

R.2274(C) :

Minor Industrial Crops in the  
Southern Africa Region: An  
appraisal of developmental  
potential with special reference  
to interregional trade.  
(June-July 1995)

Vol. 1: The Main Report

by

C L Green, R J G Steele and  
J Willemse

A study undertaken for the World  
Bank by:

Natural Resources Institute  
Central Avenue  
Chatham Maritime  
Kent, ME4 4TB  
United Kingdom

and

Agro-economic Research  
POB 52191  
0024 Fouriesrus  
Pretoria North  
South Africa

NRI Contract No. C0757

## CONTENTS

	<u>Page</u>
Abbreviations and acronyms used in the report	viii
Rates of exchange	ix
<b>SUMMARY</b>	<b>x</b>
<b>RECOMMENDATIONS</b>	<b>xiii</b>
<b>1. INTRODUCTION</b>	
Background	1
Terms of Reference	2
Team composition and roles	3
Methodology	3
Constraints	4
Organisation of the report	5
<b>2. DESCRIPTION OF THE FOCAL COMMODITIES: CHARACTERISTICS, INTERNATIONAL DEMAND AND SUPPLY TRENDS, OVERSEAS MARKET OPPORTUNITIES</b>	
Description and uses of the focal commodities	6
Relevance of the focal commodities to development needs in the region.	13
Background on the overseas market.	14
Candidate commodities for the overseas market.	16
Tables:	
(1) Promising overseas export candidates for expansion of existing production or for new developments.	24
(2) Summary of the international market for the candidate commodities.	25

	<u>Page</u>
(3) Summary of characteristics of the candidate crops and commercial shipment sizes for overseas export.	26
<b>3. SOUTHERN AFRICA AS A MARKET AND A PRODUCER OF THE FOCAL COMMODITIES</b>	<b>27</b>
Spices and herbs	28
Essential oils	33
Naval stores	38
Water-soluble gums	40
Natural colourants and dyes	42
Castor seed and its oil	43
Market awareness	44
Individual country comparative advantages for production	45
Attitudes to crop diversification	47
Tables:	
(4) Regional demand and production estimates for those commodities with a potential for import substitution.	49
(5) Overseas exports of focal commodities by the region.	50
<b>4. THE SIGNIFICANCE OF SOUTH AFRICA IN THE REGIONAL CONTEXT FOR THE FOCAL COMMODITIES</b>	<b>51</b>
Regional cooperation: Common Market Opportunities	52
Agri-policy and attitude of agri-business in South Africa.	55
Tables:	
(6) SADC - population and GNP.	52
(7) The various stages of economic cooperation.	54
(8) Comparative aspects for countries in the region with regard to production of the focal commodities.	57

	<u>Page</u>
<b>5. PERCEIVED OPPORTUNITIES FOR NEW COMMODITY DEVELOPMENTS</b>	58
Assumptions on future main producer countries.	58
Potential in the northern countries	59
Impact scale.	59
Smallholder potential.	59
Development stages.	60
Table: (9) Principal candidates for expansion of production or new developments in the northern countries.	62
Figure: Illustrated flow of gum naval stores materials in the region.	63
<b>6. CURRENT CONSTRAINTS ON DEVELOPMENT</b>	64
South Africa.	64
Malawi, Zambia and Zimbabwe	64
Table 10: Availability of germplasm as a constraint.	69
<b>7. PROSPECTS FOR CROSS-BORDER INVESTMENT, TRADE AND TECHNOLOGY TRANSFER</b>	70
Investment and trade prospects.	70
Transfer of marketing, management and technology skills.	71
<b>8. DEVELOPMENT PATHWAYS</b>	72
Commodity development strategy.	72
Principal needs to achieve development.	73
Specific proposals for the immediate future.	74
<b>APPENDICES</b>	
<b>1. Itinerary of the field studies</b>	77
<b>2. South Africa:</b>	
2A. Detailed country report:	80
- spices and herbs	80
- essential oils	91
- naval stores	99
- water-soluble natural gums	103

	<u>Page</u>
- natural colourants/dyestuffs	105
- castor seed and oil	107
- overview of agriculture and its trends	107
- implications of agricultural trends for the focal commodities	111
- attitudes within industry to sourcing materials from and investing in neighbouring countries	112
- technology transfer and collaboration	114
2B. List of organisations visited and people met in South Africa	116
2C. List of additional useful names and addresses acquired.	118

Tables:

(1) Annual consumption and supply sources for spices, herbs and their extracts.	83
(2) Estimated value and growth trend for spices herbs and compounded flavours (1995).	84
(3) Demand and growth prospects for processed foods and beverages incorporating spices, herbs and their extracts.	84
(4) Income elasticities by ethnic groups in relation to consumption of foodstuffs and some consumer products.	86
(5) Import and export statistics for essential oils and related materials.	92
(6) Provisional estimates of consumption, domestic production and exports of some essential oils.	93
(7) Estimated consumption, production, imports and exports of naval stores.	102
(8) Population and some social indicators.	110
(9) Demand and supply projections for some foodstuffs for the year 2000.	111

<b>3. Zimbabwe:</b>	
3A. Detailed country report:	124
-spices	124
-essential oils	131
-gum naval stores	140
-water-soluble gums	143
-natural colourants	145
-castor and other fatty oils	145
-overview of trends in Zimbabwean agriculture (and extant diversification into the focal commodities).	146
-new crop development: potential and needs.	152
3B. List of organisations visited and people met in Zimbabwe.	159
3C. List of additional useful names and addresses acquired.	164
Tables:	
(1) Spice and herb production in Zimbabwe.	126
(2) Estimated current domestic market demand and production of essential oils.	135
(3) Candidates for further expansion of production or for new development.	155
<b>4. Malawi:</b>	
4A. Detailed country report:	166
-spices and herbs	166
-essential oils	174
naval stores	176
-water-soluble gums	178
-castor seed	180
-natural colourants and some other materials.	181
-an overview of agriculture and its trends in Malawi.	182
-diversification and the focal commodities	202
-potential and needs for focal commodity development.	205
4B. List of organisations visited and people met met in Malawi.	212

	<u>Page</u>
4C. List of additional useful names and addresses acquired.	215
Tables:	
(1) Demand, production, imports and exports of some of the focal commodities.	169
(2) Values of some export commodities.	184
(3) A few non-plantation estate typologies.	187
(4) Duties and taxes on agricultural inputs.	191
(5) Candidate commodities for development in Malawi.	208
5. Zambia:	
5A. Detailed country report:	217
-spices and herbs	217
-essential oils	221
-naval stores	223
-water-soluble natural gums	225
-natural colourants	225
-castor seed and oil	226
-overview of trends in Zambian agriculture	227
-potential and needs for focal commodity development	230
5B. List of organisations visited and people met in Zambia	234
5C. List of other useful contacts in Zimbabwe	237
Table: Candidate commodities for development in Zambia	233
6. Swaziland:	
6A. A note on production of the focal commodities:	239
-spices	239
-essential oils	239
-gum naval stores (potential)	241
-guar	241
-research on the focal commodities	241
6B. Some useful contacts in Swaziland	243

	<u>Page</u>
7. <b>Eucalyptus oil production in Southern Africa: Development history and future prospects.</b>	244
-medical oil (cineole type)	244
-perfumery oil ( <i>E. citriodora</i> )	250
8. <b>Birdseye chillies: Production and trends in Southern Africa.</b>	252
9. <b>Paprika in Southern Africa: Development experience and future prospects.</b>	256

Tables:

(1) Estimates of paprika production in Southern Africa	267
(2) Paprika oleoresin production capacity in Southern Africa	267
(3) Paprika crop yields	268
(4) Colour quality of the Zimbabwe crop	268
(5) Estimated input costs and returns to Zimbabwean farmers	269
10. <b>Naval stores in Southern Africa: Development experience and future prospects</b>	270

Tables:

(1) Estimated rosin demand in the region and the future production deficit with marginal change in total output	280
(2) Estimated turpentine demand in the region and production surplus/deficit with marginal change in output	280
(3) Estimated pine oil demand and supply in the region	280
(4) Current and projected demand and domestic growth in production	281

	<u>Page</u>
(5) Theoretical production level in year 2000, if complete resource were economical for tapping	282
(6) Activity options within a regional developmental framework	283
<b>11. References cited in the report</b>	<b>284</b>

**Abbreviations and acronyms used in the report**

ADC	Agricultural Diversification Committee (Malawi)
ADMARC	Agricultural Development and Marketing Corporation (Malawi)
ARET	Agricultural Research and Extension Trust (Malawi)
CIDA	Canadian Aid Programme
CDC	Commonwealth Development Corporation
DRSS	Department of Research and Specialist Services (Zimbabwe)
FOREX	Foreign Exchange
GOM	Government of Malawi
GTZ	German Aid Programme
IDC	Industrial Development Corporation (South Africa and Zimbabwe)
IFEAT	International Federation of Essential Oils and Aroma Trades
MIPA	Malawi Investment Promotion Agency
MOALD	Ministry of Agriculture and Lands (Malawi)
NRI	Natural Resources Institute (UK)
ODA	Overseas Development Administration (UK)
OFI	Oxford Forestry Institute (UK)

SADAC	Southern Africa Development Community
SAFCO	South African Forestry Corporation
SAPECO	South African Estate Corporation (with tea estates and other interests)
SAR	Southern Africa Region
TOR	Tall Oil Rosin
TPI	Tropical Products Institute (the forerunner of NRI)
UDI	Unilateral Declaration of Independence (Southern Rhodesia)
UNIDO	United Nations Industrial Development Organisation
US AID	United States Aid Programme
VIPCOR	Viphya Pulp and Paper Corporation (Malawi)
ZAFFICO	Zambia Forestry and Forestry Industries Corporation
ZIMACE	Zimbabwe Agricultural Commodity Exchange
ZIMTRADE	Zimbabwe Trade Promotion Association.

#### **Rates of exchange**

At the time of the field study (June-July 1995), the following exchange rates pertained:

US\$ 1 = Rand 3.61  
           = Zim \$8.34  
           = Malawi Kw. 15.0  
           = Zambian Kw. 920

and

Rand 1 = Zim \$ 2.31  
           = Malawi Kw. 4.15  
           = Zambian Kw. 254.85

## **SUMMARY**

This report presents the findings and conclusions arising from a team study carried out in June-August 1995 of the potential for development of 'minor industrial crops' in the Southern Africa region. The study focussed on spices, essential oils, gums, resins, natural colourants and castor oil. Information was gathered on markets and production by means of field studies in South Africa, Malawi, Zimbabwe and Zambia and was supplemented by examination of trade statistics and discussions with overseas traders. Time constraints on the study precluded a thorough investigation of all topics and, therefore, the conclusions reached must be regarded as a first phase overview of the regional market and a preliminary identification of the more promising crops for future development.

Southern Africa has historically played a minor role as a producer of the focal commodities and it is only in recent decades that significant export-oriented production has developed with a limited range; paprika, citrus and eucalyptus oils and Birdseye chillies being the most notable. Save for a proportion of the Birdseye chillies - arising from Malawi - all other export products originate from commercial farming. Malawi is the only country which has an established track-record of smallholders responding positively to new cash crop opportunities, but weaknesses in the rural marketing system has led to a decline in production over the past decade.

Development of the focal commodities in the past in the northern countries has not been significantly inhibited by investment constraints. It is more the consequence of a general prioritisation of 'safe' traditional crops within all sections of the farming community and from a lack of market awareness for the focal commodities. This situation remains largely the case today.

This study concluded that a considerable potential exists for development of a range of focal commodities in the northern countries of Zimbabwe, Zambia and Malawi. A number of immediate opportunities are perceived for export-oriented production as a result of supply and demand trends on the international market and the region's likelihood of cost-competitive production; specifically with the oils of West Indian lime and sassafras (from a Brazilian *Piper* species) and with annatto seed. The last named is derived from a tree and it is an appropriate crop for smallholders and

communal farmers with low-density, extensive planting. These proposed developments, together with an expansion of paprika production would earn around USS\$15 million and require planting of some 8,000 hectares.

**The greater opportunity, however, lies with import substitution for the region as a whole; paprika, citrus and eucalyptus oils excepted, there is a major imbalance between regional demand and production for most commodities and no production of others.**

The major market in the region is South Africa but its scale and the opportunities - presented through the widening of the Southern Africa Customs Union (SACU) and the expected contraction of South Africa's agricultural sector - are poorly understood by its northern neighbours. Both agribusiness and Government in South Africa are looking to the northern countries as new supply sources of raw and processed agricultural materials but the process is presently hindered by the withering of knowledge and personal contacts during the period of that country's political isolation.

**The potential for development of the focal crops in the northern countries to supply their own and the South African markets is tentatively valued at around US\$ 20 million and this would require the planting of some 34,000 hectares.** Considerable opportunities are presented for smallholder and communal farmer production in the northern countries of guar seed, castor seed, turmeric, ginger, coriander and some other spices and this equates to around 24,000 hectares. Other significant opportunities reside with commercial farmer production of citronella oil for the soap industry, dried onion and garlic for the food industries, and of pine gum naval stores (turpentine and rosin) by dedicated companies.

Prospects for investment by South African companies in agri-processing operations in the northern countries are promising and this may extend to agricultural production in future. Multinational processing companies are likely to be more cautious over investment in the northern countries, other than in developing their existing operations, but some have a policy of local sourcing of raw materials where this is feasible and economic.

Various constraints exist on development of the focal commodities in the northern countries. These include: lack

of technical knowledge and germplasm; conservative attitudes by some parts of the commercial and smallholder/communal farming communities to non-traditional crops; plus differing levels of difficulty for the commercial sector in securing affordable loans and from taxation disincentives. It must be stressed, however, that the major barrier to development lies with lack of market awareness by the commercial farming and financial sectors in the northern countries.

Maximising the potential of some commodities will be dependent upon acceptance of the concept of a regional strategy and positive collaboration. In the case of naval stores, mooted developments in Malawi and Zambia are presently framed in narrow, national terms. However, the potential resource base in Zambia - subject to confirmation of the economic viability of gum tapping - would allow also the supply of crude gum to Zimbabwe's underutilized processing industry and exports overseas - either directly or after tertiary level processing by South Africa's technologically advanced industry. Should this occur, together with an expansion of South Africa's gum naval stores industry, the region could emerge as a significant world supplier.

The report presents a strategy and an outline plan for development of the more promising commodities in two phases. During phase one, development would be undertaken of a limited number of commodities for the overseas market and of a larger number for the regional market. Subject to acquisition of sufficient capability, proving price competitiveness and a favourable international market, phase two would see the expansion of production for export of a number of commodities. Cost-effective development would be best achieved by regional cooperation for a range of commodities, in which the as-yet untapped and very substantial technological know-how and human/institutional resources of South Africa could make a major contribution (in line with its commercial interest and its Government's policy objectives).

Specific proposals are presented also on means of stimulating market awareness, acquiring and disseminating market and technical information, and for creating a forum from which technology transfer and active collaboration might arise.

## RECOMMENDATIONS FOR THE WORLD BANK ON FOLLOW UP

- (a) Section 8 of this report (paragraphs 8, 10 to 16, commencing page 73) provides specific recommendations for a seminar and other activities meriting funding by the Bank. The seminar, envisaged for early 1996 would be the first step in developing market awareness amongst the farming and financial sectors of the northern countries and in establishing direct contacts with representatives of agri-business from South Africa. This seminar should be employed also as a forum to explore the potential for technology transfer and training by South African R & D institutions to counterparts in the public and private sectors in the northern countries. It is critically important that by means of selection of speakers and organisation of the programme the discussions are truly market-led and not subject to the high-jacking or the diversions of academics or ill-informed enthusiasts. Every effort should be employed to ensure the participation of decision-takers in loaning institutions and representatives of Lever Bros and other multinationals involved in the soap and detergent industry.
- (b) Consideration should be given to early despatch of copies of this report in its entirety to the Commonwealth Development Corporation and Barclays Bank in order that these bodies can acquire greater familiarity with the focal commodities.
- (c) Investigation of many relevant areas of production and markets in South Africa were of necessity superficial during the present study owing to time constraints. It is recommended that consideration be given to more in-depth studies, preferably before the 1996 seminar, on the following topics:
- the guar gum and castor oil markets;
  - the fragrance oil market (both multinationals and domestic companies) since this is predicted as a growth area not only for the region but for Sub-Saharan Africa as a whole;
  - trade barriers for the focal commodities;
  - the compilation of a trade directory of buyers of the focal commodities in South Africa; and
  - the production of essential oils by farmers in the Free State and the Cape which, unlike the Transvaal

eucalyptus oil industry, appears to be flourishing and would provide valuable case studies.

- (d) Consideration should be given to funding a professionally designed and evaluated pine gum tapping trial in the forests of the Zambian Copperbelt. This resource has the potential - should tapping prove economically viable - to transform production in the region from a deficit to a large surplus, supplying underutilized processing facilities in Zimbabwe and South Africa and allowing the region to enter the international market in a major form.
- (e) A study of the South African market for vegetables also merits priority for funding. Demand in South Africa's winter season is either not fully satisfied or is met by expensive, greenhouse produce while during the same period high quality vegetables are abundant and lacking a market in the north, especially in Malawi.
- (f) Finally, there is a need to address the problem created by these World Bank studies of raising expectations of immediate and substantial provision of information and other assistance amongst interviewees. Such help cannot be met by any consultant and a clearing-house system for dealing with enquiries requires urgent consideration.

## **1. INTRODUCTION**

1.1. This report presents the findings and recommendations arising from a study during June-July 1995 of the developmental potential for "minor industrial crops" in four countries of the World Bank's Southern Africa region (South Africa, Zimbabwe, Zambia, Malawi and Swaziland). The "minor industrial crops" category embraces a diverse range of products of agriculture and agro-forestry all of which possess a high value to volume ratio and good storage characteristics. The study focused on spices and their further processed products, essential oils, natural colourants, gums and resins, castor seed and its oil.

### **Background**

1.2. With a few notable exceptions, production of these commodities within the Southern Africa region has been on a minor scale only or indeed non-existent in some countries. The potential for both overseas exports and import substitution has been largely unrealised and this may be attributed to a combination of factors, which include a historical concentration on food and major cash crops by national government and donor bodies plus a general lack of market awareness.

1.3. The commodity group was selected for special study since conditions are now far more promising than formerly for their development within the region. Cash crop diversification is a priority interest for the northern countries and some of the "minor industrial crops" offer a potential for production at either or both the commercial farmer and smallholder levels, domestic added-value processing prior to export, together with unit-values which can cover transport costs to distant markets. Secondly, the large scale of current international demand for some of the commodities is such that scope exists for the capture of a modest share of the market by new suppliers while perceived medium-to-longer-term trends in world supply and demand provide opportunities for future export of a wider range and greater volume of products. Lastly, the recent political and economic changes within South Africa has opened to its neighbours a large market for "minor industrial crops" which until now has been mainly supplied by imports from overseas. South Africa, therefore, is foreseen to play a key role as an immediate market and, possibly, as a source of technology transfer and investment, in the development of new crops by countries elsewhere in the region.

## **Terms of Reference**

### **1.4 The Terms of Reference for the study were as follows:**

- (a) Briefly describe the focal commodities/products and their valued uses. Briefly discuss the agronomic problems/opportunities generally associated with these crops and characterise some of their techno-economic characteristics (i.e. gestation period, perishability, labour intensivity, value/weight).
- (b) Provide an overview of the international and (Southern Africa) regional market for the focal commodities/products. Discuss the opportunities for international exports, for supplying South Africa's needs, and for import substitution by the other countries.
- (c) Gauge the attitudes of multinational and domestic companies towards sourcing raw materials locally/regionally rather than importing pre-compounded materials, and establishing processing/marketing facilities for export-oriented products.
- (d) Discuss patterns of investment, production and trade in the focal commodities thus far in Southern Africa. Discuss the patterns of participation at the farm and processing levels. Review evidence regarding the competitiveness/non-competitiveness of Southern African suppliers. Identify important catalysts or influential factors (i.e. foreign investment, sources of finance, etc.) which have contributed to developments thus far (or effectively constrained development).
- (e) Review illustrative experiences involving outgrower farmers (especially smallholders) and/or intermediary processors, highlighting lessons.
- (f) Where data are available, compare the profitability of farm production of the focal crops with that for competing/traditional crops.
- (g) Review the existence of and potential for transfer of appropriate technology and marketing skills

within the region under collaborative arrangements. Assess possible interest in cross-border and joint venture investments in this field.

