malaysia	5 704	5 126	7 184
Ivory Coast	38 851	8 442	6 367
Taiwan	-	6 571	5 509
South Africa	2 190	5 349	1 980
Other countries	16 219	13 274	13 507
<b>TOTAL</b>	<b>189 278</b>	<b>156 792</b>	<b>168 580</b>
<u>SWEDEN</u>			
Philippines	226 540	200 971	216 527
Thailand	24 898	54 087	50 779
South Africa	29 815	21 456	25 345
P.R. of China	25 434	8 851	23 199
Other countries	76 973	57 573	47 427
<b>TOTAL</b>	<b>383 660</b>	<b>342 938</b>	<b>363 277</b>

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(Figures in basic cartons equivalent 24 x A2))

<u>NORWAY</u>	1981	1982	1983
Philippines	73 136	84 665	76 549
Thailand	42 805	31 415	32 372
Kenya	34 856	15 868	11 490
Other countries	20 349	44 587	32 204
<b>TOTAL</b>	<b>171 146</b>	<b>176 535</b>	<b>152 615</b>

<u>FINLAND</u>			
Philippines	150 224	265 031	137 800
Thailand	20 784	68 496	97 007
P.R. of China	8 548	7 047	19 986
Other countries	35 670	25 198	22 621
<b>TOTAL</b>	<b>224 226</b>	<b>305 772</b>	<b>277 502</b>

<u>JAPAN</u>			
Philippines	301 006	308 864	260 598
Thailand	145 357	342 580	220 089
Malaysia	130 147	164 015	172 684
Taiwan	249 850	79 903	54 604
Other countries	23 068	21 700	29 151
<b>TOTAL</b>	<b>849 428</b>	<b>917 962</b>	<b>737 127</b>

## IMPORTS OF FRESH PINEAPPLE INTO SELECTED EUROPEAN COUNTRIES

	1975	1976	1977	1978	1979	1980	1981	1982	1983
France	34 788	35 498	31 799	48 928	44 485	39 551	37 981	36 691	37 460
Germany	13 144	13 336	10 926	19 212	16 204	12 589	14 111	12 306	12 998
United Kingdom	5 157	4 291	4 813	7 641	8 952	*	14 409	15 809	15 864
Netherlands	2 638	2 833	5 660	9 530	9 489	8 076	8 539	8 839	8 698
Belgium - Lux	4 030	4 859	4 241	5 710	6 267	*	5 516	4 694	4 147
Switzerland	2 466	2 760	2 598	4 295	3 886	3 966	3 962	4 320	3 851
Sweden	956	1 222	1 690	1 356	1 499	*	1 284	1 146	1 172
Denmark	722	*	906	1 340	1 665	*	1 163	1 237	1 173
Austria	660	*	572	1 040	987	*	581	742	889
Norway	208	*	297	328	300	*	291	295	347
	64 819	*	63 442	99 380	93 734	*	87 837	86 079	86 599

\* Not on hand

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AVERAGE VALUE OF FRESH PINEAPPLE IMPORTS INTO WESTERN EUROPEU S DOLLARS/TONNE

COUNTRY	1981	1982	1983
United Kingdom	851	769	747
France	639	715	706
Netherlands	453	674	772
Belgium-Luxemburg	552	689	775
Switzerland	1 082	955	1 021
Sweden	814	784	770
Austria	862	717	747
Denmark	525	690	746
Norway	1 159	1 068	1 035
WEIGHTED AVERAGE	681	737	746
% CHANGE		+ 8,2%	+ 1,1%

Source: SVP Johannesburg

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## ESTIMATED GROSS MARGINS

## ENTERPRISE : WINTER CABBAGE (IRRIGATED)

## ESTATE SCALE

## SMALLHOLDER SCALE

Yield (t/ha)	55	Yield (t/ha)	40
Price (E/t)	100	Price (E/t)	100
GROSS INCOME (E/ha)	5500	GROSS INCOME (E/ha)	4 000
<u>VARIABLE COSTS</u>	E/ha		E/ha
Total seed	360	Total seed	360
Total fertilizer	578	Total fertilizer (plus manure at no cost)	289
Total chemicals	219	Total chemicals (no weedicides - hand hoe)	113
Labour : Field	346	Labour : Field	388
: Irrigation	51	: Irrigation	51
: Mechanical	45	: Mechanical	32
Total labour	442	Total labour	471
Total mechanical ops	313	Total mechanical ops (hand spray, hand topdress, hand hoe)	194
Irrigation M&R	55	Irrigation M&R	55
Insurance	165	Insurance	
Contingencies	213	Contingencies	148
Total field variable costs	2 345	Total field variable costs	1 630
Processing and marketing cost :		Processing and marketing cost :	
Labour	173	Labour	126
Pack. mat.	489	Pack. mat.	355
Transport	1 375	Transport	1 000
Total processing & marketing costs	2 037	Total processing & marketing costs	1 481
TOTAL VARIABLE COSTS	4 382	TOTAL VARIABLE COSTS	3 111
GROSS MARGIN	111 8	GROSS MARGIN	889
GROSS MARGIN PER E100 VARIABLE COSTS	26	GROSS MARGIN PER E100 VARIABLE COSTS	29
		RETURNS TO LABOUR	1 486

ESTIMATED GROSS MARGINS

ENTERPRISE : COTTON (IRRIGATED)