- (h) Present a realistic "vision" for the development of the focal crops/industries during the next five years. Discuss individual country (or regional) constraints in realising this potential, and make recommendations for cost effective programs of support.

#### **Team Composition and roles**

1.5. The study was carried out by a three-man team:

- Dr Clinton Green - team leader; minor industrial crops technologist (Natural Resources Institute, NRI, UK);
- Dr Johan Willemse - agricultural/marketing economist (Agro-economic Research Ltd, South Africa);
- Mr Jaspar Steele - agricultural economist (Natural Resources Institute but on secondment to the Agricultural Extension Research Trust - ARET - in Malawi).

1.6. Mr Steele's input was restricted to the Malawi field study and to contributing sections of this report on that country's agriculture, trade and economic development status. Dr Willemse participated in the field studies in South Africa, Zimbabwe and Zambia and provided major sections of this report on the agriculture, trade and domestic markets for each of the three countries.

#### **Methodology**

1.7. Base-line information on production, exports and imports for each of the countries was sought prior to commencement of the field study by examination of published trade statistics, contact with selected importers and multinational companies in Europe and the United States and by reference to NRI's in-house database.

1.8 The field study in Southern Africa spanned 22 consecutive days which was acknowledged from the planning stage as inadequate for a detailed examination of all topics specified in the TOR. Selected, representative major companies and institutions therefore, were targeted for interviews within each of the countries in order to obtain an overview of production, trade and markets. Supplementary information was sought also by means of telephone and facsimile correspondence with other organisations. In Malawi, Zimbabwe and Zambia, meetings were held when possible with members of the commercial farming community in order to determine experience with and attitudes to cash crop diversification. Similar enquiries were made of the smallholder sector through indirect means.

1.9. A detailed itinerary of the field study is given as Appendix 1 to this report and a list of organisations visited and people met is provided at the end of the detailed country reports (Appendices 2 to 5, inclusive).

#### **Constraints**

1.10. For all four countries, the classification systems used in official export and import statistics presented insurmountable difficulties in the precise quantification of trade for the majority of the individual target commodities.

1.11. The short duration of the field study, combined with the absence from office of several key target interviewees, posed constraints on both the quantity and quality of information acquired in each country. The South African market in particular proved highly fragmented in both the production and consumption sectors for flavours and fragrances and it proved impossible to establish direct contact with guar seed and castor oil buyers/users.

1.12. In all four countries, there was an absence of reliable data from extended, systematic studies on comparative returns for most of the target crops with those which have been traditionally grown.

1.13. No time provision was made in the TOR for a field study in Swaziland. Information presented on that country in this report is drawn from NRI's database.

1.14. The conclusions presented in this study, therefore, must be regarded as a first phase overview of the regional market - rather than a definitive statement - and a

preliminary identification of the more promising crops for future development.

## **Organisation of the Report**

1.15. The following main text of this report is organised as follows:

- Section 2 - description of the focal commodities, world trade and export opportunities;
- Section 3 - Southern Africa as a market and producer,
- Section 4 - the significance of South Africa in the regional context;
- Section 5 - perceived opportunities for new commodity developments;
- Section 6 - current constraints on development,
- Section 7 - prospects for cross-border investment and technology transfer;
- Section 8 - discussion of development pathways.

1.16. Detailed information on each of the four countries visited is given in Appendices 2 to 5 and a note on Swaziland is provided in Appendix 6. In addition, case studies of comparative experience with some particular crop developments in the region are presented in Appendices 7-10.

## **2. DESCRIPTION OF THE FOCAL COMMODITIES: CHARACTERISTICS, INTERNATIONAL DEMAND AND SUPPLY TRENDS, OVERSEAS MARKET OPPORTUNITIES**

2.1. This section provides a description of the focal commodities and their relevance to development in the region. The international market demand and supply position is discussed and a tentative selection is presented of individual commodities which offer a potential for overseas export (Table 1, page 24). For these particular commodities, a summary of the world market size, prices and the current major suppliers are given in Table 2 (page 25) and information on the crop characteristics, yields, plus the minimum acceptable scale of shipments to the international market is given in Table 3 (page 26).

### **DESCRIPTION AND USES OF THE FOCAL COMMODITIES**

#### **Spices, Herbs and their Oleoresin Extracts**

##### **Spices**

2.2. Spices are plant derived materials which possess an appreciated aroma and flavour and are employed as ingredients in foods. Certain spices also contain powerful pigments and in some applications they are valued as much for their food colouring properties as for their flavour; the principal examples are paprika (red) and turmeric (yellow).

2.3. Most spices derive their aroma and flavour from the presence of steam-volatile oils. Others also contain components which are not volatile in steam but impart a pungent or 'hot' taste in the mouth (e.g. chillies, pepper and ginger). The pigments present in paprika and turmeric are similarly not steam-volatile.

2.4. The term 'spices' is reserved for the aromatic plant parts which are not leaves and examples are given in the following table.

Spice types:	Examples:
seeds	coriander, cumin, fennel, aniseed, mustard
seed capsules	cardamon
berries	pepper, pimento ('allspice')
flower buds	clove
nuts	nutmeg, mace (the aril of nutmeg)
fruits	chillies*, paprika*, vanilla
bark	cinnamon, cassia
rhizomes (roots)	ginger, turmeric
bulbs	onion, garlic

\*See Appendices 8 and 9 for detailed information

2.5. In trade, the term 'spices' is reserved for dried material. Fresh ginger, chillies, onions and garlic are handled by the separate vegetable market.

### Herbs

2.6. Herbs also possess aroma and flavour properties and are principally employed as food ingredients. However, the term is restricted to the leaves of aromatic plants and the aroma and flavour arises solely from the presence of steam-volatile oils.

2.7. The bulk of the international herb trade is conducted with dried material. However, there is also a substantial trade in fresh herbs.

Examples of the more common herbs:	
parsley	sage
thyme	basil
oregano	tarragon
rosemary	bay
peppermint	chervil
spearmint	coriander (leaf)

### Spice and Herb Oleoresins

2.8. Oleoresins are extracts prepared by extracting spices and herbs with an organic solvent, followed by careful removal of the solvent. These products are viscous materials, containing the flavour and pigment components of the raw material in a highly concentrated form, together with other extractives (fats, etc). Oleoresins are employed in the food industry as an alternative to the raw spices or

herbs and possess the advantage of their concentrated form, standardised strength and freedom from potentially harmful live bacteria and fungi (which are always present in the raw materials, usually at levels exceeding food regulations and require sterilization treatment before sale in developed country markets).

2.9. The largest volume production of oleoresins is with those spices which contain steam-involatile flavour or colour components (pepper, paprika, chillies, turmeric and ginger). Herbs and those spices containing only steam-volatile oils are less frequently employed in the form of oleoresins since an alternative (and simpler) method of preparing a concentrated flavour is possible; namely, by production of their essential oils.

### **Essential oils**

#### **Definition**

2.10. The term '**essential oil**' is applied to the aromatic (i.e. odouriferous) liquids which are obtained by two processes from plant materials:

- (a) The '**steam distillation**' process involves vaporisation of the steam-volatile oil present in the plant material by passage of steam, condensation of oil and steam vapour, and separation of the liquid oil from water (by means of density differences) in a collection vessel.
- (b) '**Cold-pressed oil**' production is a process specific to the extraction of the oils present in the skin of citrus fruit and it is undertaken by mechanical rasping, usually as a complementary operation to fruit juicing. Buyers' specifications require that cold-pressed citrus oils do not come into contact with the juice. This operation is followed for all large citrus fruit (orange, lemon, Persian lime etc). West Indian lime fruit oil can be processed in this manner but it is mainly obtained as the '**distilled oil**' by an operation which involves crushing the whole fruit and steam distillation of the expressed fluids (either whole or after separation-by settling-of the lime juice).

2.11. The term '**essential oil**' should not be confused with '**fixed**' or '**fatty oils**', which are steam-involatile and are

obtained by mechanical expression of seeds and nuts; examples of 'fixed' or 'fatty oils' are castor, soya, sunflower, groundnut, maize and palm oils.

2.12. Although essential oils are widely used worldwide, they are by no means 'essential' commodities. The term derives from 'essence' or 'quintessence', meaning the characteristic (aroma) of an odouriferous plant.

2.13. The volatile aroma components of plants can also be extracted by solvent extraction processes. Those obtained by this means from spices and herbs are termed 'oleoresins' (see paragraph 2.8). Solvent extracts made for perfumery applications are known, according to their degree of refining as 'concretes' or 'absolutes'. These items are traded in comparatively small volumes, have a highly quality conscious market, demand a large investment in equipment and in processing skills and, for these reasons, they are not discussed further in this report which focusses on products with a large developmental potential for the region.

#### **Uses**

2.14. Although generally unrealized, most consumers come into contact with essential oils on a daily basis through incorporation - either directly or after further modification - in a variety of processed products. Examples are provided under four convenient usage classifications in the following table. This list omits pine turpentine which is the world's largest volume essential oil, since it is covered under 'naval stores' in paragraphs 2.15 - 2.17.

#### **Naval Stores**

2.15. The term 'naval stores' is used to collectively describe turpentine, rosin (and their further-processed derivatives) which are obtained by several processes from pine trees. The most important process in terms of the region is manual tapping of live pine trees to obtain the crude 'gum oleoresin', which is then subjected to steam distillation in order to separate 'gum turpentine', a volatile liquid from 'gum rosin', a hard, transparent solid.

2.16. Annual world production of turpentine is around 0.3 million tonnes, some fifteen times greater than the next largest essential oil (orange). It finds use as solvent for paints, etc. but its major application today is as a source of pinene compounds for the chemical industries.

Examples of common essential oils

(a) Perfumery oils:

cedarwood, geranium, lavender, patchouli, vetiver, tagete\*

(b) Flavour oils

orange and lemon - in soft drinks

lime and cassia - very important for 'Coke' drinks

fennel and aniseed - very important for 'Pernoud' type  
alcoholic drinks

medicinal eucalyptus\* - in confectionary and medicinal decongestants

mint oils, menthol - in toothpastes, mouthwashes, confectionary  
(also menthol in cigarettes)

coriander }

ginger }

thyme }

- in processed foods

buchu\* - in processed fruits

(c) Industrial oils (used as sources of isolates for subsequent transformation):

Litsea cubeba - citral source

Eucalyptus dives\* - piperitone source

sassafras - safrole source

(d) Dual purpose oils

citronella } - as cheap fragrance oils and as  
Eucalyptus citriodora } sources of citronellal and geraniol

lemongrass - as a cheap fragrance oil and as a source of  
citral

Key: \* oils currently exported by Southern Africa (see also Appendix 7  
for details on eucalyptus)

2.17. Rosin is the largest volume item from amongst the commodities considered in this report, with an annual world production of 0.7 million tonnes. It is employed directly or after chemical modification as a size for paper, in adhesives and for the manufacture of resins.

2.18. Since gum naval stores have a high potential for the region, a detailed description fo the subject is provided in a case study (Appendix 10).

### **Water-soluble gums**

2.19. This group includes:

Acacia gum (especially gum arabic)}	tree exudates
Gum tragacanth }	
Gum karaya (Steruculia) }	
Guar gum }	seed gums
Carob or locust bean gum }	

2.20 All of these gums are employed in the food industry, to a greater or lesser degree as adhesives and in some other applications (including medicine).

2.21. Guar gum is processed from guar seeds and finds its main use in the petroleum drilling and mining industries. Processing involves several stages: dehulling to 'splits', grinding of splits and final refining to the gum product. The plant is a drought tolerant, annual legume and is particularly appropriate for smallholder cultivation.

### **Natural Colourants**

2.22. The term 'natural colourants' is used to describe plant materials which are employed to colour foodstuffs. The spices, paprika and turmeric are employed for this purpose, usually in the form of their oleoresin extracts. Two other products of relevance to this study are 'marigold meal' and annatto.

### **Marigold Meal**

2.23. This product consists of the dried flowers of *Tagete* species, the 'marigold' family which occur as annual weeds throughout much of Southern Africa.

2.24. Marigold meal is principally employed, either directly or in the form of its extract, as an additive to poultry feed. This enhances the colour of the egg yoke and the meat.

#### **Annatto**

2.25. The annatto or bixa tree (*Bixa orellana*) provides seeds with a deep red coating. The seed pigment can be extracted by means of edible vegetable oils, organic solvents or, most commonly, by immersion in dilute alkali, followed by acidification and precipitation of the modified pigment, nor-bixin.

2.26. Annatto extracts are employed world-wide by the processed food industries. Nor-bixin is used to enhance the yellow to orange colour of hard cheeses, margarine, butter and a range of other products.

2.27. The annatto tree is well known in Southern Africa, having first been introduced as a garden ornamental and subsequently, it has naturalised in many areas. It is fairly drought tolerant and an appropriate crop for smallholders.

#### **Castor Seed and Oil**

2.28. Castor seeds (or 'beans') are obtained from a perennial shrub which is adaptable to a wide climatic range. Production systems range from harvesting of wild plants, through informal cultivation to the intensive plantation type. It is a crop which is very suitable for smallholders.

2.29. Castor oil is the major derivative in terms of crushing value. Only a very small proportion of (highly refined) oil is employed today as a medicinal purgative. The bulk of oil production is employed, usually after modification, in a wide range of industrial applications. Processing of castor, other than initial dehulling, is not a suitable activity for the village or small-scale entrepreneur level, largely because of the difficulty in producing a good quality product without investment in hydraulic presses and solvent extraction equipment.

2.30. Castor meal, the by-product of oil extraction, differs from other oilseed cakes in that it is allergenic and contains a very potent toxin, ricine. Use as a livestock feed is not possible and the meal is mainly employed as an organic fertilizer.

## **RELEVANCE OF THE FOCAL COMMODITIES TO DEVELOPMENT NEEDS OF THE REGION**

### **General Market Opportunities and Product Suitability**

2.31. Opportunities are perceived for production of a number of individual commodities within the focal group either:

- (a) to market immediately within the region, which is a nett importer; or
- (b) to export on to the international market in the short - to medium term, depending upon the particular commodity and the international supply/demand balance.

2.32. An appraisal of the regional market and the potential for import substitution is provided in the section 3 of this report and the international market is discussed below (paragraphs 2.41 to 2.65).

2.33. The advantages offered by the focal commodities relate to their characteristics in the context of the land-locked position of the northern countries in the region and the costs and problems associated with transport of produce both to the major local market of South Africa and the international market. The focal commodities have the following highly desirable characteristics:

- (a) Deterioration in quality is minor during storage and transport under normal handling conditions.
- (b) Some of the primary agricultural products have a sufficiently high unit-value to volume ratio to be shipped overseas competitively and at a profit.
- (c) Varying degrees of added-value processing is possible and with essential oils, for example, the process is intrinsic to production and the unit-value to volume ratio is very high.

- (d) A range of these crops are potentially suitable for small-holder cultivation and primary processing.
- (e) It is feasible to undertake certain types of added-value processing on a small to medium scale at a comparatively low investment cost in equipment and without the need for highly skilled staff.

## **BACKGROUND ON THE OVERSEAS MARKET**

### **Access Prospects**

- 2.34. It must be acknowledged from the outset that there are no opportunities which are unique to the Southern Africa region with most of these commodities. There is a high degree of competition between existing suppliers and there are a number of prospective new entrants standing in the wings.
- 2.35 However, these conditions do not preclude successful entrance to the market, if on a modest scale, in the short-term. The size of the international market for some commodities is such that it can absorb a new, small-scale exporter and many major consumers wish to encourage a diversification of their supply sources for security reasons.
- 2.36. With regard to the medium- and long-term, prospects are perceived as even more favourable for the following reasons:
- (a) The history of these commodities has been punctuated by periodic relocation of areas of production. This has arisen from a combination of socio-economic changes in former important sources of supply; typical causes include increasingly uncompetitive labour costs and the advent of alternative and more attractive means of income generation for the rural population (urban employment or new crops).
  - (b) Exports of some commodities from some current major suppliers, e.g. India and China, represent the surplus to their domestic requirements. The growth of population, urbanisation and the consumer market in both of these countries is

expected to progressively reduce the level of their exports of certain commodities and this offers opportunities for others.

- (c) A progressive growth in demand, if from a small base is evident in many other developing countries.
- (d) There is the enormous, nascent consumer market of Eastern Europe and the former USSR. The question here is the timing of economic take-off; one or two decades in the future?

### **Important Considerations for Success**

2.37. Product quality is of great importance on the international market for all of the focal commodities and success will not be achieved by a new exporter on a competitive world market unless this fact is understood. Various factors influence product quality, commencing with the selection of planting stock with good intrinsic properties, and spanning the operations of crop management, post-harvest treatment and even the method of packing and shipment. A learning phase in crop handling and processing is unavoidable and, where there is a local demand which is not highly quality conscious, there is merit in serving this market and overcoming problems before venturing on to the international scene. This strategy is discussed further in section 8.

2.38. Competitive pricing is of course very important to achieve market entrance. Additionally, it should be understood that with some processed products, particularly essential oils, a new supplier must be prepared to accept a price at or below that of the market's cheapest source (usually China) until such time as buyers' confidence is gained.

2.39. Regularity of shipment and provision of minimum commercial shipment volumes are additional key factors. It is pointless to attempt to market a tonne of material and another tonne one year later when the minimum acceptable volume is 10 tonnes or more. The conditions for trading must be thoroughly researched by all prospective exporters.

2.40. Understanding and effective utilization of marketing channels is another vital preparation prior to export. For some commodities, such as annatto, sassafras oil and lime

oil, it is possible to establish direct trade links with the end-user. However, most trade in the focal commodities is conducted via intermediaries in the regional and international market centres, i.e. dealers and brokers. Reputable dealers can offer a particularly valuable service to new suppliers through their knowledge of where best to place a "new product" on the market. It is advisable to select an interested dealer and to entrust them to develop a market. Continually "shopping" a product, particularly when available in only small quantities, from buyer to buyer is counter-productive.

## **CANDIDATE COMMODITIES FOR THE OVERSEAS MARKET**

### **Selection Criteria: Cautions**

#### **Conventional Products**

2.41. The great temptation when first considering options with unfamiliar commodities is to select or reject on the simplistic basis of their comparative market unit-values, i.e. US \$ per kg or per tonne. This is not a sound approach and can be the road to bankruptcy. Firstly, the very high unit-values of some commodities usually reflects a requirement for considerable inputs and skill in their production, and a highly quality conscious, often small, market. Returns, not unit-price is the more important factor for success. An acceptable return might be possible with a low unit-value product giving high crop yields, demanding lesser production skill and has a volume market which is easier to enter. Secondly, the focal commodities are no less immune to annual price fluctuations than other internationally traded agricultural products, and price changes mainly reflect those in supply levels rather than in demand. Therefore, reliance should not be placed on a single published price list. For example, mid-1995 prices for a number of essential oils (including citronella and medicinal eucalyptus) were double those of 1993-94, primarily because China had reneged on contracts signed at a historic price low and had not shipped for a year. A price series over several years must be examined in order to ascertain the norm and the possible fluctuation limits.

#### **The 'Green Market' and 'New Oils'.**

2.42. Similarly, caution should be applied to some recently emergent niche markets; specifically the much hyped "green" or "organic" markets for herbs, spices and essential oils.

Prices paid by buyers for "organic" products are very much higher than those of their mainstream market counterparts but the scale of demand is miniscule. For example, the demand for organic black pepper in Western Europe is around 100 tonnes per annum at present, equating to the annual output of 75 South East Asian smallholders, as against sales of 25,000 tonnes of conventional black pepper. In the case of "green/organic" oils, an individual European aromatherapist buys between 2 and 20kg of oil a year of any given oil - equating to a single day's output from a small distillery - whereas a mainstream market buyer purchases 1 tonne upwards per consignment. Those already engaged in supplying this niche market presently make good returns but there exists a risk of oversupply and a price collapse by the entry of a small number of extra producers. The future survivors in this market are likely to be those who can accommodate production as a low-cost, 'bolt-on' to an existing operation; for example, organic herb producers using sub-standard visual appearance material as distillation feedstock.

2.43. Similar constraints apply to the market for "new oils", especially previously non-commercial fragrance oils (which are the subject of considerable research activity in some countries). The mainstream perfumery houses (volume buyers) are very conservative and will not adopt new oils unless there is a guarantee of continuous volume production, nor will they pay the prices currently offered by the aromatherapy market.

2.44. With these "green" or "organic" products, any longer-term benefits from overseas export are likely to accrue to a small number of individuals and the developmental impact will be minor.

2.45. A greater long-term economic sustainability with "new" oils is likely to be found in the regional market, particularly as ingredients of fragrances, soaps and toiletries produced by domestically owned companies rather than by multinationals. The latter aim for volume production of standardized products to be marketed throughout Sub-Saharan Africa whereas many of the domestic companies aim to provide speciality products for perceived niche markets. Two oils meriting early consideration in this context are ninde (Ames et al, 1969 and 1970, ref. 38, 39 and 44) and Mulange cedarwood (see Green et al 1988, ref.40). The latter is a candidate for early development

since the raw material is sawdust waste from the saw pits on Mount Mulange in Malawi.

### **The Candidate List**

2.46. Table 1 (page 24) presents a list of the more promising candidates for overseas export, together with a suggested time-scale for the development. The latter takes into account the expected opportunity-windows for market entrance and, also, the need to first aim at import substitution with some commodities.

2.47. Table 2 (page 25) summarises the present world market for these candidate commodities and Table 3 gives information on the crop characteristics and the minimum scale of commercial shipments.

2.48. This commodity selection was made on the basis of:

- (a) The known or prospective climatic suitability of the crops for some areas in the region.
- (b) The assessment of the potential for the entrance of a new supplier to the market.
- (c) Maximising developmental impact.

2.49. The reasons for the inclusion of some commodities and the omission of others are discussed below.

### **Spices**

2.50. **Paprika** offers a prospect for a market expansion of total regional production to around 25,000 tonnes per annum. This takes into account an expected reduction in South African production within the total as a result of agricultural trends in that country (discussed in Sections 3 and 4). A greater expansion in the short-term is not advisable owing to the competitive state of the market in most years.

2.51. Scope exists for the entrance to the market of good quality **ginger and turmeric**, including the ground form of the latter. The export stage, however, must await a growth in production to satisfy import substitution needs (see Section 3, Table 4). Viability of exports will be dependent on the transport cost element since the more promising cultivation

areas would be the higher rainfall regions of northern Malawi and Zambia.

2.52. A larger number of items are considered to have poor prospects for overseas export and the reasons for each are summarised below:

- (a) Expansion of Birdseye chilli exports beyond the current 600 tonnes per annum is not recommended owing to the growth in market competition.
- (b) Climatic conditions for tree spices and vanilla are not good in the region and the market is already adequately supplied or oversupplied with clove, nutmeg and pimento.
- (c) While pepper and cardamom can be grown in certain higher rainfall/humidity areas of the region, climatic conditions are not ideal. Moreover, the international market for both spices is competitive with recurrent periods of oversupply.
- (d) Owing to trends in agriculture in the region, any dried herb production appears likely to be undertaken north of the Zambesi and the transport costs of these comparatively low bulk density items are likely to be prohibitive.
- (e) Spice seed exports also could be subject to unacceptable transport costs to the port of shipment from the northern countries.

#### **Spice Oleoresins**

2.53. No further expansion of paprika oleoresin production capacity in the region is recommended since it is large already (see Section 3, Table 5) and the market is competitive. In this category, other spice oleoresins could be considered but the market is competitive also.

#### **Essential Oils**

2.54. There are two very promising candidates for early development:

- (a) Sassafras oil has a unique position on the market in that the traditional supply sources - wild trees in China, Vietnam and Brazil - are rapidly

being depleted while demand is buoyant (ca. 2,000 tonnes per annum) and with a prospect of further growth, if supplies could be increased. For strategic security reasons, the major international consumers of sassafras oil (producers of heliotropin and the pyrethrum synergist, 'PBO') are actively seeking to promote and support new, sustainable production of sassafras oil. The most promising species is a previously unexploited shrublike weed, indigenous to the Southern Amazon region of Brazil: *Piper hispidinervium* (see Maia and Green, 1993, ref.59). Pilot-trials in Brazil have proven the ease of crop management, the ability to provide the first cash-flow 6-8 months from planting and for sequential leaf harvesting on a coppice system at 4 to 6 month intervals thereafter for at least 3 years. This plant should be adaptable to a range of areas in the northern countries and it possesses a number of valuable attributes in addition to the positive market outlook and early cash flow. Firstly, quality of the oil relates to the safrole content and this is determined by the germplasm rather than the skill of the distiller. Secondly, rapid ground cover is attained by coppice management and this reduces weeding inputs. Thirdly, the plant shows promise for mechanical harvesting and this would be a bonus in Zimbabwe where labour availability or cost is a significant factor in production operations. Trials with *Piper hispidinervium* must be ranked a priority in an essential oil development strategy.

- (b) Distilled West Indian lime oil is a major ingredient of 'cola type' soft drinks (Pepsi, Coca Cola, etc.). The growth rate in worldwide consumption of these beverages is such that demand is expected to double in a decade. This will put pressure on supplies of West Indian lime oil and the major consumers are seeking new supply sources to contribute to the predicted 1,000 tonne increase in demand. Lime is a crop with a proven record in Zimbabwe and it could be suitable for some areas of Zambia and Malawi. Production would be best geared to manufacturing oil alone (by the 'Mexican' process), rather than co-producing lime juice since the market for the latter has severely contracted.

2.56. Other oils with promise for development in the short-term, if on an initial modest scale are **geranium** and **vetiver**.

2.57. **Resuscitation of the region's medicinal eucalyptus oil production** to its former level of 200-250 tonnes per annum (see Appendix 7) should be strived for in the near future. This volume only represents 13 per cent of annual world trade and production profitability should improve with an upward trend in prices. It is possible, however, that the potential here lies with the northern countries rather than with the former major regional producers, South Africa and Swaziland. Profitability would be enhanced if *Eucalyptus polybrachtea* could be grown since it can be harvested mechanically.

2.58. Development of exports of the oils of **citronella**, **Eucalyptus citriodora** (which is interchangeable with citronella in most applications) and **lemongrass** is merited in the medium-term after regional import substitution is achieved. The size of their markets and predicted trends in world supply levels offer scope for a new supplier; moreover, growth in usage - particularly for citronella as an ingredient of inexpensive soaps - may be expected in Sub-Saharan Africa as a whole while production is presently modest and restricted to Kenya.

2.59. Opportunities, if on a relatively small-scale, exist for the export of certain **spice seed and herb oils**, particularly coriander and the anethole sources, fennel and aniseed. Production of these oils could be developed in parallel to cultivation of spice seeds/herbs for the regional market.

2.60. Considerable caution should be applied to expansion of existing production of the following oils in the short-term for the following reasons:

- (a) **Orange oil**, while commanding the largest world market amongst essential oils (around 20,000 tonnes annually), has been in oversupply for a number of years and fetched low prices up until 1995. The reason for the current improved price is that Brazil, the major producer has large unsold stocks of orange juice and has ceased fruit processing. Thus, output of the co-product, orange oil was terminated also in 1995.

Therefore, there is a temporary 'false' shortage of orange oil which will be overcome on Brazil's resumption of fruit processing.

- (b) **Tagete oil** demand is small, possibly no greater than 10 tonnes worldwide and of this the region supplies around 7 tonnes annually from the production of 8 farmer-distillers. Any increase in demand could be readily served by the existing producers. Encouragement of new entrants could oversupply the market and depress prices.
- (c) **Buchu oil**, a South African speciality, is in the same position as tagete.

#### **Naval Stores**

2.61. Good prospects exist for export of gum rosin, gum turpentine and their derivatives, particularly if of a quality equivalent to those produced from *Pinus elliottii* in South Africa. The capability to achieve this goal will depend upon:

- (a) the South African Forestry Corporation making more trees available for tapping, or
- (b) the mooted production by Zambia of naval stores materialises and output exceeds its domestic demand; this surplus could be sold to South Africa, freeing the latter's high quality products for export (see Appendix 10).

#### **Water-soluble Gums**

2.62. It is unlikely that Malawi's mooted production of **karaya gum** or the combined regional production of **guar** will exceed the regional demand in the medium-term. If a surplus is achieved then entry into the international market would be possible but under very price-competitive conditions.

#### **Castor Oil**

2.63. The comments made above for gums apply equally to castor oil.

#### **Natural Colourants**

2.64. Annatto has passed through phases of temporary oversupply to a recent period of shortage. Buyers in Western Europe and North America are interested in sourcing from new areas and this offers a potential for the region. The crop is very suitable for extensive planting by small-holders and it is relatively undemanding on inputs once established. Moreover, processing to the main usage form, nor-bixin is not a high technology or investment operation, and this could be taken up by entrepreneurs once sufficient seed production is reached. Also, it is a step which is being encouraged by buyers.

2.65. The marigold meal supply-side position is currently rather difficult to read. Since Zambia has recently entered into production and aims to export a very substantial quantity (2,000 tones annually), it is advised that market prospects be carefully assessed prior to a decision on any new investment in the region.

**Table 1: Promising Overseas Export Candidates for Expansion of Existing Production or for New Development**

Commodity	Development Period		Notes
	Immediate	Medium Term	
Paprika	✓		A modest expansion of existing production to around 25,000 tonnes for the region  Lag-time of 5 years to achieve full bearing
Sassafras oil	✓		
Lime oil	✓		
Geranium oil	✓		
Vetiver oil	✓		
Annatto	✓		
Medicinal eucalyptus oil		✓	Restoration of former regional output to 200-250 tonnes } } First satisfy import substitution requirement, then } employ surplus for export } } } Transport costs may be a } } constraining factor } Dependent upon availability of suitable pine trees
Citronella (and/or E. citriodora) oils		✓	
Lemongrass oil		✓	
Coriander oil		✓	
Fennel/anise oils		✓	
Herb oils		✓	
Turmeric		✓	
Ginger		✓	
Turmeric oleoresin		✓	
Ginger oleoresin		✓	
Naval stores		✓	

**Table 2: Market Summary for the Candidate Commodities**

Commodity	Est. annual int. trade (tonnes)	Price swings 1990 - 1995 (US\$/tonne)	Major Exporters	Major Markets
Paprika	40,000	1,400 - 2,000	SA, Zim, Hungary, Morocco, Spain	EU, Japan, North Africa Eastern Europe, Japan
Turmeric	18,000	570 - 675	India, China	Iran, Gulf, EU, USA, Japan
Ginger	18,000	500 - 700	Nigeria, India, China	EU, USA, Japan
Lime oil	1,000	19,000 - 23,000	Mexico, Peru, Haiti	USA
Sassafras oil	2,000	3,500 - 7,500	China, Vietnam, Brazil	Japan, EU, USA
Citronella oil	1,800	3,800 - 11,000	Indonesia, China	USA, EU, Mexico, Japan
E.citriodora oil	700	4,000 - 11,000	China, Brazil	EU, USA
lemongrass oil	600	8,000 - 12,000	India, Guatemala, China	EU, USA, Japan, Russia
Geranium oil	200	27,000 - 65,000	China, Egypt	EU, USA, Japan, Russia
Vetiver oil	260	27,000 - 70,000	Indonesia, China, Haiti	EU, USA, Japan
Coriander oil	40	-12,000	Russia, Bulgaria	EU, USA, Japan
Anise oil	100	7,000 - 11,000	China, Spain	EU, USA
Annatto seed	6,500	600 - 800	Peru, Kenya	EU, USA, Japan
Gum rosin	384,000	575 - 700	)China, Portugal, )Indonesia, Brazil	)EU, USA, Korea, India, )Japan
Gum turpentine	25,000	450 - 650		

**Table 3: Characteristics and Commercial Shipment Sizes for the Candidate Exports Crops**

Commodity	Plant type	Part used	Annual product yield (kg/ha)	Planting to 1st harvest	Intervals subsequent harvest	Age at peak bearing	Economic lifetime	Usual minimum shipment size for product
Paprika	Annual	Fruits	1,000 - 6,000	4 months	nil	NA	NA	Container, 15-20 tonnes
Turmeric	Perennial rhizome	Roots	1,000 - 2,000	9 months	nil	NA	12 months	Container, 14 tonnes
Ginger	Perennial rhizome	Roots	1,000 - 2,000	9 months	nil	NA	12 months	Container, 14 tonnes
Sassfras oil (ex. Piper)	Perennial shrub	Leaf	350 - 500	8 months	4-6 months	14 months	3 years plus	10 tonnes
Distilled Wl lime oil	Tree	Fruit	90	3 years	Annually (6 month season)	5 years	20 years	1 tonne
Geranium oil	Perennial shrub	Leaf	30 - 80	6 months	3-6 months	12 months	3-4 years	1 tonne
Vetiver oil	perennial shrub	roots	20	15 months	nil	NA	15 months	1 tonne
Medicinal eucalyptus oil	Tree (coppiced)	Leaf	150	15 months	12-15 months	2 years	20 years	10 tonnes
Eucalyptus citriodora oil	Tree (coppiced)	Leaf	150	12 months	6 or 12 months	2 years	20 years	10 tonnes
Citronella oil	Perennial grass	Leaf	150	4-6 months	3-4 months	12 months	3-4 years	10 tonnes
Lemongrass oil	Perennial grass	Leaf	90	4-6 months	3-4 months	12 months	3-4 years	10 tonnes
Coriander oil	Annual herb	Seeds	2.5 - 20	3-4 months	nil	NA	NA	100kg
Anatto seed	Tree	Seeds	1,000 - 1,500	18 months	Annually (6 month season)	3 years	20 years	Container, 12 tonnes
Gum rosin Gum turpentine	} Pine } tree	Trunk gum oleoresin	2.5 - 3.0 kg/tree	18-20 years	2 weeks		4 years (prior to tree felling)	Rosin: container 20 tonnes Turps: 20 tonne bulk tank

Key: NA not applicable; crop uprooted after 1st harvest.

### **3. SOUTHERN AFRICA AS A MARKET AND A PRODUCER OF THE FOCAL COMMODITIES**

3.1. This section provides a summary of the estimated market demand for the focal commodities in the Southern Africa region, plus estimates of the existing scale of production and of trends. Commodities are discussed group by group and illustrative lists of the demand and production for certain commodities are presented in Tables 4 and 5 (pages.49 and 50). Detailed country reports are provided in Appendices 2-5 and include information of trends in agriculture, attitudes of farmers and institutions to diversification. Case studies of regional development experiences are given for eucalyptus oil, Birdseye chillies, paprika and naval stores in Appendices 7 to 10, inclusive.

3.2. The main conclusions of the survey were that:

- (a) The region is a nett importer of the majority of the focal commodities.
- (b) South Africa is highly dependent on sourcing materials from overseas.
- (c) There is an unrealized or proven-but-under-exploited potential for production and import substitution of many of the focal commodities in the region, particularly in the northern countries (Zimbabwe, Zambia and Malawi).
- (d) Production in South Africa of many of the focal commodities, both for the domestic and export market, is likely to become more costly or even unviable as a consequence of water shortages, rising labour costs and structural adjustment.
- (e) The northern countries have a comparative advantage over South Africa in production of many of the focal commodities and could compete successfully with South African producers on the domestic and international markets.
- (f) Knowledge of the size of the South African market and the opportunities which it presents are poor in the northern countries.

- (g) The concept of producing, trading and attainment of self-sufficiency on a regional basis is unfamiliar both to many producers and to policy decision-takers in the northern countries. Production developments tend to be viewed on a narrow basis, either purely for national self-sufficiency purposes or for the overseas export market.
- (h) The major successes in ventures with focal commodities over the past decade have arisen through independent farmers or entrepreneurs who have been self-reliant for finance and acquisition of knowledge on technology and markets.
- (I) Malawi is the only country where smallholders have repeatedly proven adept at the uptake of unfamiliar cash crops and responsiveness to the market. (However, weaknesses in the rural marketing system in Malawi have not only failed to optimise development but, also, resulted in declining production of previously very successful smallholder crops).

## **SPICES AND HERBS**

### **Market Demand in the Region**

#### **The Scale of Demand**

3.3. South Africa has a very substantial demand for dried spices and herbs in the retail sector and for their further processed products within its large industrial food sector. Current annual sales in the formal market have been valued by Wallace (1995; ref.19) as approximately US\$ 42 million for retail packed herbs and spices, US\$ 26 million for curry powders and US\$ 26 million for industrial compounded flavours (dried spice mixes plus formulations of oleoresins and essential oils). Consumption levels for the majority of spices and herbs equate to 1-2 per cent of recorded annual international trade.

3.4. Demand in the Malawi, Zambia, Zimbabwe and Swaziland markets cannot be quantified so readily but in each it is disproportionately smaller per capita than for South Africa.

#### **Characteristics of the Markets**

3.5. In South Africa, the retail spice market is dominated by a number of domestically-owned companies while the industrial flavour sector has been captured by multinationals. Taste preferences within the different ethnic groups of the population differ considerably and the industry is structured to meet these needs. The European and Asian communities broadly display tastes similar to those found in Europe and the Indian sub-continent, respectively. The majority African ethnic group does not have a tradition of consumption of spicy foods but through urbanisation and exposure to processed foodstuffs it has developed as a large market for curry powders and preserves which are formulated to 'African taste'.

3.6. In all of the neighbouring countries, spice and herb consumption by the majority black populations is much less highly developed and is mainly for unsophisticated curry powders, based on coriander, chillies and turmeric, which are formulated in the home or purchased from Asian ethnic group traders. Substantial per capita consumption of spices and herbs is restricted in these countries to the very small European and Asian ethnic groups, which make retail purchases of packed spices and herbs in supermarkets or from Asian-owned spice houses. With the notable exception of Zimbabwe, the retail market for pre-packaged spices and herbs is dominated by South African products. The processed food-sector in Zimbabwe, Zambia, Malawi and Swaziland is also small compared to that of South Africa and flavour ingredients used by these industries are supplied by multinationals, based in South Africa.

#### **Market Trends**

3.7. In South Africa a progressive growth is expected in consumption of spices, herbs and their extracts via the urban black population's adoption of new maize-based snack foods and meat substitutes and, also, from institutional food programmes. However, the rate of growth will depend upon the performance of the overall South African economy and the disposable income of the predominantly poor, urban black population.

3.8. Any growth in the spice and herb products markets in South Africa's neighbours is likely to be very small in the medium term.

#### **Sourcing of Materials**

3.9. South Africa is dependent upon imports from overseas of most of its requirement for herbs and spices (both tropical and temperate types). The notable exceptions are coriander and chillies (for which domestic production is not adequate in all years) and for paprika. Small quantities of pungent (Birdseye) chillies are purchased from Zimbabwe and Malawi, which also supply coriander on an irregular basis. Imports of other spices from neighbouring countries have been constrained by inadequacy of volume, deficiencies in quality and the unreliability of exporters. Some of the multinationals in South Africa manufacture spice oleoresins and essential oils for their in-house use but the bulk of these processed products are imported. India is the dominant supplier of tropical spices and their oleoresins.

3.10. Zimbabwe is self-sufficient in chillies and coriander and has developed production of a large part of its requirement for herbs since the early 1980s. There is a small volume production of turmeric, ginger, black pepper and cardamon in Zimbabwe but the bulk of its requirement for spices grown under humid, tropical conditions are imported.

3.11. Malawi was formerly self-sufficient in mildly pungent chillies, coriander, turmeric and ginger but has now reached the stage where imports might be necessary, not through massively increased demand but rather from a contraction of production. Volume demand for all other spices and herbs is met by imports.

3.12. Zambia has no tradition of spice and herb production and the bulk requirement of its market is met by imports.

3.13. Demand on the small Swaziland market is met largely by imports (via South Africa). Only a limited scale production is undertaken of chillies and turmeric by smallholders.