ESTATE SCALE

SMALLHOLDER SCALE

Yield (t/ha)	2,5	Yield (t/ha)	2,0
Price (E/t)	820	Price (E/t)	820
GROSS INCOME (E/ha)	2050	GROSS INCOME (E/ha)	1640
<u>VARIABLE COSTS</u>	E/ha		E/ha
Total seed	17,00	Total seed	17,00
Total fertilizer	134,00	Total fertilizer	116,00
Total chemicals	228,00	Total chemicals (no weedicides - hand hoe)	167,00
Labour : Field	55,00	Labour : Field	92,00
: Irrigation	126,00	: Irrigation	126,00
: Mechanical	13,00	: Mechanical	6,00
Total labour	194,00	Total labour	224,00
Total mechanical ops	218,00	Total mechanical ops (hand spray, hand topdress, hand hoe)	99,00
Irrigation M&R	55,00	Irrigation M&R	55,00
Insurance		Insurance	
Contingencies	85,00	Contingencies	68,00
Total field variable costs	931,00	Total field variable costs	746,00
Processing and marketing cost :		Processing and marketing cost :	
Labour	250,00	Labour	200,00
Levies	136,00	Levies	109,00
Transport	94,00	Transport	75,00
Total processing & marketing costs	480,00	Total processing & marketing costs	384,00
TOTAL VARIABLE COSTS	1 411,00	TOTAL VARIABLE COSTS	1 130,00
GROSS MARGIN	639,00	GROSS MARGIN	510,00
GROSS MARGIN PER E100 VARIABLE COSTS	45	GROSS MARGIN PER E100 VARIABLE COSTS	45
		RETURNS TO LABOUR	934,00

## U.S. A.I.D. PROJECT SWAZILAND

## ESTIMATED GROSS MARGINS

ENTERPRISE : COTTON (RAINGROWN - MIDDLEVELD)

## ESTATE SCALE

## SMALLHOLDER SCALE

Yield (t/ha)	1,5	Yield (t/ha)	1,2
Price (E/t)	820	Price (E/t)	820
GROSS INCOME (E/ha)	1 230	GROSS INCOME (E/ha)	984
<u>VARIABLE COSTS</u>	E/ha		E/ha
Total seed	17	Total seed	17
Total fertilizer	116	Total fertilizer	101
Total chemicals	178	Total chemicals (no weedicides - hand hoe)	124
Labour : Field	47	Labour : Field	75
: Irrigation		: Irrigation	
: Mechanical	13	: Mechanical	6
Total labour	60	Total labour	81
Total mechanical ops	185	Total mechanical ops (hand spray, hand topdress, hand hoe)	98
Irrigation M&R	-	Irrigation M&R	-
Insurance	-	Insurance	-
Contingencies	56	Contingencies	42
Total field variable costs	612	Total field variable costs	461
Processing and marketing cost :		Processing and marketing cost :	
Labour	150	Labour	120
Pack. mat.	81	Pack. mat.	65
Transport	56	Transport	45
Total processing & marketing costs	287	Total processing & marketing costs	230
TOTAL VARIABLE COSTS	899	TOTAL VARIABLE COSTS	691
GROSS MARGIN	331	GROSS MARGIN	293
GROSS MARGIN PER E100 VARIABLE COSTS	37	GROSS MARGIN PER E100 VARIABLE COSTS	42
		RETURNS TO LABOUR	514

ESTIMATED GROSS MARGINS

ENTERPRISE : COTTON (RAINGROWN - LOWVELD)

ESTATE SCALE

SMALLHOLDER SCALE

Yield (t/ha)	1,0	Yield (t/ha)	0,75
Price (C/t)	820	Price (E/t)	820
GROSS INCOME (E/ha)	820	GROSS INCOME (E/ha)	615
<u>VARIABLE COSTS</u>	E/ha		E/ha
Total seed	17	Total seed	17
Total fertilizer	87	Total fertilizer	76
Total chemicals	133	Total chemicals (no weedicides - hand hoe)	93
Labour : Field	41	Labour : Field	64
: Irrigation	12	: Irrigation	7
: Mechanical		: Mechanical	
Total labour	53	Total labour	71
Total mechanical ops	170	Total mechanical ops (hand spray, hand topdress, hand hoe)	96
Irrigation M&R		Irrigation M&R	
Insurance		Insurance	
Contingencies	46	Contingencies	35
Total field variable costs	506	Total field variable costs	388
Processing and marketing cost :		Processing and marketing cost :	
Labour	82	Labour	75
Pack. mat.	54	Pack. mat.	41
Transport	37	Transport	28
Total processing & marketing costs	173	Total processing & marketing costs	144
TOTAL VARIABLE COSTS	679	TOTAL VARIABLE COSTS	532
GROSS MARGIN	141	GROSS MARGIN	83
GROSS MARGIN PER E100 VARIABLE COSTS	21	GROSS MARGIN PER E100 VARIABLE COSTS	16
		RETURNS TO LABOUR	229

## U.S. A.I.D. PROJECT SWAZILAND

## ESTIMATED GROSS MARGINS

## ENTERPRISE : FIRE CURED TOBACCO (RAINGROWN)

## ESTATE SCALE

## SMALLHOLDER SCALE

Yield (t/ha)	1,6	Yield (t/ha)	1,1
Price (E/t)	2 200	Price (E/t)	2 200
GROSS INCOME (E/ha)	3520	GROSS INCOME (E/ha)	2420
<u>VARIABLE COSTS</u>	E/ha		E/ha
Total seed	110	Total seed	110
Total fertilizer	543	Total fertilizer	418
Total chemicals	249	Total chemicals (no weedicides - hand hoe)	193
Labour : Field	492	Labour : Field	391
: Irrigation		: Irrigation	
: Mechanical	79	: Mechanical	66
Total labour	571	Total labour	457
Total mechanical ops	280	Total mechanical ops (hand spray, hand topdress, hand hoe)	229
Curing costs	64	Curing costs	50
Insurance	352	Insurance	
Contingencies	217	Contingencies	146
Total field variable costs	2 386	Total field variable costs	1 603
Processing and marketing cost :		Processing and marketing cost :	
Labour	184	Labour	140
Pack. mat.	28	Pack. mat.	21
Transport	40	Transport	28
Total processing & marketing costs	252	Total processing & marketing costs	189
TOTAL VARIABLE COSTS	2 638	TOTAL VARIABLE COSTS	1 792
GROSS MARGIN	882	GROSS MARGIN	628
GROSS MARGIN PER E100 VARIABLE COSTS	33	GROSS MARGIN PER E100 VARIABLE COSTS	35
		RETURNS TO LABOUR	1 225

## U.S. A.I.D. PROJECT SWAZILAND

## ESTIMATED GROSS MARGINS

ENTERPRISE : GROUNDNUTS (RAINGROWN - MIDDLELEVEL)