3.14. In conclusion, the region as a whole is a significant nett importer of spices, herbs and their extracted products.

### Spice and Herb Production in the Region

#### **Overview of Production and Developmental Experiences.**

3.15. The only major production developments in the region, post - 1980 have been with paprika and its oleoresin and Birdseye chillies. These two spice developments have been export-oriented and the region now accounts for a very substantial proportion of world supplies; some 20,000 tonnes

of paprika and 500 tonnes of Birdseye chillies annually. In addition to the individual country information provided in Appendices 2 to 5, an overview of development modes, experiences and future prospects with these two commodities is given in Appendices 8 and 9.

**3.16. Smaller-scale successes** have been achieved by two entrepreneurs, one in Zimbabwe with herbs and the other in Malawi with a Tabasco-type, chilli sauce ('Nali Sauce'). In both cases, production was initiated as an import-substitution opportunity but later developed to niche marketing in the region and overseas. The history of both developments are briefly reviewed in the Zimbabwe Appendix (3A, paragraphs 31 and 59-62) and in the Malawi Appendix (4A, paragraphs 33-34).

**3.17. Other initiatives** have been either unsuccessful or very modest to date in all countries:

- (a) Production by commercial farmers in South Africa has been constrained by the low returns for most herbs and spices by comparison with some other crops. This factor has come into play with their counterparts in neighbouring countries but lack of market awareness and market knowledge has been a more important factor.
- (b) In both Zimbabwe and South Africa attempts made by buyers and Government bodies at stimulating production by smallholders and communal farmers have met very limited success owing to factors which include no real tradition of horticultural cash crop production beyond the kitchen-garden scale, an inadequate extension service, (and in South Africa, labour availability constraints) and fear of drought, which jointly impress an aversion to risk-taking with novel crops and a focusing on well-known, subsistence food crops. Malawi is the notable exception in that its smallholders have repeatedly displayed an ability to respond with alacrity to market needs for cash crop production but their spice output has declined (Birdseye chillies excepted) owing to the inadequacies of the internal marketing system since independence. In Zambia, smallholder/communal farmer awareness for most spices and herb crops has been non-existent until recently.

## **Trends and New Developments**

3.18. All significant production of spices and herbs in South Africa is expected to remain in the hands of commercial farmers. However, the agricultural sector is coming under increasing pressure through shortages of water for irrigation, increasing labour costs and other factors which are described in detail in Appendix 2A, paragraphs 111-123. Production of spices and herbs, therefore, could decline in future. Paprika production in South Africa (currently 10,000 tonnes annually) appears at particular risk since yields are highly dependent upon irrigation, harvesting requires manual labour, and neighbouring countries are very price competitive in production. The major paprika buyers in South Africa are active in promoting production elsewhere in the region because of these reasons.

3.19. In Zimbabwe and Zambia, paprika appears to be the only crop amongst the spices and herbs with a prospect of a large scale production expansion in the medium term and this will arise largely from commercial farmers.

3.20. Malawi only entered into paprika production in 1994. As found elsewhere in the region, the crop returns were similar to tobacco and production fitted in well with the tobacco schedule. A substantial growth in output is expected but the mode of production is likely to differ from other countries in that a substantial proportion will arise from black tenant farmers and outgrowers to estates. By contrast, export of Birdseye chillies by Malawi could fall as a result of the existing comparative advantages of its competitor, Zimbabwe and from the emergence of other suppliers in Sub-Saharan Africa. Also, the proven potential of Malawian smallholders to produce mildly pungent chillies, coriander and some other spices will not be optimised unless there are radical improvements to the internal marketing systems; this implies granting freedom to the Asian business community to trade in rural areas.

3.21. No significant stimulus to production of spices and herbs is to be expected by installation by multinationals of processing facilities in Zimbabwe, Zambia or Malawi. One such company has closed its Zimbabwe factory owing to the non-development of a sufficiently wide range of spices and the other multinationals have focussed factory operations in South Africa to serve Sub-Saharan Africa as a whole. However, the domestically-owned paprika oleoresin factories in Zimbabwe, Zambia and South Africa might well attempt to foster cultivation of a range of spices in order to

diversify away from dependence upon a single product for which the global market place is very competitive.

## **ESSENTIAL OILS**

### **Market Demand in the Region**

#### **The Scale of Demand**

3.22. South Africa's flavour and fragrance industries consume substantial quantities of oils of natural origin, plus synthetic materials. Precise quantification of demand for naturals is not possible owing to the inadequacies of trade statistics and to the fragmentation of the industry, in which many multinationals are involved in the flavour sector and both domestic and multinational companies cater for the fragrance sector. A wide range of oils are used by the flavour industry and the largest demand items are ready-to-use citrus oils (70 tonnes or more per annum) and mint oils (160 tonnes or more). The fragrance sector similarly consumes a wide range of oils but demand is dominated by the soap, detergent and toiletries industries and production of inexpensive laundry soaps for the mass (black community) market is the most important application for fragrance oils. Consequently, consumption of citronella oil, the commonest fragrance for laundry soaps is of the order of 150 tonnes per annum, which is very high by developed country standards. Lemongrass oil is next in importance as a soap/detergent fragrance with consumption estimated at 40 tonnes annually.

3.23. Flavour oil usage in Zimbabwe, Zambia and Malawi is much smaller than that of South Africa since the processed foods market is less highly developed. However, significant quantities of citrus oils are used in soft drinks and mint oils in toothpaste and similar 'personal products'. The greatest demand in these countries also falls to fragrance oils for the production of mass market laundry soaps and detergents; tentative estimates indicate that 170 tonnes of citronella oil and 20 tonnes of lemongrass oil are jointly consumed per annum by Zimbabwe, Zambia and Malawi.

3.24. The total regional demand for citronella oil, tentatively estimated at 320 tonnes per annum equates to 15 per cent of the volume entering international trade; a remarkable figure in relation to the combined population size of the region.

## **Market Trends**

3.25. A progressive growth in citrus oil usage may be expected along with world-wide trends for consumption of soft drinks. Lime oil demand probably will display the fastest rate since it is a key ingredient of the most popular Cola drinks. Amongst the other flavour oils, usage of the mints should grow modestly along with toothpaste/mouthwash consumption regionally. Flavour oil usage in processed foods is predicted to increase in South Africa. However, the fastest growth rate is expected with fragrance oils - as elsewhere in Sub-Saharan Africa - in toiletries and inexpensive perfumes.

## **Sourcing of Materials**

3.26. With the exception of citrus and eucalyptus oils, the Southern Africa region is a nett importer of essential oils.

3.27. A very substantial part of imports are ready-to-use formulations composed of a mixture of naturals (with or without synthetics) which are tailored to the user's requirements. For example, the 'citronella oil' imported by a major multi-national for laundry soaps contains about 95 per cent of the natural oil and the remainder is aroma additives.

## **Production of Essential Oils in the Region**

### **Overview of Production and Development Experiences.**

3.28. The region as a whole did not play any significant role as a world ranking source of essential oils for almost the first three-quarters of the twentieth century. Its subsequent impact has effectively been restricted to citrus oils, eucalyptus oils and, on a much smaller scale, to the oils of buchu and tagete (African marigold or 'khaki bush'). Developments in South Africa and Swaziland were unconnected with those in the northern countries and are separately reviewed below.

3.29. During the early colonial period of the former Rhodesias and Nyasaland some individuals recognized the potential of essential oils as high unit-value/low volume and non-perishable products for export (see refs.41-42 and 45-48). However, the various sporadic efforts made did not progress beyond the early stages of development, unlike

other former British Territories in East and Central Africa (see refs.33-37) and the French Indian Ocean islands.

3.30. The main stumbling block to progress has been suggested, if expressed in over-harsh terms, by Sholto-Douglas (1961; ref.50): *'Apathy, ignorance of the techniques of cultivation and processing with the crops has constrained development'*. However, the realities of the situation in the former Rhodesias in the early part of the century were not greatly different from those pertaining until recently. Tobacco, cattle and maize production were too easy and safe an option for the majority of commercial farmers, while insufficient resources were devoted by Government Departments to crops which were considered of marginal potential to the overall agricultural economy. Moreover, market penetration proved difficult through lack of direct contact with buyers and from the small volume of oil which could be offered; the latter being a classical 'chicken and egg' situation of producers refraining from production expansion without certainties of a market while buyers lacked confidence in marketing a new source oil without guarantees of minimum supply volumes and consistency of quality.

3.31. Notable examples of early initiatives include Gore-Brown and the Gamwell sisters in Northern Rhodesia (see refs. 40 and 44) in the 1930s and the Pollitt and Daines families in Southern Rhodesia in the 1940-50s period. These were enthusiasts with limited knowledge and resources who were dependent on provision of information and oil sample analysis services from the Imperial Institute and the Colonial Plant and Animal Products Department (the precursors of the Tropical Products Institute, which is now the Natural Resources Insititute) in a very distant London.

3.32. The sole (and continuing) success story from the pre-1960 period is the modest production of citrus oils (including distilled, West Indian lime) by the Mazoe Estate near Harare.

3.33. The only noteworthy venture occurring in the northern countries during the 1960s was the domestication and commercial production of ninde oil by the Malawi Department of Agriculture in collaboration with the Tropical Products Institute (see Ames et al 1970; refs. 38-39). This plant is the indigenous weed discovered by the Gamwells in Northern Rhodesia in the 1930s and which yields an oil similar in character to Indian palmarosa. Market reception was good

and the smallholder outgrowers found returns attractive. However, the venture eventually failed, largely as a result of Malawi's state marketing corporation (Admarc) insisting on monopoly rights for sales but failing to understand the marketing requirements. No significant British aid assistance on essential oils was forthcoming to the northern countries post - 1970 for a variety of reasons: UDI in Southern Rhodesia and, later, ODA's strategic prioritisation of food crop production by smallholders and communal farmers.

3.34. During the late 1970s, interest in essential oils was rekindled in Zimbabwe amongst a group of tobacco farmers and the company which had initiated herb production. This arose from the need to earn foreign exchange and a degree of uncertainty over the future of tobacco. All initially grew a range of oils, and then refocussed according to experiences, particular interests and convenience of crop production within their existing operations. Their continuing common interest lies in a careful, if informally controlled volume of export-oriented production of tagete oil, using wild growing plants on their farms or bought in from neighbours. They have captured a major share of the world market, double that of their competitors in South Africa. One group of four farmers only produce this oil since the processing season fits in with the tobacco management schedule and the major cost item in a distillery, the steam boiler was available already as a component of the tobacco curing facilities. Another farmer has built the largest distillery north of the Zambesi and originally produced eucalyptus oil along with tagete, but has subsequently reduced output of the former for reasons which include conflict of labour with other farm activities. He intends now to focus on small scale production of high-unit value oils, including tea-tree (*Melaleuca*), for the 'Green'/aromatherapy market in Europe. The herb company has similarly focussed recently on this small niche market, producing 'organic herb oils' as a convenient ancillary to the herb operation. A more detailed description of the evolution of these ventures is provided in Appendix 3A, paragraphs 44-64.

3.35 In Malawi, a multinational-owned estate produced citronella oil briefly during the early 1990s for Lever Bros' soap factory in Blantyre. The operation was terminated since Lever Bros' import parity price was unattractive, and this problem appears in part to involve tax structures in Malawi.

3.36. The major developments in South Africa and Swaziland have resulted as adjuncts or spin-offs from other ventures. Citrus oil production arose as a by-product from fruit juicing while the fortuitous selection of certain species of eucalyptus for timber production led later to the creation of a eucalyptus oil industry.

3.37. Production of eucalyptus oil has involved eight South African farmers and a Commonwealth Development Corporation (CDC) forestry operation in Swaziland. The bulk of output has derived from deliberate coppice management for leaf biomass production, rather than for timber. During the late 1980s, the two countries jointly captured 13 per cent of the world market for 'medicinal eucalyptus oil' and 90 per cent of that for 'industrial eucalyptus oil'. Post - 1992, medicinal eucalyptus oil production has undergone a severe contraction in both countries. The South African producers have responded to lower world prices to the oil and increased prices for timber on the domestic market by mothballing most of the distilleries, while the CDC has relocated its operation to new plantations in Tanzania. The development experience of this industry is examined in greater detail in Appendix 7.

3.38. A range of other oils have been produced periodically by independent farmers and some companies in South Africa with exporting as the primary objective. Marketing and other problems were encountered and only tagete and buchu oils have withstood the rigours of the international market but their production is very limited in scale and arises from a small number of independent farmer-distillers. Trials involving indigenous plants and communal farmers were conducted in the early 1990s but appear to have been unsuccessful and all subsequent initiatives have revolved around commercial farmers.

#### **Trends and New Developments**

3.39. Interest in essential oils exists within certain sectors of the agricultural communities throughout the region. However, much of this is presently based on hopes of generating foreign exchange through export of high unit-value commodities rather than from a thorough understanding of markets, production requirements and likely returns. Moreover, negligible knowledge exists in the northern countries of the opportunities presented within the regional market.

3.40. In South Africa, it is possible that any revival of the medicinal eucalyptus oil industry will be on a comparatively modest scale owing to unrealizable expectations of returns in an economy with rising labour costs. Citrus oils apart, developments with any other oils are likely to be small, niche marketing ventures in particularly favourable growing areas.

3.41 Some tobacco farmers in Zimbabwe with experience of tagete oil are now receptive to ideas of large volume oil production. Others newly entering orange cultivation have expressed interest in juicing and oil processing for lower grade fruit. Funding has been made available in the recent past by several donor bodies for a research and development programme, led by the University of Zimbabwe on production of essential oils by smallholders and communal farmers, using small capacity transportable distillation units. It is too early yet to gauge the response of the targeted producers or of the market.

3.42. In Zambia, two commercial farmers are keenly interested in essential oils production. One has undertaken cultivation trials with a range of crops for some years and now is purchasing distillation equipment for processing trials. The other has introduced perfumed roses and is currently examining options for processing equipment.

3.43. Interest exists in essential oils within the large estate sector and amongst small estate owners in Malawi but as elsewhere knowledge of markets and technology are a constraint on development.

#### **GUM NAVAL STORES (PINE ROSIN AND TURPENTINE)**

3.44. This topic is the subject of a regional case study (presented in Appendix 10) and only a brief summary is presented here of the key issues.

#### **Market Demand**

3.45 The main item in demand in the region is rosin with current consumption estimated as in excess of 6,000 tonnes per annum and South Africa as the major market. The projected demand for rosin in the year 2000 is of the order of 10,000 tonnes as a result of increased usage in South Africa and the mooted commissioning of new paper plants in Zambia and Malawi. If adequate supplies were available,

additional sales might be possible to soap manufacturers in the northern countries.

3.46. Demand for pine oil, a turpentine derivative, is currently 600 tonnes annually and may be expected to grow modestly in future. Usage of turpentine is currently weak but will transform in 1996 with the commissioning of a pine oil plant in South Africa. Additionally, there is a possibility of new usage of several hundred tonnes of turpentine by paint manufacturers in Zambia and Malawi; subject to the availability of good quality, domestically produced material at a parity price to imported 'white spirit'/'mineral turpentine'.

#### **Sourcing of Materials and Existing Production**

3.47. Production of naval stores is presently undertaken only in South Africa and in Zimbabwe. Moreover, output in Zimbabwe is entering a decline along with the supply of the pine tree resource. A regional production deficit of the order of 1,600 tonnes per annum presently exists for rosin and this requirement is met by imports, valued at US\$ 1 million. If regional output of naval stores undergoes only a marginal change by the year 2000, the import requirement for rosin will increase to some 5,600 tonnes (valued at US\$ 3.6 million).

#### **Development Potential**

3.48. South Africa has a very large pine resource which is only partly exploited for gum tapping owing to constraints applied by the major owner, the State Forestry Corporation. If freedom were given to fully utilize the resource, which is unlikely, rosin output could rise to at least 24,000 tonnes. This would be more than adequate to supply the region and to allow significant penetration of the international market with rosin. Additionally, the associated turpentine output of some 3,000 tonnes annually would permit development, mainly for export, of a range of added-value derivatives.

3.49. Production of naval stores from the Viphya Forest in Malawi has been mooted since the early 1980s. This may come to fruition in 1996 with a proposed joint-venture between Malawian institutions and the South African naval stores producer. The output of this factory would cater for Malawi's domestic market.

3.50. A very substantial pine resource exists in the Copperbelt Province of Zambia, which subject to confirmation of the economic viability of gum tapping, could in theory furnish around 12,000 tonnes of rosin and 2,000 tonnes of turpentine. Only 1,000 tonnes of rosin are required by the domestic market in the medium term and several options are open for development. One of these would involve sales of 1,000 tonnes of crude gum rosin to the Zimbabwe processing plant to permit it to service the domestic market demand. Another option would be shipment of crude oleoresin to South Africa which also has underutilized processing capacity.

3.51. The South African industry - because of its scale and advanced state of development - could process all surplus turpentine and rosin from the region into added-value derivatives.

#### **WATER-SOLUBLE GUMS**

##### **Guar**

##### **Market Demand in the Region**

3.52. Amongst the natural water-soluble gums, the greatest demand by far in the region is for guar, which plays an important role in the mining industries. Demand levels for this gum fluctuate along with the international market for mineral ores and it has certainly reduced in the region over the past decade. A very tentative estimate for current demand is 10,000 tonnes (in guar seed equivalents) with South Africa as the main market.

##### **Sourcing of Materials**

3.53. The bulk of the markets demand is met by imports of partially refined guar seed or gum from the Indian Sub-Continent.

##### **Regional Production**

3.54. Guar seed was introduced to Malawi as a smallholder crop in 1976 and production exceeded 5,000 tonnes per annum by the early 1980s. Until recently, purchase of guar seed was a monopoly of the state agricultural marketing corporation (Admarc) which also owns a first stage seed splitting factory. Difficulties in marketing the factory's poor quality product has led to its closure and the investment in a more advanced processing factory (8,000

tonnes capacity) by a private company from the Asian community. However, supplies of guar seed had fallen to around 2,000 tonnes in 1994 owing to the poor prices offered by Admarc to farmers. The private company offers double Admarc's price but the ban on its direct trading - as an Asian firm - in rural areas together with the poor market awareness of remote rural dwellers has hindered its efforts to restimulate production.

3.55. Attempts have been made in both Zimbabwe and South Africa to promote guar cultivation by smallholders and communal farmers. This failed in Zimbabwe owing to lack of farmer interest and extension inadequacies. No confirmation of success could be obtained for the venture promoted in South Africa by a major seed processor.

3.56. No initiatives have been taken with guar in Zambia where the agricultural sector appears largely unfamiliar with crop and the scale of the domestic or regional market demand.

3.57. A marketing and processing system already exists in the region, involving traders/processors in Malawi, Zimbabwe and South Africa, and this could rapidly gear-up to achieve total import substitution of guar. All that is required is the promotion of cultivation and the installation of an effective purchasing mechanism at the rural level.

### **Other Gums**

#### **Market Demand in the Region**

3.58 A range of other water-soluble gums are employed in the region as adhesives and in the processed food sector. No reliable data is presently available on the present scale of demand but a modest growth in usage may be expected along with general economic development.

#### **Production in the Region**

3.59. The region is not naturally well-endowed with plants which yield commercially-valuable water-soluble gums. However, two ventures are underway in the region.

3.60. *Acacia karroo* gum in Zimbabwe has been harvested since 1987 from wild growing trees in the Southern region. This venture developed as an informally organised activity between cooperatives, the Forestry Department and a

multinational flavour compound manufacturer with a factory in Bulawayo. This company's interest was in import-substitution of Sudanese gum arabic. Collection soon grew to 10 tonnes annually and some of the crop found other uses locally. The flavour factory was recently closed but collection of gum continues and the multinational has assisted with sales in South Africa to adhesive manufacturers as a substitute for the more expensive gum arabic. The potential of this gum is limited owing to its quality inferiority to gum arabic. However, it could remain a useful source of rural cash income if the marketing chain is maintained. (Further details are provided in Appendix 3A, paragraphs 87-91).

3.61. In Malawi, karaya gum has been the subject of interest to the Forestry Department and Admarc for a number of years. The source plants (*Steraculia* sp.) occur wild, if sparsely distributed in a number of areas. Admarc is presently attempting to stimulate collection but the Forestry Department are concerned that sound, sustainable tapping methods have not been devised as yet.

## **NATURAL COLOURANTS AND DYESTUFFS**

### **Market Demand in the Region**

#### **Dyestuffs**

3.62. The demand in the region for natural dyestuffs for textiles, etc. is small, paralleling the worldwide trend for substitution by superior and less expensive synthetic dyes. Import statistics for South Africa record only kg shipments of natural indigo from India. The significant use of 'Khaki bush' (African marigold) as a textile dye ceased early in the century and any current usage is probably restricted to artisanal, specialist materials.

#### **Food Colourants**

3.63. In the processed food sector, competition exists between synthetic and natural colourants. Annatto (bixa) extract is employed by some multinationals but the scale of demand is not clear. Marigold meal or its extract may be employed as a food additive in the South African poultry industry but this is suffering severe competition from imported chicken meat following market deregulation.

### **Production in the Region**

#### **Marigold Meal**

3.64. Production of marigold meal commenced recently in Zambia by a Government owned factory. Its export target is 2,000 tonnes of pelletised meal. Extraction trials are scheduled for mid-1995 at the Zambian paprika oleoresin factory which has surplus processing capacity.

3.65. South Africa also has been a supply source for marigold meal in the past but the present production scale is not clear. The paprika oleoresin factory is contemplating production of marigold extract in the future.

#### **Annatto**

3.66. The annatto tree was introduced to the region as a garden ornamental early in the century and has subsequently become naturalised in many areas. No records exist of any sustained attempt at cultivation for seed exports. However, small plantations exist on two estates in Malawi and a 2 tonne trial shipment was made to a South African buyer in 1994.

### **CASTOR SEED AND OIL**

#### **Market Demand in the Region**

3.67. There is a substantial scale of demand for castor oil in the region, tentatively estimated at 2,000 tonnes per annum and of which South Africa accounts for 75 per cent. Usage is in industrial applications as a lubricant, ingredient for paints, etc. A progressive growth in consumption may be expected in the region along with economic and industrial development.

#### **Sourcing of Materials**

3.68. The great bulk of the region's requirement for castor oil has to be met by imports from overseas.

#### **Production in the Region**

3.69. South Africa is listed in FAO yearbooks as a producer of castor seed but no evidence could be obtained of any current production.

3.70. Malawi appears to be the only country in the region which has a current, if small commercial production and this is milled domestically for a paint manufacturer. Castor occurs wild in Malawi and is informally cultivated on the Lakeshore. Prior to 1990, there was a significant scale of production and export to South Africa. The principal purchaser was Admarc but this organisation only secured 2 tonnes in 1994, presumably because of the low prices which it offers.

3.71. Zambia also was a substantial producer of castor seed during the 1950s. In the intervening period, the plant has naturalised in many areas. A small processing operation has been established with US AID support in the northern region and some members of the recently formed women's group, 'The Herb and Spice Association of Zambia' are planting with the aim of sales of seed to a Zimbabwean buyer. The Tobacco Association of Zambia has castor on its priority list of diversification crops and aims to stimulate planting of 1000ha in 1996 and to install a mill. None of these parties in Zambia were aware of the scale of demand for castor oil on the South African market.

#### **MARKET AWARENESS**

##### **The International Market**

3.72. Commercial farmers engaged in the production and direct marketing of essential oils in Zimbabwe freely admit their continuing lack of knowledge of the market beyond their own products. Counterparts in South Africa appear to be in a similar position.

3.73. With the exception of a small group of specialist importers/exporters and processors, knowledge of the international market for the majority of the focal commodities is poor across the spectrum of the commercial farming community to funding institutions in all countries in the region.

##### **The South African Market**

3.74. Knowledge of this market is very weak amongst commercial farmers in the northern countries and it is very narrow in the business community at large.

### **Internal Marketing Facilities**

3.75. The existence and identity of domestic buyers of the focal commodities is surprisingly weak within the comparatively sophisticated commercial farming community in Zimbabwe. At the smallholder and communal farmer level in all countries, knowledge of marketing chains and market opportunities for all but traditional crops is extremely poor.

### **COMPARATIVE ADVANTAGES WITH THE FOCAL COMMODITIES**

#### **South Africa**

3.76. The commercial farming community in South Africa is confronted with the least favourable set of conditions in the region. Much of the land area is semi-arid, the climate is harsher and rainfall is low compared to its neighbours, while exploitation of the water resource for irrigation has almost reached its limit. These natural constraints place the South African farmer at a disadvantage compared to counterparts north of the Zambesi. In addition, South African commercial agriculture is faced with problems of availability and increasing costs of labour, deregulation of markets, removal of import permits and lowering of import tariffs. The collective effect is expected to lead to a contraction of commercial agriculture.

3.77. No expansion of low cost, cash-crop production is foreseen within the smallholder and communal farmer sector.

3.78. South Africa's comparative advantage over its neighbours rests almost entirely with agri-business management and marketing skills, technical know-how in downstream processing, and the existence of capable R D institutions in the agricultural sector.

#### **Zimbabwe**

3.79. The commercial farming sector in Zimbabwe possesses management skills which are comparable to their counterparts in South Africa and infrastructure is also good. The climate is generally superior to South Africa, water is available if not abundant, and labour is competitively priced..

3.80. In the smallholder/communal farmer sector, however, interest in and management skills with non-traditional crops are not great.

#### **Zambia**

3.81. Zambia possesses advantages of high rainfall in its northern region and a substantial natural, if presently underexploited water resource. Commercial farming skills are good but this sector accounts only for a small element of agriculture. Land is available and underutilized while labour is abundant and competitively priced against South Africa.

3.82. The interest and capability of Zambian smallholders and commercial farmers in adopting novel crops and in producing material of a high marketable quality has not been thoroughly tested.

3.83. A major disadvantage for Zambia compared to Zimbabwe is the higher cost of transporting produce to South African and overseas markets.

#### **Malawi**

3.84. Like Zambia, Malawi possesses comparative advantages over South Africa and Zimbabwe with rainfall, water resources and labour but it is more distant from the major markets.

3.85. The large estate sector has good management skills but the present taxation structure imposes some disincentives.

3.86. There is an emergent small estate sector which is actively seeking new sources of cash income.

3.87. It possesses also a unique, proven capability in the smallholder sector to adopt new crops but this is offset by weaknesses in the present internal marketing arrangements.

3.88. Additionally, the estate system of tenant farmers/outgrowers provides a good mechanism for introduction of new crops since there is an in-built extension and product marketing system. This has a particular advantage for commodities which require central, skilled processing facilities (e.g. essential oils) or could be subjected to other forms of added-value processing.

## **ATTITUDES TO CROP DIVERSIFICATION IN THE NORTHERN COUNTRIES**

### **Commercial Farmers**

3.89. All members of the commercial farming community in the northern countries are interested in cash crop diversification, at least in theory. The degree of interest and effort spent in examining potential, however, ranges from a relatively small number of innovators and risk-takers to the cautious and very conservative.

### **Zambia and Zimbabwe**

3.90. In Zimbabwe and Zambia, there exists a degree of suspicion amongst a large number of commercial farmers over new crops, particularly those which require a middleman for marketing. This has been compounded by a folk-lore of 'disasters', particularly associated with the early years of paprika development.

3.91. Attitudes to new crops also centre strongly around tobacco; the 'tobacco standard' for comparative returns and the ease or difficulty of integration of a new crop with the demands of the tobacco regime. New crops are more favourably viewed when their management does not clash with tobacco and the existing labour force and installed facilities can be shared; paprika, Birdseye chillies and certain, small-volume essential oils (such as tagete) meet these requirements.

3.92. Three other considerations apply in Zimbabwe:

- (a) The 'return per megalitre of water' used in irrigation is assuming comparable importance to the 'tobacco standard' for new crops.
- (b) Perennial (tree) crops are of increasing interest.
- (c) Labour costs (and availability) for harvesting and some post-harvest operations are important. Great advantage is seen with those crops which can be mechanically harvested.

### **Malawi**

3.93. The large commercial estates are receptive to ideas on new cash crops. However, land availability is an important

- factor when considering diversification. Additionally, the ability to utilize existing infrastructure would be a bonus with any new cash crop.

3.94. Tea estates are also particularly interested in perennial crops while other large estates see perennials of value in defining borders and reducing the risk of squatting.

#### Smallholders and Communal Farmers

3.95. As noted earlier, Malawi is the sole case where this sector of agriculture has displayed clear interest and adeptness with new crops.

**Table 4: Regional Demand and Production Estimates for Certain Focal Commodities with a Potential for Import Substitution**

(Note: Import projections for the year 2000 assume marginal changes over 1995 regional production levels)

Commodity	1995 (tonnes)				Projection for 2000 (tonnes)				Overseas import requirement for region	
	Demand		Production		Demand		Production		1995	2000
	Region total	South Africa	Region total	South Africa	Regional total	South Africa	Regional total	South Africa	tonnes (US\$ mill.)	tonnes (US\$ mill.)
<b>Spices</b>										
Dried onion, garlic	5,000*	4,800	small	small	6,000*	5,800			5,000 [2.0]	6,000 [2.4]
Chillies	3,500	3,000	3,000	2,500	3,800	3,300		<3,000	500 [0.6]	800 [0.96]
Coriander	2,600*	2,000	1,600*	1,000	2,800	2,200		<1,000	1,000 [0.8]	1,200 [0.96]
Other spice seeds	1,400	1,300	small	neg	1,500	1,400			1,400 [1.9]	1,500 [2.1]
Turmeric	1,300*	1,000	120*	nil	1,400	1,100			1,200 [0.6]	1,300 [0.65]
Ginger	700*	600	150*	100	750	650			550 [0.7]	600 [0.8]
Dried herbs	400*	300	small	small	430	330			300	
<b>Essential Oils</b>										
Citronella	320	150	nil	nil	350	160			320 [1.6]	350 [1.75]
Lemongrass	60	40	nil	nil	70	45			60 [0.48]	70 [0.56]
<b>Naval Stores</b>										
Rosin	6,100	5,000	4,500	4,000	10,600	8,000	5,000	5,000	1,600 [1.0]	5,600 [3.6]
Turpentine	170	70	1,100	1,000	700-1,400	700	1,200	1,200	nil	nil
Pine Oil	600 +	600	nil	nil	700 +	700	700	700	600	100
<b>Guar seed</b>	10,000*	7,000*	2,000	small	?	?			8,000 [7.0]	
<b>Castor oil</b>	2,000*	1,500	small	small	2,200	1,600			2,000 [1.5]	2,200 [1.65]

**Key:** \* Very provisional estimate  
neg negligible  
? dependent upon performance of mining industries

**Table 5: Overseas Exports of Focal Commodities**

(Tonnes)

Commodity	Pre-1980	1988	1994
<b>Spices</b>			
Birdseye chillies	neg	300 (Malawi)	600 (Malawi and Zim)
Paprika	nil	10,000 (SA)	20,000 (SA, Zim, majors; Malawi and Zam, minors)
Paprika oleoresins	nil	neg	100 (SA and Zim) (a)
<b>Essential oils</b>			
Lime oil	NA	10	10 (Swaziland and Zim)
Other citrus oils	NA	NA	NA but large (SA, major; Zim, minor)
Eucalyptus oil	NA	350	180 (SA, Swaziland and Zim) (b)
Tagete	NA	5 (?)	10 (Zim and SA)
Buchu	NA	2 (?)	2 (?) (SA)
<b>Naval stores</b>			
Turpentine	NA	NA	900 (SA)
Rosin	(c)	(c)	(c)
<b>Natural colourants</b>			
Marigold meal	NA	NA	1,000 (?) (SA and Zam)

**Key:** NA data not available; SA..South Africa; Zim..Zimbabwe; Zam..Zambia.  
? quantity uncertain

**Notes:** (a) With construction of a new factory in Zambia, the installed capacity in the region now equates to an annual production capability of 420 tonnes or more.

(b) Many operations mothballed owing to low market price of medicinal oil and increasing demand in South Africa for timber.

(c) South Africa exports rosin derivatives and some gum rosin but also imports. Nett effect is a domestic production shortfall for rosin.

#### **4. THE SIGNIFICANCE OF SOUTH AFRICA IN THE REGIONAL CONTEXT FOR THE FOCAL COMMODITIES**

4.1. The market survey results presented in the previous section of this report revealed a very substantial demand in South Africa for many of the focal commodities. Moreover, a significant growth in consumption is expected on the South African market for food and non-food products which incorporate the focal commodities.

4.2. South African agriculture is presently unable to service the domestic market demand for the focal commodities owing to a combination of natural resource constraints and its cost structure. Current trends in agriculture, involving land redistribution, market deregulation and labour wages are expected not only to impact adversely on production of the focal commodities but also to a contraction of the agricultural sector. One major expected consequence is that food production will fall below market demand by the year 2000. (These trends in agriculture in South Africa are examined in greater detail in Appendix 2A, paragraphs 111-132).

4.3. Prior deficiencies in domestic production levels for a wide range of products (including the focal commodities) had to be met by imports from overseas owing to its political isolation. However, the recent political change in South Africa has made it possible to participate in an integrated manner in the economic development of the region. This was clearly shown when South Africa became a member of the Southern African Development Community (SADC) in 1994 and when the renegotiation of the Customs Union Agreement (SACU) between South Africa, Botswana, Lesotho, Namibia and Swaziland were announced in 1994. Everything considered, 1994 paved the way for a new economic dispensation in Southern Africa.

**Table 6: Southern African development community  
(SADC): Population and GNP (1992)**

Country/Region	Population	GNP	
		Total US\$mn	Per capita US\$
Angola	9 732	6 000	620
Botswana	1 360	3 797	2 790
Lesotho	1 860	1 090	590
Malawi	9 085	1 896	210
Mozambique	16 565	1 034	60
Namibia	1 529	2 502	1 160
Swaziland	860	930	1 080
South Africa	42 500	106 000	2 670
Tanzania	25 965	2 561	110
Zambia	8 589	2 580	290
Zimbabwe	10 352	5 896	570

Source: Esterhuysen et al, 1994 (ref. 12)

#### **Regional Co-operation: Common Market**

4.4. The historical development of the region was not always colourful and full of opportunities, because of four main reasons. Firstly, the Southern African region was the target of a destabilising policy by South Africa in the late seventies and eighties. Secondly, South Africa followed a policy of non-co-operation in the Southern African region in as far as trade and economic development and promotion. Thirdly, other regional organisations were established to lessen the extent of economic dependence on South Africa, eg. SADC. Finally, South Africa followed a policy of entering into bilateral trade agreements with, among others: Zimbabwe, Malawi and Mozambique.

4.5. This however, has changed dramatically after South Africa became a full democratic society in 1994. An indication of this dramatic change is the fact that South Africa joined SADC in 1994 and was allocated the finance and investment sector of SADC. This highlights the importance that member countries place on South Africa's financial infrastructure and South Africa's ability to co-ordinate economic growth and development through investment in the Southern African region (SAR).

4.6. In Southern Africa there are three principal regional organisations, namely the Southern African Development Community (SADC), the Preferential Trade Area for Eastern and Southern Africa (PTA) and the Southern African Customs

Union (SACU). The aim of SADC is to develop the region into a regional free trade area and to use the SACU as its core for future development. The 1995 SADC Theme Document underwrites this by stating: "In line with the principal of variable geometry the countries of the Southern African Customs Union (SACU) should move to the level of a common market with free movement of labour." South Africa is responsible for the co-ordination of the finance and investment sector of SADC which highlights the importance that other countries place on South Africa's financial institutions. South Africa is dominant in the region: economically, with respect to scale and depth; technologically, especially with respect to modern industrial capabilities in all sectors, including agriculture, finance, etc. as well as manufacturing; in infrastructure provision, operation and maintenance and in trade as a result of all the above. And above all South Africa offers a big market for most agricultural-based products for SADC countries.

4.7. In analysing the possibilities for further regional co-operation, Truter (1995; ref. 13) came to the conclusion that the most appropriate approach should be a developmental view on Southern Africa.

4.8. A developmental view of future economic co-operation and trade policies will manifest in an evolutionary process of economic interaction by: (a) exploiting present comparative advantages through selected endeavours of co-operation in areas where interaction can occur immediately (i.e. agricultural research, food trade etc.); and (b) laying the foundation for future comparative advantages in the region through planned and programmed interventions (i.e. future food production specialization, energy provision, university training, etc.). Both actions however should receive simultaneous attention of policy makers. The ultimate objective of a development view on economic co-operation in a regional policy is to *"expand the area of choices to the inhabitants of the region"*.

4.9. The development of a common market in SADC is a high priority. A Common Market is a customs union with no internal tariffs and a common external tariff and in addition allow free movement of all factors of production among all members, this includes the free movement of labour and capital. It must be noted that a common market differs substantially from other forms of regional integration,

Table 7 gives a summary of the various stages (forms) of economic co-operation.

Table 7: Various stages of economic co-operation

	Free trade among the members	Common external tariffs	Free movement of factors of production	Harmonization of all economic policies (Fiscal, monetary)
Free trade area	yes			
Customs union	yes	yes		
Common market	yes	yes	yes	
Economic union	yes	yes	yes	yes

### Opportunities

4.10. Taking into account the situation in South Africa, it is clear that a shift in production within the Southern African region can be expected in the years to come.

4.11. It is a fact that the best agricultural production potential in the region exists in the northern parts of the region, where unutilized production capabilities exist. An recent analysis by the African Development Bank (1993) confirmed this view.

4.12. The high financial and economic cost of sustaining yields in the commercial farming sector in RSA (on relative poor resources) eventually led to a steep cutback in subsidies in the late 1980's, and in turn to a decline in the area planted to field crops and to stagnant or declining yields as resources have been re-allocated to the livestock and horticultural sectors. Thus, although reserves of under- or un-utilised land exist in the RSA, it is unlikely that, they will make a significant contribution to increase production to meet the expected growth in demand.

4.13. The regional market for agricultural commodities is dominated by the purchasing power of RSA, which imports close to US\$1 billion of commodities from international markets annually. This dominance of the needs of the South African market, will continue to constitute an opportunity for intra-regional trade, notably in meat, fruit and vegetables, coffee, tea, cocoa, textile fibres and (minor industrial products) and especially for products that are labour intensive and require natural resources which are unavailable to South Africa.

4.14. South African imports of these commodities from other countries within SADC, will not only create purchasing power in these countries, but will further stimulate regional trade and increase welfare.

### **Agri-Policy and Attitude of Agri-business in South Africa**

#### **Policy approach**

4.15. The published "White Paper on Agriculture 1995", which sets out South Africa's policy on agriculture, supports the role of an integrated approach to Southern Africa. As one of six critical agricultural policy goals, the following is stated:

*"Developing agriculture's important role in the regional development of Southern Africa and other countries."*

4.16. As part of the general policy principles, to guide policy, it is further stated as the third principle, that *"The research and institutional infrastructure of South Africa is important for the development of agriculture in Africa."*

#### **Agri-business**

4.17. During the "apartheid-era" South African agri-business were prohibited to engage openly in business with most SADC countries. During this study, and based on other experiences, the following emerged:

- (a) Agri-business acknowledge the fact that South Africa will become an integral part of a larger Southern Africa co-operation framework.
- (b) Most Agri-business in South Africa also indicated an acceptance of the fact that it made economic sense to source raw materials from neighbouring countries and even to get involved in local production (including extension) and processing. Investment is being considered with the aim of better serving the South African market.
- (c) It was also stated, that because of previous isolation from neighbouring countries, knowledge of business contacts in neighbouring countries are limited, as well as business opportunities.

(d) Agri-businesses visited as part of this study indicated their willingness to switch sourcing of raw or processed materials from overseas to neighbouring countries, under the following conditions:

- A continuous and reliable source of raw material is available.
- The quality of the product is of acceptable standard.
- The products are price competitive.