## ESTATE SCALE

## SMALLHOLDER SCALE

	1,8 <sup>a</sup> 550* <sup>a</sup>	1 <sup>b</sup> 20 <sup>b</sup>		1,4 <sup>a</sup> 550* <sup>a</sup>	0,75 <sup>b</sup> 15 <sup>b</sup>
Yield (t/ha)			Yield (t/ha)		
Price (E/t)			Price (E/t)		
GROSS INCOME (E/ha)	1 010		GROSS INCOME (E/ha)	785	
<u>VARIABLE COSTS</u>	E/ha			E/ha	
Total seed	120		Total seed	120	
Total fertilizer	47		Total fertilizer (plus manure at no cost)	-	
Total chemicals	147		Total chemicals (no weedicides - hand hoe)	91	
Labour : Field	75		Labour : Field	201	
: Irrigation	-		: Irrigation	-	
: Mechanical	19		: Mechanical	13	
Total labour	94		Total labour	214	
Total mechanical ops	186		Total mechanical ops (hand spray, hand toddress, hand hoe)	122	
Irrigation M&R	-		Irrigation M&R	-	
Insurance	-		Insurance	-	
Contingencies	59		Contingencies	55	
Total field variable costs	653		Total field variable costs	602	
Processing and marketing cost :			Processing and marketing cost :		
Labour	7		Labour	4	
Pack. mat.	9		Pack. mat.	7	
Transport	45		Transport	35	
Total processing & marketing costs	61		Total processing & marketing costs	46	
TOTAL VARIABLE COSTS	714		TOTAL VARIABLE COSTS	648	
GROSS MARGIN	296		GROSS MARGIN	137	
GROSS MARGIN PER E100 VARIABLE COSTS	41		GROSS MARGIN PER E100 VARIABLE COSTS	21	
			RETURNS TO LABOUR	355	

U.S. A.I.D. PROJECT SWAZILAND

ESTIMATED GROSS MARGINS

ENTERPRISE : MAIZE (RAINGROWN - MIDDLEVELD)

ESTATE SCALE

SMALLHOLDER SCALE

Yield (t/ha)	4,5	Yield (t/ha)	3,0
Price (E/t)	313	Price (E/t)	313
GROSS INCOME (E/ha)	1409	GROSS INCOME (E/ha)	939
<u>VARIABLE COSTS</u>	E/ha		E/ha
Total seed	39	Total seed	39
Total fertilizer	200	Total fertilizer	149
Total chemicals	71	Total chemicals (no weedicides - hand hoe)	23
Labour : Field	31	Labour : Field	96
: Irrigation		: Irrigation	
: Mechanical	19	: Mechanical	13
Total labour	50	Total labour	109
Total mechanical ops	196	Total mechanical ops (hand spray, hand topdress, hand hoe)	135
Irrigation M&R		Irrigation M&R	
Insurance		Insurance	
Contingencies	56	Contingencies	46
Total field variable costs	612	Total field variable costs	501
Processing and marketing cost :		Processing and marketing cost :	
Labour	7	Labour	10
Pack. mat.	19	Pack. mat.	13
Transport	113	Transport	75
Total processing & marketing costs	139	Total processing & marketing costs	98
TOTAL VARIABLE COSTS	751	TOTAL VARIABLE COSTS	599
GROSS MARGIN	658	GROSS MARGIN	340
GROSS MARGIN PER E100 VARIABLE COSTS	88	GROSS MARGIN PER E100 VARIABLE COSTS	57
		RETURNS TO LABOUR	459

## U.S. A.I.D. PROJECT SWAZILAND

## ESTIMATED GROSS MARGINS

ENTERPRISE : WINTER ONION (IRRIGATED)

ESTATE SCALE

SMALLHOLDER SCALE

Yield (t/ha)	25	Yield (t/ha)	15
Price (E/t)	190	Price (E/t)	190
GROSS INCOME (E/ha)	4 750	GROSS INCOME (E/ha)	2 850
<u>VARIABLE COSTS</u>	E/ha		E/ha
Total seed	138	Total seed	138
Total fertilizer	435	Total fertilizer (plus manure at no cost)	218
Total chemicals	453	Total chemicals (no weedicides - hand hoe)	42
Labour : Field	51	Labour : Field	231
: Irrigation	81	: Irrigation	82
: Mechanical	26	: Mechanical	19
Total labour	158	Total labour	332
Total mechanical ops	319	Total mechanical ops (hand spray, hand topdress, hand hoe)	193
Irrigation M&R	55	Irrigation M&R	55
Insurance	-	Insurance	-
Contingencies	156	Contingencies	98
Total field variable costs	1 714	Total field variable costs	1 076
Processing and marketing cost :		Processing and marketing cost :	
Labour	150	Labour	88
Pack. mat.	625	Pack. mat.	375
Transport	625	Transport	375
Total processing & marketing costs	1 400	Total processing & marketing costs	838
TOTAL VARIABLE COSTS	3 114	TOTAL VARIABLE COSTS	1 914
GROSS MARGIN	1 636	GROSS MARGIN	936
GROSS MARGIN PER E100 VARIABLE COSTS	53	GROSS MARGIN PER E100 VARIABLE COSTS	49
		RETURNS TO LABOUR	1 356

U.S. A.I.D. PROJECT SWAZILAND

APPENDIX 25.7.1

ESTIMATED GROSS MARGINS

ENTERPRISE : POTATO (IRRIGATED)