**Table 8: Comparative Aspects for Countries in the Region with Regard to Production of the Focal Commodities**

Country	Natural Resources				Commercial agriculture sector				Smallholder - communal farmer interest or adeptness	R & D Capability
	Climate	Water Availability	Land	Labour	Management and infrastructure	Market knowledge	Availability of market information	Contact with SA business		
South Africa	Unsuitable for some products	Limited for agriculture	Under pressure and quality poor	High cost, labour acts and unions	Very good and suitable	Good	Good		Poor	Good and suitable
Zimbabwe	Suitable for a range of products	Available but not abundant	Available but not abundant	Competitive vs South Africa	Good and suitable	Limited	Limited	Limited	Poor	Limited
Zambia	Very suitable	Virtually unlimited but underexploited	Available and underutilized	Abundant and very competitive	Good	Very limited	Very poor	Very poor	Untested	Very limited
Malawi	Very suitable	Virtually unlimited but underexploited	Available but already much utilized	Abundant and competitive	Good	Limited	Limited	Very limited	Good	Very limited

## **5. PERCEIVED OPPORTUNITIES FOR NEW CROP/PROCESSED PRODUCT DEVELOPMENT IN THE REGION**

5.1. The three preceding sections of this report dealt sequentially with opportunities for export of the focal commodities on to the international market, for import substitution in the region, the expected radical changes underway both in trading between members of SACU and in the South African agriculture sector. Here, these various aspects are drawn together to assess the potential impact of development in the region with the focal crops and how this might occur.

### **Assumptions on Future Main Producer Countries**

5.2. The predicted restructuring of South African agriculture is central to the analysis. It assumed in the following discussion that:

- (a) Any new developments with agricultural production in South Africa will probably be small and will contribute only marginally to import substitution or international exports. (However, the South African naval stores industry, based on pine forests may expand).
- (B) There will be a reduction in South Africa's paprika production by approximately 50 per cent over a period of 5-10 years, i.e. a drop in annual output of approximately 5,000 tonnes by 2005. Also, its medicinal eucalyptus oil industry will recover to only 50 per cent of its former level, i.e. future exports settling at around 100 tonnes annually.
- (c) These shortfalls in South African agricultural production will be made good by the northern countries.
- (d) Owing to a range of constraints (small volume output, economics of scale, etc), the extent of downstream (tertiary level) processing in the northern countries will be limited. South Africa can fill this processing role and then either recirculate the refined products within the region or export them overseas.

5.3. The possible flow of materials between countries for various refining operations is illustrated with gum naval stores in the figure (page 63).

5.4. In the northern countries, the capability for production of the various agricultural commodities will differ according to climate and rainfall constraints. Also, production of some commodities will fall almost entirely to the smallholder/communal farmer sector owing to unattractive returns for the commercial agriculture sector. Certain other production operations - involving skill in crop management and processing - will be taken up only by the commercial agriculture sector.

### **Potential in the Northern Countries**

#### **Impact Scale**

5.5. The assumptions described above lead to the approximate quantification (expressed in tonnes and hectareage) of the potential scale of agricultural production in the northern countries as shown in Table 9. This table also suggests which countries are likely to have the most favourable conditions for production of certain crops on the basis of higher rainfall - northern Malawi and northern Zambia being superior to Zimbabwe - and by smallholders.

5.6. Table 9 indicates the (base line) production considered possible for supplying the Malawian, Zambian and Zimbabwe markets with pine gum rosin. It assumes the establishment of tapping and processing operations in Malawi and Zambia with the latter also selling crude gum to the underutilized plant in Zimbabwe. Attainment of this goal will depend upon gum tapping being economic in Zambia; if this proves viable, then Zambia could produce many thousands of tonnes of naval stores annually and become a significant exporter.

#### **Smallholder Potential**

5.7. The analysis indicates that there is a very substantial theoretical potential within the smallholder and communal sector in the northern countries. Its realization, however, will depend upon the receptiveness of these groups to new crops and an improvement in extension support and marketing systems. Their ability to produce material of sufficiently high quality (e.g. spices for the discerning, major market of South Africa) also will be an important factor in achieving success.

5.8. On the basis of past experience, Malawian smallholders are expected to display a generally better capability than their counterparts in other countries. Furthermore, the Malawian tenant/outgrower system linked to estates is likely to facilitate production by smallholders of more demanding crops, such as paprika.

5.9. A number of raw materials could be grown by smallholders to supply further-processing operations of entrepreneurs or even of large private farms/estates. Castor, guar, annatto, turmeric and ginger fall into this category. The opportunities for this supply linkage between a large number of independent smallholders and a processing unit is more limited for essential oils. Many essential oil crops should be distilled on the day of harvesting and the logistics and costs of smallholder delivery of raw material (low bulk-density in the case of herbaceous material) pose too great a problem. Opportunities with essential oils are probably restricted to smallholders with land immediately adjacent to a distillery or to the supply of comparatively non-perishable raw materials such as spice seeds and vetiver roots .

#### **Developmental Stages**

5.10. Development of the agricultural commodities is envisaged as passing through two stages:

##### **Phase 1:**

- Immediate development of certain crops for the overseas market (paprika, annatto, lime oil, sassafras oil, geranium oil and vetiver oil),
- plus immediate development of certain crops for import substitution on the regional market.

Phase 2: - On achievement of regional self-sufficiency in production for certain crops (between 2000 and 2005), there would be next an expansion for overseas export or the surplus of some primary commodities will be processed prior to export. (For example, spice seeds and herbs could be converted to their essential oils and turmeric and ginger could be transformed to their oleoresins.) The scales of export oriented production shown in Table 9 for phase 2 correspond to capturing 5 to 10 per cent of world trade in the particular commodities (but

the actual potential may prove greater by the year 2005).

5.11. With regard to added-value processing of agricultural products, the greatest opportunity and need resides with paprika. At present, only one company (in South Africa) is manufacturing fully refined (ground) paprika.

5.12. Constraints applying to the development opportunities outlined above are discussed in the following section of this report.

**Table 9: Principal Candidates for Expansion of Production/New Commodity Developments in the Northern Countries**

Commodity	Phase 1; tonnes (ha)		Phase 2; tonnes (ha)	Producer type			Countries (✓✓ most favourable conditions)		
	For the regional market	For overseas export	For overseas export	Independent Smallholder/communal	Tenant farmer/outgrower	Commercial farm/estate	Malawi	Zambia	Zimbabwe
Castor seed	4,400 (8,800)			✓			✓✓	✓	✓
Guar seed	8,000 (8,000)			✓			✓✓	✓	✓
Turmeric	1,300 (1,300)		1000 (1000)a	✓			✓✓	✓✓	✓
Ginger	600 (600)		1000 (1000)a	✓			✓✓	✓✓	✓
Coriander	1,200 (1,200)			✓			✓✓	✓	✓
Cumin	900 (1,800)			✓			✓✓	✓	✓
Other spice seeds	600 (1,200)			✓			✓✓	✓	✓
Dried onion/garlic	6,000 (7,500)				✓	✓	✓✓	✓✓	✓
Dried herbs	300 (300)				✓	✓	✓	✓	✓
Citronella oil	350 (2,500)		150 (1000)		✓ b	✓	✓✓	✓✓	✓
Lemongrass oil	70 (800)		60 (700)		✓ b	✓	✓✓	✓✓	✓
Sassafras oil		200 (570)	Review market		✓ b	✓	✓	✓	✓
Lime oil		100 (1,100)	Review market		✓ b	✓	✓	✓	✓
Med. eucalyptus		100 (700)	Review market		✓ b	✓	✓	✓	✓
Geranium oil		20 (400)	Review market		✓ b	✓	✓	✓	✓
Vetiver oil		25 (1,200)	Review market	✓ b	✓ b	✓	✓	✓	✓
Herb oils			c		✓ b	✓	✓	✓	✓
Spice seed oils			c	✓ b		✓	✓✓	✓	✓
Annatto seed		650 (650)	Review market	✓	✓	✓	✓	✓	✓
Paprika		20,000 (5,700)d	Review market		✓	✓	✓	✓	✓
Pine rosin	3,000e		e	Dedicated company			✓	✓	-

Key: (a) Transport cost may be a constraint but oleoresin production is an option.

(b) Material processed by commercial farmer/estate.

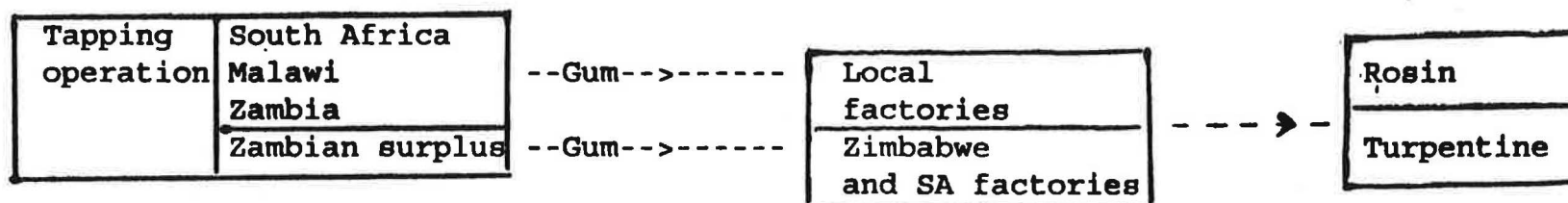
(c) Particular oils and their production volume to be assessed at surplus stage.

(d) Assumes SA production of 5,000 tonnes only and regional target of 25,000 tonnes. Hectarage is a minimum and assumes largely commercial farmer production.

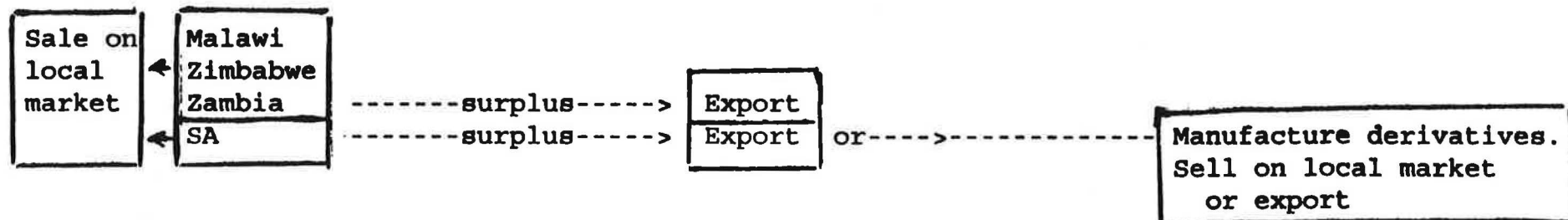
(e) Dependent on viability of Zambian production.

## Illustrative Flow of Gum Naval Stores Materials

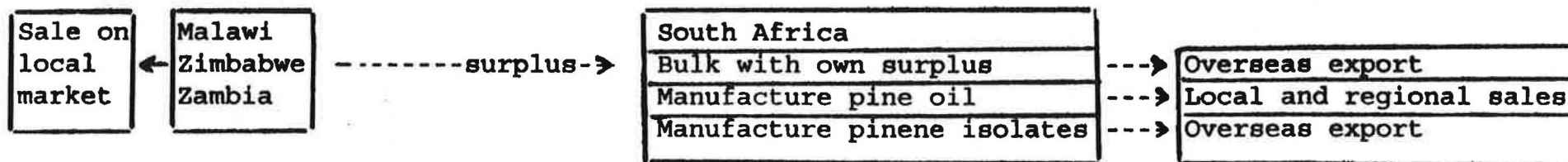
### Crude gum oleoresin



### Rosin



### Turpentine



## **6. CURRENT CONSTRAINING FACTORS ON DEVELOPMENT**

### **SOUTH AFRICA**

#### **Production Constraints**

6.1. The major constraints of climate, water shortage, labour costs and the impact of market deregulation on South African agriculture have been previously addressed in sections 3 and 4 of this report.

6.2. The naval stores industry offers perhaps the greatest opportunity for an expansion of production amongst the focal commodities in South Africa. If, moreover, the estimates on the pine resource potential are accurate then South Africa could emerge as a very significant supplier to the world market. The constraint on development of this industry rests with the reluctance of the national Forestry Corporation to make trees available for non-traditional (i.e. timber production) purposes.

6.3. In the more speciality areas of essential oils, it appears that some producers have a limited understanding of world markets and this is a constraint on appraisal of crop options.

#### **Raw Material Sourcing and Investment with Neighbours**

6.4. There is a clear interest within many sections of South African agribusiness to source materials from neighbouring countries and, also, to invest in joint-ventures. However, lack of intimate knowledge of neighbouring countries and of personal contacts is presently a major constraint. This situation arises from South Africa's political isolation until very recently

### **MALAWI, ZAMBIA AND ZIMBABWE**

#### **The Commercial Sector**

##### **Market Awareness**

6.5. The major constraint on development of the focal commodities in all three countries is undoubtedly the poor to non-existent market awareness of commercial farmers, loaning institutes and government bodies. Within the trading community market awareness is highly variable and few individuals possess more than a sketchy knowledge of world markets for the focal commodities.

6.6. This problem applies equally to the South African market as to the international market. Indeed, most commercial farmers in the northern countries interpret the term 'export market' as meaning the overseas market. Few as yet have grasped the idea of the opportunities presented by South Africa on its entrance to SADC. Export promotion agencies also appear to have a weak understanding of the opportunities offered by South Africa.

#### **Accessibility of Market Information**

6.7. Those aware that markets exist for the focal commodities encounter great difficulty in accessing information on the focal commodities. In all three of the northern countries, the data-bases held on the focal commodities by farmers' associations, export promotion bodies, etc, is presently poor. In the case of Malawi, three organisations have been created by different donors and each compete to some extent as information centres but owing to resource constraints for each, the system is not very efficient.

#### **Marketing Institutions and Systems**

6.8. Zimbabwe is unique in having a recently created commodity exchange (ZIMACE) which acts as a market place where farmers can sell their products through traders, while the public reporting system of bids and offer prices creates transparency and market information. However, only a small number of the focal commodities (notably a range of spices) are quoted on the ZIMACE floor. Small volume, speciality products, such as Zimbabwe essential oils, are not covered by ZIMACE and producers must undertake direct marketing to South African or overseas dealers.

6.9. Traders specialising in paprika are now present in all three countries. Others deal in guar seed and spices in Zimbabwe and Malawi but awareness of these firms does not appear high amongst the farming sector.

#### **Access to and Affordability of Finance**

6.10. Interest rates charged by all but one or two banks in Zimbabwe, Zambia and Malawi are very high and this is a disincentive to development.

6.11. None of the loaning institutions in the three countries appear to have listed the focal commodities as potential candidates for investment in their current

portfolios. This is almost certainly due to lack of knowledge of markets and potential, plus the 'minor crop' connotation.

## **Taxation**

6.12. Tax structures in Malawi appear to create disincentives to production and trade in certain commodities rather than to provide a necessary incentive.

## **Attitudes of Farmers to Diversification**

6.13. A wide range of attitudes to crop diversification exist within the commercial farming sector of all three countries. There appears a progressive move away from conservatism but with a remaining tendency to consider 'safe' i.e. better known crops. In Zimbabwe and Zambia, there is also an underlying distrust by commercial farmers of any crop which involves a middleman - whether local or external - and this poses a primary mental barrier for the focal commodities which rely heavily on traders and dealers.

6.14. In Zambia there is a particularly strong aversion to financial risk-taking amongst a large sector of the commercial farming community. This is the consequence of the technical bankruptcies of farmers who borrowed some years ago and were then hit by very large interest rate hikes. Many Zambian farmers will not now contemplate any development which cannot be financed from their own resources.

6.15. For tobacco farmers generally, any new crop must avoid clashing in its management and labour needs with the tobacco schedule. This poses a constraint on adoption of a number of essential oil crops which either have an extended season or are almost continuously harvested throughout the year. If tobacco farmers are to benefit from the opportunities offered by such crops, they must accept that it would involve setting up a separate, committed operation within the farm with all the implications on labour, management and equipment investment for high efficiency.

6.16. Labour availability and costs are an important factor in Zimbabwe. Consequently, preference is given by commercial farmers to crops which can be mechanically harvested and this poses a constraint on for example, geranium and eucalyptus oils. (The problem with the latter, however, could be overcome if a lesser-known species, *E. polybrachtea*, were found adaptable to Zimbabwean conditions.)

## **The Smallholder and Communal Sector**

6.17. In all three countries, the potential of the smallholder and communal farming sector is underutilized from poor market awareness.

6.18. Receptiveness to new cash crops differs by country and appears the worst in Zimbabwe.

6.19. In Malawi, general receptiveness to new crops is the highest but this is undermined by the rural marketing provisions. Until such time as all ethnic groups in Malawi are allowed to trade in the countryside, the potential of its smallholders will not be realized.

6.20. Extension services for smallholders and communal farmers in all three countries are weak and this imposes a constraint on any new crop which requires more than very basic management.

## **Research and Development Facilities**

6.21. Government R & D institutions in all three countries have very limited resources and no significant knowledge of the focal commodities.

6.22. In recent years, some academic institutions have undertaken research on certain of the focal commodities but appear to have limited market knowledge and this could adversely influence the focus of their work.

6.23. An R & D capability exists within certain organisations within the commercial sector; for example, the Tobacco Association of Zimbabwe and the Agricultural Research and Extension Trust (ARET) in Malawi. However, none of these bodies appear to have knowledge or experience of the majority of the focal crops and that which exists is virtually confined to the pre-harvest area. The only significant and truly commercially oriented R & D work in recent years has been conducted independently by a small number of commercial farmers and by the major buyers of paprika.

## **Germplasm Availability**

6.24. Germplasm is available in the region for the majority of the crops proposed for development (see Table 10) but much of this is unselected, providing an end-product of mediocre marketable quality. Selection of superior

cultivars from within the existing stock or introduction of known superior material from elsewhere may prove necessary. Certain crops will certainly need to be introduced and these include: superior quality turmeric, seed of certain eucalyptus species (particularly those suitable for forage harvesting) and *Piper hispidinervium* for sassafras oil production.

#### Utilization of the Region's Financial, Technical and Human Resource

6.25. In some of the northern countries, the efforts of Government bodies is very much focussed on attracting investors from overseas. A low awareness exists of the potential and interest of South Africa's agribusiness in investment in its neighbours.

6.26. New developments also tend to be viewed within Government institutions on a very narrow, national basis. The benefits offered by envisaging production and trade within a regional context have not been fully appreciated as yet.

6.27. Similarly, there is a propensity to look overseas for technical know-how and to ignore the existence of a considerable resource within South African R & D and commercial bodies which, moreover, are well attuned to the particulars of production and processing problems and of solutions in Africa. These attitudes all relate to the isolation of South Africa until recently and a lack of familiarity with that country.

**Table 10: Availability of Germplasm as a Constraint on Achieving Phase 1**

Commodity	Germplasm already available in region	Need to introduce germplasm (source)	Ability to achieve Phase 1 target by year 2000	Comments
<b>For overseas Export:</b>				
West Indian lime oil	Yes		In part	Long gestation time to full bearing (5 years)
Sassafras oil	No	Yes (Brazil)	Yes	Rapid multiplication from seed
Vetiver oil	Yes		Yes	Material available from erosion control programmes
Medicinal eucalyptus oil	Not for multiplication	Yes (Australia)	Yes	Seed readily available. Should include <i>E.polybrachtes</i> trials (b).
Geranium oil	Yes, but not best	Preferable (Reunion)	Yes	
Annatto	Yes		In part	Shortish gestation time but selection of elite material is preferable
<b>For Import Substitution:</b>				
Guar	Yes		Yes	
Castor	Yes		Yes	
Turmeric	Yes but poor quality	Imperative (Asia)	In part	Slow bulking for rhizomes
Ginger	Yes		Yes	
Coriander	Yes		Yes	
Cumin	?	Yes (Asia)	Yes	
other spice seeds	Limited range	Yes	Yes	
Herbs	Limited range	Some	Yes	
Lemongrass	Yes	}Preferable to obtain	Yes	
Citronella	Yes	}additional CVS	Yes	
Euc. Citriodora	Not for multiplication	Yes (Australia)	Yes	Seed readily available

Key: (a) assumes a concerted development effort from 1996

(b) *E. polybrachtes* trials recommended since this species can be forage harvested. Seed readily available from Australia.

## **7. PROSPECTS FOR CROSS-BORDER INVESTMENT AND TECHNOLOGY TRANSFER**

### **INVESTMENT AND TRADE PROSPECTS**

#### **By Multinational Companies**

7.1. A thorough canvassing of attitudes of multinational companies to investment in the northern countries was not possible owing to the brief duration of the field study. However, the views obtained and reported below are probably broadly representative of multi-national companies with interests in employing the focal commodities in their processed products.

7.2. The majority of multi-national companies have a presence in each of the northern countries. The giants in the edible vegetable oil, soap and personal-care products industries also have manufacturing operations in Malawi, Zambia and Zimbabwe but others only have marketing branches.

7.3. Following the fall of the apartheid system, most of the multinationals have relocated their major manufacturing operations to South Africa since it has the best infrastructure and communications for their aim of serving the whole of Sub-Saharan Africa from a single base. This trend is exemplified by one major flavour and fragrance company which during the period of 'Fortress South Africa' established a manufacturing operation in Zimbabwe, both to serve the markets in the northern countries and in the hope of drawing on locally produced spices as raw materials. Volume production of a sufficiently wide range of spices in Zimbabwe did not develop and this company recently closed its factory there and relocated to Johannesburg.

7.4 Interest exists amongst multinationals in sourcing raw or processed materials from the northern countries, subject to the normal qualifications of quality and price competitiveness against their current major (overseas) suppliers. Indeed, one of the giant vegetable oil and soap manufacturers has a policy of import substitution where possible and has positively attempted, as yet unsuccessfully, to stimulate production of oilseeds in Malawi for its Blantyre factory. However, the general mood appears to be that of great caution over investment in agricultural production. Moreover, any future investment in

processing factories will be dependent upon the particular country establishing a track-record as a major producer of materials of special in-house interest and when there would be a clear competitive advantage of processing at source.

#### **By South African Companies**

7.5 By contrast, South African owned companies are displaying considerable interest in sourcing agricultural products and investing in processing factories in the northern countries. Within the focal commodities group, examples already exist with paprika and citrus production in Zimbabwe and investment in a toiletry products factory and a naval stores venture (pending) in Malawi. Investment in agricultural production itself is a likely future move.

7.6. As previously noted under the discussion on constraints, the rapid development of cross-border trade and investment is presently hindered by lack of knowledge by South African agri-business of neighbouring countries.

#### **TRANSFER OF MARKETING, MANAGEMENT AND TECHNOLOGY SKILLS**

7.7. As a historical consequence of the long years of South Africa's isolation, the northern countries still tend to look overseas for acquisition of skills. The very substantial reservoir of relevant management, marketing and technology skills available in South Africa remain untapped.

7.8. The inevitable process of direct involvement in the northern countries by South African agri-business will lead to a transfer of skills, if initially on a modest and compartmentalised basis with individual ventures.

7.9. Considerable scope exists for a transfer of skills at an institutional level under collaborative agreements - as has been mooted by the Government of South Africa - and this could involve formal vocational training and R & D in agriculture and agro-industries. A range of candidate institutions exist in South Africa and for the focal commodities the Institute for Tropical and Sub-Tropical Crops in Nelspruit is of direct relevance. (This organisation also could supply germplasm of a range of the focal commodities to the northern countries).

## **8. DEVELOPMENT PATHWAYS**

### **COMMODITY DEVELOPMENT STRATEGY**

8.1 Table 9 (section 5, page 62) illustrates a dual-pronged approach in phase 1 to development of the focal commodities which would involve:

- (a) immediate initiation of production of a limited range of commodities for the overseas export market; and
- (b) immediate development of a wider range of commodities for the regional market.

8.2. Expansion of production of certain commodities within groups (a) and (b) for the export market would be undertaken in a second phase. This step would be dependant upon the absence of major production constraints, the products display price and quality competitiveness on the international market and conditions on this market are favourable for the entrance of new suppliers.

8.3. The regional market clearly offers the greater potential by far in the medium-term in terms of volume and value, plus an opportunity for major involvement for smallholders and communal farmers. Therefore, the regional market should be assigned high priority.

8.4. For a number of commodities, there are advantages in passing through an initial phase of production for the regional market prior to venturing on to the international market. These include:

- (a) allowing a learning phase for the acquisition of the technology and experience necessary to produce highly price-and quality-competitive materials;
- (b) establishing a volume production base which will create confidence amongst overseas buyers on the ability for continuous supply of products; and
- (c) provision of a 'buffer' or 'safety-net' regional market in which a large product offtake is reasonably assured before confronting the vagaries of world supply and price fluctuations on the international market.

8.5. Within this strategy, South Africa is foreseen not only as the major market but also as the location for much of the downstream-processing of commodities, either for resale on the regional market or for overseas export. Economics-of-scale constraints on secondary and tertiary-level processing will apply to the northern countries for at least the medium-term with a number of commodities.

#### **PRINCIPAL NEEDS TO ACHIEVE DEVELOPMENT**

8.6. Creation of market awareness within the region, especially of the opportunities presented by the South African market, is the priority and pre-requisite for development.

8.7. Secondly, the concept and benefits of pursuing - where possible - a concerted regional development programme must be disseminated and be widely accepted. New ventures conceived within a narrow, purely national vision will not optimise the national or regional potential and, through lack of awareness of parallel developments in the region, there is a risk of overproduction from which all would suffer.

8.8. For commodities which have a clear potential for several countries but constraints exist from lack of technical knowledge or germplasm, it would be more cost-effective to collaborate on development. This could be achieved by networked, mutually supportive R & D and germplasm bulking centres, training facilities, information (technical and market) data-bases and enquiry clearing-houses.

8.9. Any significant remaining barriers for trade in the focal commodities between the northern countries and South Africa must be identified and addressed within future SACU negotiations.

8.10. The focal commodities should be included within the list of candidates open to consideration by loaning institutions. Project proposals should be assessed on an individual merit basis rather than be automatically excluded by the 'minor crop' connotation.

8.11. Individual governments must review their legislation, remove any taxation disincentives which apply to agricultural production and trading, and abolish any

restrictions which curtail the establishment of an effective rural marketing system.

## **SPECIFIC PROPOSALS FOR THE IMMEDIATE FUTURE**

### **Development of Market Awareness and Knowledge**

#### **On the South African Market During 1996**

8.12. A seminar should be held in early 1996 at a suitable venue in the region on the South African market for the focal commodities. This should involve participation of prospective producers, traders and loaning institutions from the northern countries and interested representatives of South African agri-business. This would provide a valuable and cost-effective preliminary bridging mechanism to fill the present void in awareness, knowledge and direct personal contact.

8.13. This preliminary seminar should be followed up by:

- (a) Familiarisation visits by groups of interested producers and traders from the northern countries to interested sectors of the South African agro-industry.
- (b) Thorough surveys of the South African market for some volumes products for which information is presently inadequate (particularly guar, castor and fragrance oils). Additionally, trade barriers applied by South Africa to the wider range of the focal commodities should be identified in parallel.
- (c) A trade directory should be compiled on South African agri-business involved with the focal commodities.

#### **On the International Market During 1996**

8.14. An overview of the international market for the focal commodities should be presented as a brief component of the seminar proposed in paragraph 8.12 above.

8.15. This should be followed up by:

- (a) Overseas familiarisation visits by prospective producers and traders from the region. The most

cost-effective means would be by participation in commodity specific trade conferences. For example the seminar to be held in Israel in 1996 by the International Federation of Essential Oil and Aroma Trades (IFEAT) would allow direct personal contact with the major world buyers of essential oils. The formal presentations from world authorities at these meetings would also furnish an overview of the scale and trends in the international market.

- (b) Libraries of publised information on the markets for the focal commodities should be established in selected, appropriate organisations in each country of the region.
- (c) Since publications on the market for most of the focal commodities appear irregularly, there would be value in commissioning international experts to prepare for key commodities up-to-date profiles on world supply and demand trends, trading structures, quality requirements and a directory of major international buyers. (Ideally, these monographs would be techno-economic profiles which include information on agronomy and processing.)

**For 1997**

8.16. Follow-up commodity group specific seminars in 1997 would be valuable. These would allow presentation of information in greater depth to interested parties and a venue for dissemination of new information which had been gathered/published in 1996.

#### **Technical Know-How Acquisition and Collaboration Potential**

##### **Preliminary Status, Needs and Potential Appraisal**

8.17. The first market seminar suggested above (para 8.12) for 1996 would be valuably enhanced by inclusion of complementary sessions, attended by technical personnel from the public and commercial sectors, which would establish the present status and accessibility of technical knowledge, germplasm availability and the potential for future collaboration in the region. The output of this sub-seminar would be a statement of present knowledge, human and physical resources, development needs and proposals for future collaboration on R & D and training. Two very

important areas require examination on collaboration potential:

- (a) The contribution possible from South African institutions; and
- (b) the extent and form of possible collaboration between R & D bodies and the commercial sector in individual countries; for example, the commercial sector could provide land and other resources for trials or germplasm bulking operations undertaken by R & D bodies.

### **Implementation**

8.18. A follow-up meeting should be held within six months at which elaborated and costed proposals are presented, discussed and then refined for submission to prospective funding sources (private sector, governments and donors) with the view to implementation in early 1997.

8.19. These proposals should be very specific with respect to prioritisation of commodities, targets and time-frames, and identified institutions/locations to undertake specific tasks of trialing, training and information dissemination.

8.20. Bulking of germplasm for R & D trials and for issue to commercial growers would be of a high priority. This work may involve the need for introductions from outside the region (with possible quarantine implications) and should develop to include selection of elite cultivars.

8.21. Another early task would be the better definition of suitable agro-climatic zones for each commodity by means of correlating published data on crop requirements with local knowledge.

8.22. Presentation of the status of the available information base, arrangements for R & D, germplasm bulking and training should be made at the commodity specific seminars suggested for 1997 in paragraph 8.16.



R.2274(C) :

Minor Industrial Crops in the  
Southern Africa Region: An  
appraisal of developmental  
potential with special reference  
to interregional trade.  
(June-July 1995)

Vol. 2: The Appendices

by

C L Green, R J G Steele and  
J Willemse

A study undertaken for the World  
Bank by:

Natural Resources Institute  
Central Avenue  
Chatham Maritime  
Kent, ME4 4TB  
United Kingdom

and

Agro-economic Research  
POB 52191  
0024 Fouriesrus  
Pretoria North  
South Africa

NRI Contract No. C0757

**ITINERARY OF THE FIELD STUDIES**

**South Africa** (Green and Willemse)

- June 18 (Sun): Green arrives from UK.
- 19 (Mon): Visit to Bush Boake Allen Ltd (Isando) and evaluation of import/export statistics.
- 20 (Tue): (a) Visits to McCormick Glentham Ltd. (Midrand), Mr A Parsons at Amka Products Ltd (Pretoria), Quest International (Johannesburg).  
(b) Flight to Durban.
- 21 (Wed): (a) Meetings with Pinechem Ltd and Robertsons Ltd in Durban.  
(b) Visit to Eucatrade in Pietmarisburg.  
(c) Flight to Johannesburg.
- 22 (Thu): (a) Visit to Colour-X (Brits).  
(b) Telephone sourcing of information from Institute for Tropical and Sub-tropical Crops, commercial growers and processors.
- 23 (Fri): (a) Meeting with Agro-Trade International.  
(b) Further sourcing of information by telephone.

**Malawi** (Green and Steele)

- June 24 (Sat): Green arrives in Lilongwe from Johannesburg.
- 25 (Sun): Travel to Blantyre.
- 26 (Mon): Visits to Admarc, Lever Bros., Group Commodity Brokers.
- 27 (Tue): Visits to Chamber of Commerce, Vipcor, Transglobe Produce Exports, Nali Farms, Bharat Trading Co., Royale Chemicals.

- 28 (Wed): (a) Travel from Blantyre to Lilongwe.
- (b) Visits to Agricultural Research Extension Trust, Cheetah Ltd, Press Agriculture Ltd and Malawi Investment Promotion Agency.

**Zimbabwe** (Green and Willemse)

- 29 (Thu): (a) Green arrives in Harare.
- (b) Visits to World Bank Office, Zimtrade and Dept of Research and Specialist Services.
- 30 (Fri): (a) Meetings with Zimbabwe Phosphate Industries, German Advisory Service, Plant Oil Producers' Association, Four Seasons Foods, and Zimbabwe Tobacco Association.
- (b) Mr Willemse arrives in Harare.

- July 1 (Sat): Visit to Essen Oils Co. in Marondera
- 2 (Sun): Visit to the Lions' Den Farmers' Syndicate in Chinhoyi.
- 3 (Mon): Meetings with Industrial Development Corporation, Paprika Zimbabwe Ltd., Hy-Veld Seed Co. and Four Seasons Foods.
- 4 (Tue): Visits to Tagete oil producers (Zimbabwe Aromatics) in Concession and to Mazoe Citrus Ltd. Meeting with Nature Nurture in Harare.
- 5 (Wed): (a) Meetings with Lomag Exports, Commonwealth Development Corporation, and ZIMACE
- (b) Flight to Lusaka.

**Zambia** (Green and Willemse)

- 6 (Thu): Visits to Commonwealth Development Corporation, Flora Consultancy Services, Export Board of Zambia and retail products outlets.

- 7 (Fri): Meetings with Ubizane/Ubi-Gemcon Ltd.,  
Bimzi Ltd., Zambia National Farmers Union,  
Cheetah Ltd.
- 8 (Sat): Visit to Enviroflor oleoresin factory.
- 9 (Sun): Meeting with commercial farmers and the  
Herbs, Spices and Essential Oils  
Association.
- 10 (Mon): (a) Visits to Tobacco Association, ROP Ltd  
and Central Statistical Office.
- (b) Departure from Lusaka.

## SOUTH AFRICA: DETAILED COUNTRY REPORT

## COUNTRY POPULATION PROFILE

Population: 41.2 million

- 32 million, black ethnic group, predominantly low income (29% unemployment)
- 4.2 million, Asian/coloured ethnic group
- 5 million, European ethnic group
- 16% engaged in commercial agriculture (and expected to decline)

## SPICES AND HERBS SECTOR

Market Characteristics

## Structure of the Industry

1. The spice and herb industry in South Africa has two sectors:-

sector:	% share of total market:	
Retail market suppliers (grinders packagers)	50%	dominated by domestically owned companies
Industrial market suppliers (of dry spice mixes, oleoresin/spice oil flavour packages to food processors)	50%	dominated by multinational companies

2. The retail sector market leader is Robertsons of Durban (77% market share), followed by Buffalo of Cape Town (12% share), while the remainder of the formal market is almost entirely catered for by five other brand names. There is also a sizeable but unquantifiable informal retail market in spices and herbs.

3. The industrial sector contains some medium to small scale, South African owned companies but it is dominated by branches of the major multinational flavour houses, some of which also engage in fragrance compounding (see also paragraphs 43 - 44). Following the demise of apartheid, all of these multinationals now employ their South African branches to service the entire Sub-Saharan Africa regional market. (For example, Bush Boake Allen has closed its former factory in Bulawayo, Zimbabwe and has centralised its operations in Johannesburg where logistics are superior for region-wide activities). The US giant, McCormick entered the scene in 1992 by acquisition of a South African company, Glenthams. However, Firmenich appears to be the only multinational which has established a joint-venture with a local company (Guenther).

#### **The Market's Size and Growth Trends**

4. Precise quantification of the South African market for spices, herbs and their extracts is hindered by the dearth of detailed published statistics and by the fragmentation of the industry (within which there is also little free exchange of information).

5. Table 1 (page 83) provides a preliminary estimate of spice and herb consumption in the South African market, based on a limited number of interviews within the industry and from inspection of trade statistics. For those spices which are not produced domestically, the import figures are taken to equate closely with South African consumption since re-exports for most items appear less than 10 per cent of imports.

6. No detailed information is available on the scale of consumption by the industrial sector of the oleoresins and essential oils of spices and herbs. However, the relative usage of individual extracts should be similar in the main to that illustrated in the raw spice and herb consumption figures of Table 1; the exceptions are probably those where there is significant, additional usage by the soft drinks industry (especially of ginger oil).

7. The processed meat industry is the major consumer of compounded flavours at present.

8. Table 2 (page 84) shows the value of the various sectors of the South African market as estimated by the retail spice house, Robertsons.

9. Table 3 (page 84) presents the findings of a study carried out in 1992 by a market research company for selected clients on the growth prospects for spices, herbs and processed foodstuffs incorporating these commodities or their extracts.

10. Both analyses indicate a growth trend in consumption and Table 3 reveals a move in food demand to processed food products which incorporate spices, herbs and their extracts.

### **Special Features of the Market**

11. **Tastes** in food flavours vary within the population along ethnic lines. The European community has preferences similar to those of the United Kingdom and the Netherlands (with certain local idiosyncracies; see paragraph 14 below) while the Asian community displays the expected preference for curry and spiced preserves, etc. The majority, black community by tradition has consumed rather bland cereal-based foods but it is now progressively adopting a taste for more flavoured products, if less broad-spectrum and "spicey" in character than found with the other ethnic groups.

12. The future **major market growth area** is expected to lie with the black community, led initially by urban dwellers and via industrial (processed, convenience) foodstuffs in the form of flavoured maize-based snackfoods and meat-substitutes such as the spiced mango preserve, "achar". Institutional food programmes are likely also to play an important role in developing food tastes. However, the rate of growth in consumption in the immediate future by the black community is constrained by its low disposable income and high level of unemployment.

13. This conclusion is based on an analysis of income-elasticities for foodstuffs among the various ethnic groups (see Table 4, page 86). The income-elasticity indicates the percentage change in demand of a product that can be expected, with an increase in the real income of people (10%). The higher the coefficient, the higher the expected future growth in demand of this product. The figures clearly show that the growth in the food market in terms of size and spending will be in the lower income group of urban and rural black households, which represents 76 per cent of South Africa's population.

**Table 1: South Africa's Annual Consumption (Estimated) and Supply Sources for Spices, Herbs and Their Extracts**

(tonnes)

Item	Total consumption	Sourcing		Import sources (principal countries)	
		Domestic	Imports (value, US\$ mill.) (a)	Regional	From overseas
Pepper	1,400	Nil	1,400 (3.5) (b)	Nil	(Sing, Maly, Indon, India)
Chillies	>3,000	Major	) 500 (c)	) 140 (Malw,	(China, Sing, India)
Paprika	NA	Main	)	) Zim, Zam)	
Turmeric	1,000	Nil	1,000 (1.0)	Minor	Major (India)
Ginger	600	100	500 (0.4)	Nil	(India)
Cinnamon/cassia	400	Nil	400 (0.8)	Nil	(Sey, Sing, China)
Nutmeg/mace	200	Nil	200 (0.4)	Nil	(Sing, Indon)
Cloves	200	Nil	200 (0.3)	Nil	(Mad, Sing, Com)
Cardamom	50	Nil	50 (0.3)	Nil	(Guat, India, Sing)
Pimento/allspice	50	Nil	50 (0.2)	Nil	(Mexico, WE)
Vanilla	<1	Nil	<1	Nil	(WE, Mad)
Coriander	2,000	1,000	1,500 (1.0) (c)	Minor (Zim)	Major (EE, India, Aust, Sing)
Anise	50	Nil	50	Nil	(Sing, WE, China)
Caraway	50	Nil	50	Nil	(WE)
Cumin	700	Nil	50 (1.2)	Nil	(Iran, Sing)
Other spice seeds	500	Minor	500 (d)	Nil	(WE)
Herbs and garlic flakes	500	Minor	500	Nil	(WE)
Onion flakes	4,600	Minor	4,600 (1.6)	Nil	(WE)
Paprika oleoresin	NA	Major (?)	Minor (?)	Minor	(Spain)
Coriander oleoresin	6 (min.)	Minor	Major	Nil	(WE)
Others spice oleoresins	NA	Minor	Major	Nil	) (India, WE, NA)
Spice oils	NA	Minor	Major	Nil	)
Herb oils	NA	Minor	Major	Minor	Major

Notes: (a) Import figures are estimated averages for 1992-1994

(b) White pepper is the most popular on the retail market while industrial users employ black or white according to food product type.

(c) High annual fluctuation.

(d) Contains large proportion of fennel and celery seeds.