ESTATE SCALE

SMALLHOLDER SCALE

Yield (t/ha)	35	Yield (t/ha)	28
Price (E/t)	200	Price (E/t)	200
GROSS INCOME (E/ha)	7 000	GROSS INCOME (E/ha)	5 600
<u>VARIABLE COSTS</u>	E/ha		E/ha
Total seed	1 620	Total seed	1 620
Total fertilizer	542	Total fertilizer	515
Total chemicals	193	Total chemicals (no weedicides - hand hoe)	70
Labour : Field	346	Labour : Field	374
: Irrigation	20	: Irrigation	20
: Mechanical	26	: Mechanical	26
Total labour	392	Total labour	420
Total mechanical ops	391	Total mechanical ops (hand spray, hand topdress, hand hoe)	296
Irrigation M&R	55	Irrigation M&R	55
Insurance	-	Insurance	-
Contingencies	320	Contingencies	298
Total field variable costs	3 513	Total field variable costs	3 274
Processing and marketing cost :		Processing and marketing cost :	
Labour	112	Labour	88
Pack. mat.	466	Pack. mat.	373
Transport	875	Transport	700
Total processing & marketing costs	1 453	Total processing & marketing costs	1 161
TOTAL VARIABLE COSTS	4 966	TOTAL VARIABLE COSTS	4 435
GROSS MARGIN	2 034	GROSS MARGIN	1 165
GROSS MARGIN PER E100 VARIABLE COSTS	41	GROSS MARGIN PER E100 VARIABLE COSTS	26
		RETURNS TO LABOUR	1 673

ESTIMATED GROSS MARGINS

ENTERPRISE : POTATO (RAINGROWN)

ESTATE SCALE

SMALLHOLDER SCALE

Yield (t/ha)	27	Yield (t/ha)	21
Price (E/t)	200	Price (E/t)	200
GROSS INCOME (E/ha)	5 400	GROSS INCOME (E/ha)	4 200
<u>VARIABLE COSTS</u>	E/ha		E/ha
Total seed	1 620	Total seed	1 620
Total fertilizer	515	Total fertilizer (plus manure at no cost)	258
Total chemicals	193	Total chemicals (no weedicides - hand hoe)	70
Labour : Field	301	Labour : Field	336
: Irrigation	-	: Irrigation	-
: Mechanical	26	: Mechanical	26
Total labour	327	Total labour	362
Total mechanical ops	369	Total mechanical ops (hand spray, hand topdress, hand hoe)	274
Irrigation M&R	-	Irrigation M&R	-
Insurance	-	Insurance	-
Contingencies	302	Contingencies	258
Total field variable costs	3 326	Total field variable costs	2 844
Processing and marketing cost :		Processing and marketing cost :	
Labour	85	Labour	61
Pack. mat.	360	Pack. mat.	280
Transport	675	Transport	525
Total processing & marketing costs	1 120	Total processing & marketing costs	866
TOTAL VARIABLE COSTS	4 446	TOTAL VARIABLE COSTS	3 710
GROSS MARGIN	954	GROSS MARGIN	490
GROSS MARGIN PER E100 VARIABLE COSTS	21	GROSS MARGIN PER E100 VARIABLE COSTS	13
		RETURNS TO LABOUR	913

## U.S. A.I.D. PROJECT SWAZILAND

ESTIMATED GROSS MARGINSENTERPRISE : TOMATO (IRRIGATED)ESTATE SCALESMALLHOLDER SCALE

Yield (t/ha)	30	Yield (t/ha)	20
Price (E/t)	347	Price (E/t)	347
GROSS INCOME (E/ha)	10 410	GROSS INCOME (E/ha)	6 940
<u>VARIABLE COSTS</u>	E/ha	(No	E/ha
Total seed	998	Total seed trellising)	190
Total fertilizer	977	Total fertilizer (plus manure at no cost)	458
Total chemicals	368	Total chemicals (no weedicides - hand hoe)	86
Labour : Field	170	Labour : Field	363
: Irrigation	92	: Irrigation	92
: Mechanical	25	: Mechanical	13
Total labour	287	Total labour	468
Total mechanical ops	316	Total mechanical ops (hand spray, hand topdress, hand hoe)	123
Irrigation M&R	55	Irrigation M&R	55
Insurance	-	Insurance	-
Contingencies	300	Contingencies	138
Total field variable costs	3 301	Total field variable costs	1 518
Processing and marketing cost :		Processing and marketing cost :	
Labour	687	Labour	456
Pack. mat.	2 200	Pack. mat.	1 467
Transport	750	Transport	500
Total processing & marketing costs	3 637	Total processing & marketing costs	2 423
TOTAL VARIABLE COSTS	6 938	TOTAL VARIABLE COSTS	3 941
GROSS MARGIN	3 472	GROSS MARGIN	2 999
GROSS MARGIN PER E100 VARIABLE COSTS	50,0	GROSS MARGIN PER E100 VARIABLE COSTS	76
		RETURNS TO LABOUR	3 923

## U.S. A.I.D. PROJECT SWAZILAND

## ESTIMATED GROSS MARGINS

ENTERPRISE : TOMATO (RAINGROWN - SUMMER)

## ESTATE SCALE

## SMALLHOLDER SCALE

Yield (t/ha)	22	Yield (t/ha)	12
Price (E/t)	347	Price (E/t)	347
GROSS INCOME (E/ha)	7 634	GROSS INCOME (E/ha)	4 164
<u>VARIABLE COSTS</u>	E/ha	(No	E/ha
Total seed	998	Total seed trellising)	190
Total fertilizer	853	Total fertilizer (plus manure at no cost)	427
Total chemicals	368	Total chemicals (no weedicides - hand hoe)	86
Labour : Field	170	Labour : Field	363
: Irrigation	-	: Irrigation	-
: Mechanical	25	: Mechanical	13
Total labour	195	Total labour	376
Total mechanical ops	296	Total mechanical ops (hand spray, hand topdress, hand hoe)	111
Irrigation M&R	-	Irrigation M&R	-
Insurance	-	Insurance	-
Contingencies	271	Contingencies	119
Total field variable costs	2 981	Total field variable costs	1 309
Processing and marketing cost :		Processing and marketing cost :	
Labour	503	Labour	282
Pack. mat.	1 613	Pack. mat.	880
Transport	550	Transport	300
Total processing & marketing costs	2 660	Total processing & marketing costs	1 462
TOTAL VARIABLE COSTS	5 647	TOTAL VARIABLE COSTS	2 771
GROSS MARGIN	1 987	GROSS MARGIN	1 393
GROSS MARGIN PER E100 VARIABLE COSTS	35	GROSS MARGIN PER E100 VARIABLE COSTS	50
		RETURNS TO LABOUR	2 051

ESTIMATED GROSS MARGINSENTERPRISE : SOYABEAN (RAINGROWN - MIDDLEVELD)ESTATE SCALESMALLHOLDER SCALE

Yield (t/ha)	1,8	Yield (t/ha)	1,4
Price (E/t)	400	Price (E/t)	400
GROSS INCOME (E/ha)	720	GROSS INCOME (E/ha)	560
<u>VARIABLE COSTS</u>	E/ha		E/ha
Total seed	65	Total seed	65
Total fertilizer	48	Total fertilizer	32
Total chemicals	61	Total chemicals (no weedicides - hand hoe)	15
Labour : Field	7	Labour : Field	68
: Irrigation	-	: Irrigation	-
: Mechanical	13	: Mechanical	6
Total labour	20	Total labour	74
Total mechanical ops	174	Total mechanical ops (hand spray, hand topdress, hand hoe)	98
Irrigation M&R	-	Irrigation M&R	-
Insurance	-	Insurance	-
Contingencies	37	Contingencies	28
Total field variable costs	405	Total field variable costs	312
Processing and marketing cost :		Processing and marketing cost :	
Labour	7	Labour	4
Pack. mat.	8	Pack. mat.	6
Transport	45	Transport	35
Total processing & marketing costs	60	Total processing & marketing costs	45
TOTAL VARIABLE COSTS	465	TOTAL VARIABLE COSTS	357
GROSS MARGIN	255	GROSS MARGIN	203
GROSS MARGIN PER E100 VARIABLE COSTS	55	GROSS MARGIN PER E100 VARIABLE COSTS	57
		RETURNS TO LABOUR	281

## S.S. A.I.B. PROJECT SWAZILAND

## ESTIMATED GROSS MARGINS

## ENTERPRISE : SUNFLOWER (RAINGROWN - MIDDLELEVEL)

## ESTATE SCALE

## SMALLHOLDER SCALE

Yield (t/ha)	2	Yield (t/ha)	1,6
Price (E/t)	325	Price (E/t)	325
GROSS INCOME (E/ha)	650	GROSS INCOME (E/ha)	520
<u>VARIABLE COSTS</u>	E/ha		E/ha
Total seed	7	Total seed	7
Total fertilizer	136	Total fertilizer	90
Total chemicals	51	Total chemicals (no weedicides - hand hoe)	13
Labour : Field	24	Labour : Field	123
: Irrigation	-	: Irrigation	-
: Mechanical	13	: Mechanical	6
Total labour	37	Total labour	129
Total mechanical ops	174	Total mechanical ops (hand spray, hand toddress, hand hoe)	98
Irrigation M&R	-	Irrigation M&R	-
Insurance	-	Insurance	-
Contingencies	40	Contingencies	33
Total field variable costs	445	Total field variable costs	370
Processing and marketing cost :		Processing and marketing cost :	
Labour	7	Labour	4
Pack. mat.	9	Pack. mat.	7
Transport	50	Transport	40
Total processing & marketing costs	66	Total processing & marketing costs	51
TOTAL VARIABLE COSTS	511	TOTAL VARIABLE COSTS	421
GROSS MARGIN	139	GROSS MARGIN	99
GROSS MARGIN PER E100 VARIABLE COSTS	27	GROSS MARGIN PER E100 VARIABLE COSTS	27
		RETURNS TO LABOUR	232

APPENDIX 29.1

U.S. A.I.D. PROJECT SWAZILAND  
ESTIMATED GROSS MARGINS

ENTERPRISE : AVOCADO (PATIGPOW)

ESTATE SCALE

SMALLHOLDER SCALE

ITEM	ESTABLISHMENT DURATION Yrs 1-3 (£/ha)	BEARING LIFE Yrs 4-15 (£/ha)	TOTAL LIFE Yrs 1-15 (£/ha)	REMARKS
AVERAGE ANNUAL GROSS INCOME : (Price : £176/t )		6 504	5 203	Expect to attain yields equivalent to Estate Scale
AVE ANNUAL VAR. COSTS:	460	-	92	
Planting material				
Fertilizer	50	104	95	Manure would substitute part of the inorganic fertilizer
Chemicals	136	233	213	Hand hoeing would substitute weedicides
Labour	196	187	189	A proportion of family labour would be used
Mechanical ops	48	17	23	Where possible knapsack spraying would substitute machine spraying. Hand slashing would substitute mechanical form Less field transport costs.
Irrigation MSR	-	-	-	
Other	47	207	175	
Contingencies	93	75	76	
Total average annual field production costs	1 030	821	863	
Average annual harvest- ing and marketing cost:				
Labour	-	303	242	
Packing materials	-	1 583	1 267	
Transport	-	765	612	
Contingencies	-	265	212	
Total average annual harvesting and marketing costs	-	2 916	2 333	
Total average annual variable costs	1 030	3 737	3 196	
Average annual gross margin		2 767	2 007	By maintaining yields, and reducing costs as above, aver annual gross margins will be higher.
Average annual gross margin per £100 variable costs		74	63	

U.S. A.I.D. PROJECT SWAZILAND

ESTIMATED GROSS MARGINS

ENTERPRISE : BANANA (IRRIGATED)

ESTATE SCALE

SMALLHOLDER SCALE

ITEM	ESTABLISHM. DURATION Yrs 1 (£/ha)	BEARING LIFE Yrs 2-10 (£/ha)	TOTAL LIFE Yrs 1-10 (£/ha)	REMARKS
<b>AVERAGE ANNUAL GROSS INCOME :</b> (Price : £200/t )		5 200	4 680	Expect to attain yields equivalent to Estate Scale
<b>AVE ANNUAL VAR. COSTS:</b>				
Planting material	1 841		184	
Fertilizer	608	815	794	Manure would substitute part of the inorganic fertilizer
Chemicals	268	575	545	Hand hoeing would substitute weedicides
Labour	224	408	390	A proportion of family labour would be used
Mechanical ops	76	17	23	Where possible knapsack spraying would substitute machine spraying. Hand slashing would substitute mechanical form. Less field transport costs
Irrigation M&R	20	20	20	
Dther	5	613	551	
Contingencies	304	245	251	
Total average annual field production costs	3 346	2 693	2 758	
Average annual harvest- ing and marketing cost:				
Labour	-	320	288	
Packing materials	-	94	85	
Transport	-	130	117	
Contingencies	-	54	48	
Total average annual harvesting and marketing costs	-	598	538	
Total average annual variable costs	3 346	3 291	3 296	
Average annual gross margin		1 909	1 384	By maintaining yields, and reducing costs as above, average annual gross margins will be higher
Average annual gross margin per £100 variable costs		58	42	

## U.S. A.I.D. PROJECT SWAZILAND

## ESTIMATED GROSS MARGINS

ENTERPRISE : GUAVA (RAINGROWN)

ESTATE SCALE

SMALLHOLDER SCALE

ITEM	ESTABLISHM. DURATION Yrs 1-2 (£/ha)	BEARING LIFE Yrs 3-40 (£/ha)	TOTAL LIFE Yrs 1-40 (£/ha)	REMARKS
AVERAGE ANNUAL GROSS INCOME : (Price : £70/t )		1 610	1 530	Expect to attain yields equivalent to Estate Scale
<u>AVE ANNUAL VAR. COSTS:</u>				
Planting material	575		29	
Fertilizer	416	480	477	Manure would substitute part of the inorganic fertilizer
Chemicals	26	156	149	Hand hoeing would substitute weedicides
Labour	175	238	235	A proportion of family labour would be used
Mechanical ops	66	40	41	Where possible knapsack spraying would substitute machine spraying. Hand slashing would substitute mechanical form. Less field transport costs
Irrigation M&R	-	-	-	
Other	-	-	-	
Contingencies	124	910	93	
Total average annual field production costs	1 383	1 005	1 024	
Average annual harvest- ing and marketing cost:				
Labour	-	240	229	
Packing materials	-	20	19	
Transport	-	144	136	
Contingencies	-	41	38	
Total average annual harvesting and marketing costs	-	445	422	
Total average annual variable costs	1 383	1 450	1 446	
Average annual gross margin	-	160	84	By maintaining yields, and reducing costs as above, average annual gross margins will be higher
Average annual gross margin per £100 variable costs		11	6	

## U.S. A.I.D. PROJECT SWAZILAND

## ESTIMATED GROSS MARGINS

ENTERPRISE : MANGO (IRRIGATED - FRESH PRODUCTION)

ESTATE SCALE

SMALLHOLDER SCALE

ITEM	ESTABLISHM. DURATION Yrs (£/ha)	BEARING LIFE Yrs (£/ha)	TOTAL LIFE Yrs (£/ha)	REMARKS
AVERAGE ANNUAL GROSS INCOME : (Price : £642/t )		6 147	5 778	Expect to attain yields equivalent to Estate Scale
AVERAGE ANNUAL VAR. COSTS:				
Planting material	302	34	50	
Fertilizer	62	171	164	Manure would substitute part of the inorganic fertilizer
Chemicals	-	314	295	Hand hoeing would substitute weedicides
Labour	209	96	104	A proportion of family labour would be used
Mechanical ops	74	87	86	Where possible knapsack spraying would substitute machine spraying. Hand slashing would substitute mechanical form. Less field transport costs
Irrigation MAR	20	20	20	
Other	2	29	27	
Contingencies	66	75	75	
Total average annual field production costs	735	826	821	
Average annual harvest- ing and marketing cost:				
Labour	-	359	337	
Packing materials	-	1 612	1 515	
Transport	-	806	758	
Contingencies	-	278	262	
Total average annual harvesting and marketing costs	-	3 055	2 872	
Total average annual variable costs	735	3 881	3 693	
Average annual gross margin	-	2 266	2 085	By maintaining yields, and reducing costs as above, average annual gross margins will be higher
Average annual gross margin per £100 variable costs		58	56	

## U.S. A.I.D. PROJECT SWAZILAND

## ESTIMATED GROSS MARGINS

ENTERPRISE : PINEAPPLES (RAINGROWN)

ESTATE SCALESMALLHOLDER SCALE

ITEM	ESTABLISHMENT Yrs 1-2 (E/ha)	BEARING LIFE Yrs 3-4 (E/ha)	TOTAL LIFE Yrs 1-4 (E/ha)	REMARKS
AVERAGE ANNUAL GROSS INCOME : (Price : E85/t )		5 100	2 550	Expect to attain yields equivalent to Estate Scale
AVE ANNUAL VAR. COSTS:				
Planting material	364	-	182	
Fertilizer	546	480	513	
Chemicals	374	130	252	Hand hoeing would substitute weedicides
Labour	275	116	196	A proportion of family labour would be used
Mechanical ops	257	149	203	Knapsack spraying would substitute machine spraying. Hand hoeing would substitute machine slashing. Less field transport costs.
Irrigation MAR	-	-	-	
Other	-	-	-	
Contingencies	182	88	134	
Total average annual field production costs	1 998	963	1 480	
Average annual harvest- ing and marketing cost:				
Labour	-	172	86	
Packing materials	-	-	-	
Transport	-	300	150	
Contingencies	-	47	24	
Total average annual harvesting and marketing costs	1 998	519	260	
Total average annual variable costs:		1 482	1 740	
Average annual gross margin		3 618	810	By maintaining yields, and reducing costs as above, average annual gross margins will be higher.
Average annual gross margin per E 100 variable costs		244	47	
Average annual return to labour				

U.S. A.I.D. PROJECT SWAZILANDESTMATED GROSS MARGINENTERPRISE : DAIRY (ZERO GRAZING, 200 COW UNIT - TOTAL HERD 444 A.U.)ESTATE SCALE

	<u>E/A.U.</u>	<u>E/ℓ</u>
<u>*GROSS INCOME PER A.U./litre</u> (Price : E0,42/ℓ) Yield : 16ℓ/cow/day)	1 252,0	0,475
<u>VARIABLE COSTS PER A.U./litre</u>		
Feed	752	0,285
Veterinary medicines	27	0,010
Cleaning agents	4	0,002
A.I. Nitrogen	9	0,003
Electricity	12	0,004
Labour	49	0,019
Parlour & Machinery M&R	19	0,007
Transport	33	0,013
Contingencies	97	0,037
<u>TOTAL VARIABLE COSTS PER A.U./litre</u>	992	0,38
<u>GROSS MARGIN PER A.U./litre</u>	250	0,095
<u>GROSS MARGIN PER E100 VARIABLE COSTS</u>	25	25

\* Includes sale of cull cows, surpluts heifers and bull calves.

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U.S. A.I.D. PROJECT SWAZILANDESTIMATED GROSS MARGINENTERPRISE : BROILER 500 BIRD UNIT (5 BATCHES PER ANNUM)SMALL HOLDER SCALE

GROSS INCOME PER BATCH (Price : E1,85/bird)	E/BATCH 1 850
<u>VARIABLE COSTS PER BATCH</u>	
Broiler chicks costs	238
Feed costs	932
Veterinary costs	20
Brooding gas costs	75
Labour costs	62
M & R unit	10
Contingencies	134
TOTAL VARIABLE COSTS PER BATCH	1 471
GROSS MARGIN PER BATCH	379
GROSS MARGIN PER E100 VARIABLE COSTS	26
RETURN TO LABOUR	441

U.S. A.I.D. PROJECT SWAZILANDESTIMATED GROSS MARGINENTERPRISE : 480 BIRD EGG UNIT (576 BIRDS PER ANNUM)

	<u>E/Unit</u>	<u>E/Bird</u>
GROSS INCOME PER UNIT/BIRD	9 735*	20,28*
PRICE : E1,24/doz eggs		
<u>VARIABLE COST PER UNIT/BIRD</u>		
Feed	6 120	12,75
Veterinary supplies	25	0,05
Cleaning agents	50	0,10
Labour	388	0,81
Unit M&R	50	0,10
Egg trays	540	1,13
Transport	72	0,15
Contingencies	725	1,51
TOTAL VARIABLE COSTS PER UNIT	7 970	16,60
GROSS MARGIN PER UNIT	1 765	3,68
GROSS MARGIN PER E100 VARIABLE COSTS	22	22
RETURN TO LABOUR	2 153	4,49

\*Includes sale of spent hens.

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QUANTITIES AND PRICES OF PINEAPPLES SOLD ON 14 R.S.A.  
FRESH PRODUCE MARKETS IN 1975-1984

APPENDIX : 22

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1975 TONNE	2017,81	1883,51	1897,31	1552,33	1407,06	947,91	1188,27	1308,31	1616,10	1637,60	2260,63	2813,36	20530,20
R/TON	103,52	110,18	100,58	133,19	132,34	147,24	190,39	133,02	178,01	178,20	132,40	145,25	137,04
1976 TONNE	1876,86	1491,56	1756,68	1676,25	1471,27	1537,59	1203,50	1648,45	1329,73	1516,45	2199,42	1712,87	19420,73
R/TON	147,53	145,26	168,58	152,02	137,50	163,09	157,62	151,18	222,82	203,29	193,48	204,68	170,87
1977 TONNE	1162,35	1412,41	2242,08	1530,24	1513,78	1012,54	904,71	1165,58	1305,00	1694,88	2900,32	2263,60	19107,49
R/TON	241,71	183,63	138,78	160,88	179,62	178,65	201,47	225,73	223,55	199,20	171,89	196,08	186,71
1978 TONNE	1963,04	1908,31	1998,26	1928,66	1597,77	1316,95	1559,12	2369,42	2130,19	2458,58	2216,29	2630,20	24076,79
R/TON	201,58	160,59	153,84	145,08	196,13	156,28	133,35	141,20	152,49	198,32	192,83	195,59	170,51
1979 TONNE	3907,21	2028,07	2163,64	1771,75	1623,10	1509,03	1663,23	1726,76	1678,34	3271,25	2879,08	3053,93	27275,39
R/TON	125,56	179,74	156,79	183,50	215,72	150,75	180,56	160,04	207,04	165,88	145,76	171,66	165,71
1980 TONNE	3395,89	2005,23	1744,33	2674,03	2150,84	1750,58	1970,36	1708,28	2673,28	2687,79	2793,54	4229,29	29783,44
R/TON	157,29	192,48	222,48	188,98	150,31	156,21	181,29	208,99	194,13	201,35	200,50	175,56	184,24
1981 TONNE	4092,11	2042,95	3125,63	2239,77	1754,40	2158,29	1878,18	1952,71	3501,40	2705,18	3230,71	4457,83	33139,16
R/TON	124,33	218,15	166,32	205,58	194,28	209,71	187,12	190,33	154,76	209,61	209,37	205,87	185,71
1982 TONNE	3069,57	2971,57	3122,35	2163,78	1834,20	2039,22	1408,41	2226,61	2140,58	2363,32	3478,99	3845,60	30664,20
R/TON	170,25	192,26	229,21	233,71	241,89	244,78	262,64	278,25	295,01	282,96	248,26	239,14	239,06
1983 TONNE	2350,77	2128,34	2513,67	2072,90	2874,49	1737,22	1751,84	2209,13	2362,06	2839,69	3866,66	3037,87	30344,64
R/TON	224,03	300,70	348,40	281,24	245,23	260,62	270,06	292,22	296,35	270,46	255,12	371,77	284,07
1984 TONNE	3539,47	2372,20	2137,13	2891,66	4920,08	2768,89	3180,26	2757,32	2982,41	4408,00	4305,18	4809,03	41071,63
R/TON	273,06	335,35	370,62	238,05	144,18	189,26	205,62	210,54	233,03	252,72	222,99	225,22	232,82

## WORLD PINEAPPLE PRODUCTION BY COUNTRY

	'000 TONNES				OF TOTAL	
	1974 - 76	1980	1981	1983	1974-76	1983
<u>ASIA</u>						
India	420	549	593	613*	6,8	6,9
Indonesia	118	141	500	550*	1,9	6,2
Philippines	415	901	896	871	6,8	9,8
Thailand	813	1 372	1 673	1 824	13,2	20,6
Others	1 052	1 095	1 067	1 116	17,1	12,6
TOTAL ASIA	2 818	4 098	4 729	4 974	45,8	56,1
<u>NORTH &amp; CENTRAL AMERICA</u>						
Mexico	404	551	560	550	6,6	6,2
U.S.A.	635	596	577	549	10,3	6,2
Other	232	234	250	256	3,8	2,9
TOTAL NORTH & CENTRAL AMERICA	1 271	1 381	1 387	1 355	20,7	15,3
<u>AFRICA</u>						
Ivory Coast	271	330*	350*	350*	4,4	3,9
R.S.A.	184	222	227	230*	3,0	2,6
Kenya	72	145	150	155*	1,2	1,8
Zaire	172	153*	153*	153*	2,8	1,7
Congo	99	102*	103*	104*	1,6	1,2
Other	236	253	263	266	3,8	3,0
TOTAL AFRICA	1 034	1 205	1 246	1 258	16,8	14,2
<u>SOUTH AMERICA</u>						
Brazil	513	566	620	667	8,3	7,5
Colombia	117	127	124	140	1,9	1,6
Ecuador	120	135	140	140*	2,0	1,6
Other	145	188	494	195	2,4	2,2
TOTAL SOUTH AMERICA	895	1 016	1 078	1 142	14,6	12,9
<u>OCEANIA</u>						
Australia	108	123	133	115	1,9	1,3
Other	17	18	18	18	0,3	0,2
TOTAL OCEANIA	125	141	151	133	2,2	1,5
<u>EUROPE</u>						
Spain	2	2	2	2*	**	**
TOTAL EUROPE	2	2	2	2*	**	**
WORLD TOTAL	6 145	7 841	8 593	8 864	100,0	100,0

\* Estimates \*\* Less than 0,1

Source: FAO PRODUCTION YEARBOOK

ORIGIN OF CANNED PINEAPPLE IMPORTS INTO WESTERN EUROPE 1983

SUPPLYING COUNTRY	BASIC CARTONS	TONNES	% OF TOTAL
Thailand	2301 065	46 965	21,1
Philippines	2093 435	42 727	19,2
Kenya	2087 400	42 604	19,2
R.S.A.	1143 617	23 341	10,5
Ivory Coast	706 503	14 420	6,5
Martinique	561 218	11 455	5,2
Swaziland	506 955	10 347	4,7
Malaysia/Singapore	500 369	10 213	4,6
Taiwan	349 443	7 132	3,2
U.S.A.	109 142	2 228	1,0
Indonesia	20 746	423	0,2
Other*	505 458	10 316	4,6
TOTAL	10885 351	222 171	100,0

\* As these countries are the sum of the 12 individual countries' imports it is possible that some countries included under "other" for one country may be given individually in another. However, this is unlikely to affect the overall %'s substantially as only relatively small quantities are included under the "other" category and typically include imports from a large number of countries.

IMPORTS OF CANNED PINEAPPLES INTO  
UNDERMENTIONED COUNTRIES

APPENDIX: 25  
1 of 4

(Figures in basic cartons equivalent 24 x 42) cans with a nett mass of 20,41 kg)

<u>UNITED KINGDOM</u>	1978	1979	1980	1981	1982	1983
Kenya	269 065	695 249	541 380	522 740	453 237	519 549
South Africa	495 086	597 449	621 846	435 194	474 746	450 464
Malaysia/Singapore	792 796	713 552	637 953	585 573	672 591	398 540
Philippines	166 093	136 941	158 098	400 497	406 368	358 628
Swaziland	78 940	172 228	120 514	281 406	181 699	254 670
Thailand	27 530	17 846	42 269	29 507	111 132	124 309
P.R. of China	-	-	21 482	31 155	45 306	39 654
Ivory Coast	24 640	72 907	76 527	32 963	4 079	-
Other Countries	60 586	139 627	142 774	25 158	34 615	34 903
<b>TOTAL</b>	<b>1 914 736</b>	<b>2 545 799</b>	<b>2 362 843</b>	<b>2 344 201</b>	<b>2 584 973</b>	<b>2 180 737</b>
<u>WEST GERMANY</u>						
Thailand	1 228 664	1 110 533	1 333 765	1 309 125	1 621 230	1 443 576
Kenya	702 499	456 655	319 612	641 573	525 059	805 339
Philippines	469 533	560 843	581 022	602 975	615 934	534 024
P.R. of China	34 983	115 495	172 380	196 759	36 954	261 095
South Africa	378 628	315 557	281 334	164 065	513 505	199 935
Swaziland	87 559	225 632	220 241	241 398	179 321	132 631
Malaysia	88 979	45 934	58 295	71 122	71 670	65 001
Ivory Coast	834 674	1 020 642	740 372	810 947	294 219	62 001
USA	129 082	73 819	59 725	43 764	46 325	48 667
Other Countries	319 054	171 906	131 254	27 801	42 511	133 931
<b>TOTAL*</b>	<b>4 273 655</b>	<b>4 095 293</b>	<b>3 948 000</b>	<b>4 159 529</b>	<b>4 005 620</b>	<b>3 695 474</b>
<u>FRANCE</u>						
Martinique	253 703	388 727	406 345	472 291	409 195	473 132
Ivory Coast	1 100 900	904 133	919 419	940 561	617 682	411 222
Kenya	128 474	142 366	267 194	265 754	192 878	239 542
Thailand	208 377	131 161	162 630	144 826	437 698	223 400
Philippines	145 864	95 635	100 619	87 148	112 589	132 244
South Africa	79 548	35 237	118 004	7 357	70 635	61 205
Swaziland	49 635	24 802	3 184	54 751	47 186	33 163
USA	54 705	20 888	9 816	23 018	9 836	6 987
Other Countries	32 448	12 488	21 077	7 147	58 037	35 201
<b>TOTAL</b>	<b>2 053 654</b>	<b>1 755 437</b>	<b>2 008 288</b>	<b>2 002 848</b>	<b>1 955 742</b>	<b>1 522 202</b>

\* 1983 imports include: 88 086 cartons from Martinique and 20 746 cartons from Indonesia

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