Key:

NA - data not available

Aust - Australia

Com - Comores

EE - Eastern Europe

Guat - Guatemala

Indon - Indonesia

Mad - Madagascar

Malw - Malaysia

Malw - Malawi

Sey - Seychelles

Sing - Singapore

WE - Western Europe

**Table 2: Estimated Value and Growth Trend for Spices, Herbs and Compounded Flavours in 1995**

Product type	(US\$ value million)	annual growth trend (volume)
curry powders	26*	1%
retail herbs, spices and their blends (other than curry powder)	42	5%
industrial sector products (dry spice mixes, oleoresins and oils)	26	growing

Source: Wallace, 1995 (ref 19)

\*estimated as 3,700 tonnes

**Table 3: Demand and Growth Prospects for Processed Foods and Beverages Incorporating Spices, Herbs and Their Extracts as Estimated in 1992**

Product type	1995 Estimate Tons	Av. % growth 1990-1995
Gravies	1,857	5
Flavour Enhancers	4,332	3
Soups	14,974	3
Pickles	3,200	static
Achar (spices mangoes)	29,727	8
Tomato sauce	26,091	4
Herbs and spices	29,585	4
Mustard	975	3
Curries	9,278	3
Savoury spreads	5,592	2
Prepared meals and convenience foods	4,580	5
Snack foods:		
- Potato chips	23,790	5
- Extruded products	19,566	7
Fruit juices	373	5
Carbonates soft drinks	2,421	7

Source: BMI Foodpack, 1992 (Confidential); ref. 9

14. With regard to the existing pattern of spice usage in South Africa, consumption for the majority of items appears to equate to 1-2 per cent of the international traded volumes. However, the levels for coriander and turmeric at around 5 per cent of world trade are unusually high and noteworthy by comparison with most Western markets. The per capita consumption of these two spices in South Africa appears equal to, if not greater than that of the United States in spite of the great differences in GNP and food sector developments. This can be explained in part by the influence of Indian cuisine (curry, achar etc.) but in the case of coriander there is also a peculiar penchant for high incorporation in certain meat products, especially boerewors sausages.

15. There is also a clear division in the market with respect to product quality. The top-end of the market appears as demanding on quality (flavour characteristics plus macro- and micro-cleanliness) as developed countries whereas the lower-end of the retail market is characterised by price overriding quality.

#### Sourcing of Materials

16. Major scale domestic production is limited to paprika (and its oleoresin), chillies and coriander (see paragraphs 21-25). The market is dependent upon imports from overseas to meet the bulk of its needs for other spices and for herbs. Moreover, substantial imports of coriander and chillies (over 1,000 tonnes in some years) are required in drought years to supplement the domestic crop.

17. The method of importing dried spices and herbs differs from company to company. All of the retail grinding and packaging companies import direct from source (or an entrepot). Some of the multinational flavour companies also import direct from source (and also buy in to a lesser extent from retail spice houses - Robertsons, Buffalo, etc.) while others are supplied via their overseas parent.

18. Sourcing from neighbouring countries (Zimbabwe, Zambia, Malawi and Swaziland) for spices and herbs has been minor in scale (see Table 1) and has mainly involved coriander, paprika and Birdseye chillies; the bulk of the last two being destined for re-export. While several South African companies have attempted to source within the region, their experiences to date have been disappointing. Most materials offered were reported as available in only limited quantities and the quality has been either poor or mediocre. Additionally exporters in neighbouring countries have been found unreliable in honouring contracts and delivery times. These factors rather than prices have constrained trade development with neighbours to date.

**Table 4: Income-elasticities by Ethnic Group in Relation to Consumption of Foodstuffs and Some Consumer Products**

Item	Population group			
	Whites	Asians	City Blacks	Rural Blacks
Grain products	0,28	0,35	0,45	0,27
Meat products*	0,32	0,89	0,90	1,34
Fish products	0,54	0,67	1,11	1,51
Fats and oils	0,14	0,33	0,69	0,40
Milk products and eggs	0,32	0,67	0,74	0,65
Vegetable products	0,26	0,54	0,65	0,67
Fruit products	0,69	1,20	1,30	1,04
Sugar products	0,22	0,45	0,53	0,29
Bottled drinks*	0,91	1,35	1,31	1,12
	0,44	0,68	0,90	0,79
- Dried potato chips*	0,78	1,25	1,46	0,46
- Pepper*	-	1,35	0,74	0,48
- Curry powder*	-	0,18	0,57	0,63
- Spices and herbs*	-	0,76	1,61	0,91
- Mustard*	-	1,08	0,28	0,12
- Achar / pickles*	-	1,20	1,37	0,79
- Soups*	0,44	1,45	0,94	0,92
- Meat extracts*	-	0,98	0,62	0,19
Personal Care products:#	0,61	0,80	0,90	0,81
Dry cleaning and laundry#	1,54	1,69	1,65	2,77

Source: Bureau of Market Research, (1990; ref 10)

\* Indicates users of spices and herbs or their extracts

# Indicates users of (fragrance) essential oils

19. Some of the multinational flavour companies in South Africa carry out distillation of **spice oils** for their in-house needs but bulk requirements are met by imports. None of these companies appear to produce **spice oleoresins** - although some do possess processing facilities - and rely upon imports from overseas, ordered either direct from source or via their overseas parent. The source of the main range of **spice oleoresins** is India which offers keenly priced, good quality material. The main role of the multinational flavour houses in South Africa, therefore, is to compound flavour packages to the specific requirements of their clients.

20. **Import tariffs** for spices and herbs prior to 1994 were not uniform. Certain spices produced within South Africa were protected by import controls and imports were possible only after receiving written permission from growers associations and the Control Board. Controls have now been abolished and for imports from overseas the tariffs are expected to be set between 15 and 30 per cent during 1995. Tariffs for SADAC countries are planned to be abolished or set at a minimum level (see paragraphs 119 and 131 below).

#### Domestic Production

##### **Bulk Items**

21. Large volume production in South Africa is limited to three items:

	Est. av. annual production (tonnes)	Principal market outlet	Produced by
paprika	10,000	export	)
dried chillies	3,000	) domestic	) commercial
coriander seed	1,000	) market	) farmers
			)

22. Annual production volumes for each of these spices is subject to high fluctuation since it is strongly influenced by drought and water availability constraints.

23. **Paprika** production in South Africa commenced in earnest around 1980 with the aim of supplying the Spanish market. Considerable difficulties were encountered in the early phase of this development in meeting buyers' quality requirements but now these have been

largely overcome and South Africa has achieved the status of a major individual supplier to Spain of unmilled, dried paprika pods. While crop yields in South Africa are lower (averaging 2.3 tonnes/ha and reaching 3 tonnes under irrigation) than in California and Zimbabwe, paprika is popular with commercial farmers and provides competitive returns with tobacco. Major domestic paprika buyers contract farmers, issue selected seeds and provide extension support. Cultivation was centred originally on the Rustenburg/Brits area, close to Johannesburg but owing to local soil salination and temperature problems its importance has declined in relation to Natal and the Cape. Crop levels have suffered considerably from drought/water shortages in recent years and in 1995 output is predicted as half the former average. (Further information on the South African paprika industry is provided in the case study on the region-wide development of this spice in Appendix 9 and factors which may influence its future are discussed below in paragraphs 111 and 123).

24. The **dried chillies** grown in South Africa are mainly the long fruited, mildly pungent types and production is entirely in the hands of commercial farmers; neither this crop nor paprika has achieved any great success with smallholders who focus instead on kitchen-garden scale cultivation of fresh chillies, mainly for the informal market. The figure of an annual production of 3,000 tonnes for dried chillies is very tentative.

25. **Coriander seed** is also a commercial farmer crop but annual production levels are highly variable since returns are generally much less attractive than wheat on irrigable land.

#### **Minor Spices and Herbs**

26. **Ginger** production was formerly adequate for the requirements of the domestic market. However, there has been a major decline in output owing to the unrealistic price expectations of commercial farmers. Production is focused now on fresh ginger for the domestic and export markets and only some 100 tonnes of dried ginger is available annually, mainly from the Hazey View area.

27. **Dried onion** is the largest item consumed by the domestic flavour industry (see Table 1) but production is relatively minor for reasons similar to those given above for ginger.

28. **Dried herbs**, spanning the common range, are produced in small quantities by smallholders. Returns from these crops have proved unattractive to commercial farmers.

## **Initiatives with other spices**

29. Research and production trials have been undertaken by government bodies, the parastatal tea company (SAPEKO) and the major spice grinder on a range of spices. These ventures have included the more humid-tropical types (pepper, etc.) in North Natal with community or smallholder groups. While cultivation has appeared feasible for many of the spices, no success has been achieved in developing production. In the cases involving smallholder/community ventures, particular problems have been encountered in stimulating a change of attitude from market garden production to commercial agriculture with its demands for good management and quality control.

## **Further Processed Products**

30. **Paprika powder** is produced for export by only one company, Agro-Trade International, which was instrumental in stimulating crop production in South Africa and has strong commercial links with the Spanish and Chilean paprika industries. Its focus is on niche marketing of high flavour quality paprika powder - comparable to the best Spanish and Hungarian products - in Northern Europe and it has developed selected cultivars for this purpose. It sources its raw material from its own farm and by contracting other farmers who are issued with seed and extension support on the understanding that they will sell back their entire crop. As a result of the chronic shortage of water for agriculture in South Africa, this company contracts farmers in Zimbabwe via a local company and is seeking others in Malawi and Zambia.

31. **Paprika oleoresin** production capacity exists in three purpose-designed factories. However, only one of these is operating on a significant scale: Colour-X at Brits, a subsidiary of the SAPECO Group which is in turn owned by the parastatal, the Industrial Development Corporation. Its existing annual production capacity is 45 tonnes of paprika oleoresin and this will be increased to 60 tonnes by the end of 1995. Until recently Colour-X has experienced problems of both quality (colour strength) and supplies of its raw material; the latter has been addressed by establishing production (approx. 30 per cent of the factory's requirement) on SAPECO estates and contracting farmers for the remainder in a system which involves issue of selected seed and extension support. Raw material has been purchased also from Zimbabwe but quality problems have encountered with many consignments. Exports of the paprika oleoresin was made initially to Spain via intermediaries but this is now done direct. The Colour-X plant also extracts the anti-cancer drug from *Vincia rosea* and is considering the production of spice oleoresins and marigold extract..

32. Domestically grown material is incorporated by the retail and industrial sectors of the industry in the production of **ground spices** and their blends (curry powder, etc). Chilli powder production is based on use of the local Rustenburg type material but its pungency is standardized by blending with Birdseye chillies from Malawi and Zimbabwe.

## **Exports**

### **Spices**

33. South Africa exports the full range of **retail packs** of whole and ground spices and herbs, plus curry powder to neighbouring countries. Robertsons are the leader in this trade.

34. More recently, export of **chilli powder** has commenced to **Mexico**, a world major producer and consumer of chilli products.

35. **Export of ground paprika powder** for the European market is presently undertaken by one company, Agro-trade International, and as noted earlier this is aimed at a niche market for premium flavour material.

36. Trade in all the retail items described above is dwarfed, however, by that of **unmilled paprika pods** which has averaged 10,000 tonnes annually. Over 95 per cent of exports are destined for Spain where the material is employed for paprika oleoresin extraction and for blending with other origins in ground paprika manufacture. More recently, a trade has developed with Japan where paprika is being incorporated as a colouring agent into poultry feeds as an alternative to marigold meal.

<i>South Africa's spice exports: estimated annual averages</i>		
	<i>(tonnes)</i>	<i>Major market</i>
<i>Unmilled, paprika pods retail packs of spices</i>	<i>10,000</i>	<i>Spain</i>
<i>Herbs, spices and their blends</i>	<i>not available</i>	<i>regional sales</i>
<i>Fresh ginger</i>	<i>not available</i>	<i>various, overseas</i>

## **Further-processed Products**

37. **Paprika oleoresin** exports have fluctuated and possibly have not exceed 50 tonnes in any one year. The principal buyer has been Spain.

38. Sales are made to many countries in the Sub-sahalian region of Africa of **spiced sauces and preserves** by South Africa's lead brand-names. Additionally, there is a developing regional trade in **compounded industrial flavours**, manufactured by multi-nationals based in South Africa. No reliable data is presently available on the export trade for these items.

## **ESSENTIAL OILS**

### **The Domestic Market**

#### **Uses and Scale of Demand**

39. South Africa is a substantial consumer of natural essential oils, which find application in the flavours, fragrances, 'personal-care' (soaps, toothpastes, cosmetics, etc) and pharmaceutical industries. However, there appears to be little consumption of 'industrial oils' for conversion by chemical means to derivatives. A very small demand exists in the new, fashionable 'aromatherapy' market but this is not considered further in this report.

40. Precise quantification of the demand for individual natural essential oils and for the group as a whole is impossible since the vast bulk of the market's requirements are imported and the published statistics fail to provide an adequate breakdown between the natural oils, synthetic fragrance and flavour materials and their compounded blends(see Table 5).

41. A very tentative estimate of consumption for some natural essential oils is given in Table 6. The figures shown are based on interpretation of published statistics and a limited number of interviews with representatives of the South African flavour and fragrance industries. (Additional comments on individual oils is provided in paragraphs 52-59 below).

42. Table 3 supports the consensus view of the industry that flavour applications are presently much greater than in fragrances; the latter sector also utilizes very substantial quantities of synthetic materials as elsewhere in the world. However, the rate of **future growth** is expected to be greatest in the fragrance sector - in contrast to general world trends - owing to the perceived potential for sales within the majority black communities both in

**Table 5: South Africa's Import and Exports Statistics for Essential Oils and Related Materials in 1993**

(Value: fob, Rand million)

Item (Code)	Imports			Exports		Notes
	tonnes	value	principal sources	value	principal destinations	
<b>Identifiable Flavour oils</b>						
'Peppermint'	35	3.7	US, WE, Braz., Thai, HK	0.01	Zim.	(a)
Other mints	12	1.7	US, WE, China			
Orange	23	0.26	WE, Braz., Zim.	0.18	WE, Zim.	}
Lemon	29	1.3	WE, US, Israel	1.2	WE, US, Malw., Zim.	} (b)
Lime	5	0.27	WE, Jam., Zim.	0.16	WE, US	
Bergamot	0.1	0.03	WE	0.01	Zim.	
<b>Identifiable Fragrance oils</b>						
Geranium	0.2	0.07	WE			
Jasmine	0.01	0.05	WE	0.004	HK, Zim.	
Lavender/lavendin	1.8	0.13	WE	0.002	Zim.	
Vetiver	0.06	0.01	WE			
<b>'Other'</b>						
(33011900)	9.7	0.37	WE, Zim.			}
(33012900)	173.7	5.9	US, WE	7.7	WE, US	}
Resinoids (3301900)	5.9	0.59	US, WE			}
Aqueous distillates and solutions (3301000)	4.1	0.03	WE, US			}
(3301909)	6.7	0.58	WE, US	0.47	WE	}
<b>Mixtures of odiferous materials</b>						
in alcohol (33021010)	14.9	0.64	WE			}
(33021090)	797.8	45.3	WE, US	3.4	Malw., Zim.	}
in alcohol (33029010)	0.1	0.05	US, WE			}
Perfumery bases (33029020)	7.6	1.7	WE	0.002	UK	}
<b>Other used in perfumery</b>						
(33029080)	654.4	51.0	WE, US	0.48	Zam., Zim., Malw., Moz.,	
(33029090)	1,264.4	66.5	WE, US	0.9	Zim., Malw.	

**Key:**

- (a) Principally true peppermint (*M. piperita*) but includes some dementholised *M. arvensis* oil.
- (b) Exports principally of natural orange and lemon oils while imports of processed (terpeneless) oils?
- (c) Mixed category of naturals, plus possible inclusion of some synthetics.
- (d) Mixtures of synthetics and naturals.

Braz. - Brazil, Thai. - Thailand, HK - Hongkong, WE - Western Europe, Jam. - Jamaica, Zam. - Zambia, Malw. - Malawi, Zim. - Zimbabwe, Moz. - Mozambique

**Table 6: Provisional Estimates of South Africa's Consumption, Domestic Production and Exports of some Essential Oils**

(tonnes)

	Domestic market consumption	Domestic production	Exports of domestically produced oils (main markets)
<b>Fragrance oils</b>			
citronella	150 (min)	nil	nil
lemongrass	40	nil	nil
geranium	1 (min)	nil	nil
lavender	2 (min)	vs	nil
vetiver	1	nil	nil
rose	NA/S	nil	nil
jasmine (concrete)	<1	nil	nil
tagete	nil	2	2 (WE)
<b>Flavour oils</b>			
orange	30 (min*)	NA/L	NA/L (WE)
lemon	30 (min*)	NA/L	NA/L (WE, US)
lime	10 (min*)	nil	nil
grapefruit, tangerine	NA	NA/S	NA/S
peppermint:			
- true, <i>M. piperita</i>	80 (min)	VS	nil
- ex. <i>M. arvensis</i>	40	nil	nil
spearmint	40 (min)	vs	nil
menthol	NA/S	nil	nil
medicinal eucalyptus	20	pre 94:180	160
		95: 70	50 (WE, Aust.)
spice oils	NA/S	vs	nil
herb oils	NA/S	vs	nil
buchu	nil	NA (<10)	NA (<10)
<b>Industrial oils</b>			
Eucalyptus dives	nil	180	180 (WE, Aust.)

Key: NA data not available  
 NA/L unknown but large  
 NA/S unknown but significant  
 VS very small  
 WE Western Europe  
 Aust. Australia

\* terpeneless citrus oils

South Africa and Sub-sahalian Africa as a whole; the multinationals fragrance companies are now using their South African branches to service the region. The present value of the South African cosmetics and toiletries industry is estimated as greater than Rand 2 billion annually.

### **Structure of the Consumer Industries**

43. The industries consuming essential oils fall into the following broad categories:

<i>soaps, detergents</i>	<i>composed of multi-nationals (Lever Bros, Colgate - Palmolive, etc) and South-African owned companies</i>
<i>other toiletries, personal care products, toothpaste, etc</i>	<i>multi nationals important but largest market share by South African owned companies</i>
<i>soft drinks</i>	<i>dominated by multinationals (Coke, Pepsi and for cordials, by Cadbury Schweppes) but also a number of domestic companies</i>
<i>industrial food flavours</i>	<i>dominated by multinationals</i>
<i>tobacco pharmaceuticals</i>	<i>}mix of domestically-owned and }multinational companies</i>

44. In the soap and detergent industry, the South Africa-based multinationals manufacture mainly for the domestic market since they have processing facilities in many neighbouring countries.

45. The Asian community has captured a large share of the domestic soap, fragrance and toiletries market. This is a consequence of the former apartheid system which restricted the Asian community to catering for the black community, which is the majority consumer group.

### **Sourcing of Essential Oils**

46. With the notable exceptions of citrus and eucalyptus oils (see paragraphs 60-61 below), South African production of essential oils is small in scale and the range is

limited. The bulk requirements of the industry are met, therefore by imports from overseas.

47. Only a few of the multinational companies undertake compounding of fragrances within South Africa; the majority - including the soap manufacturers - depend upon supply of fully compounded ingredient packages from their overseas HQ's.

48. The market leaders in the soft drinks industry, Coca Cola and Pepsi Cola, import their 'heart flavour' which is then topped-up with other locally available ingredients.

49. The tobacco industry probably sources pre-compounded flavours (a mixture of essential oils and other materials) from multinational flavour houses or their overseas affiliates.

50. Domestically owned fragrance and flavour companies import essential oils but also make extensive use of pre-compounded packages (incorporating various proportions of synthetics) from multi-nationals.

51. The pharmaceutical industry can source pharmacopoeia grade medicinal eucalyptus oil and a limited number of other oils from domestic producers. The remainder of its requirement (mainly flavour oils) is sourced directly or indirectly from overseas.

#### **Consumption of Individual Fragrance Oils**

52. **Citronella** oil is the largest item imported, although this is not apparent from the import statistics. It is mainly consumed by the soap and toiletries industry. The leading soap manufacturer amongst the multinational companies consumes 70 tonnes annually of a compound fragrance, containing 90 per cent citronella oil, which is supplied by its parent in the UK. One industry source estimated that 70 tonnes of citronella oil is used annually by the South African-owned soap and toiletry companies. These figures suggest that total South African consumption of citronella oil is at least 150 tonnes annually and may possibly approach 200 tonnes. This represents approximately 10 per cent of recorded international trade in this oil. The remarkable demand level in relation to the size of South Africa's population arises from its use as a fragrance in inexpensive laundry soaps which are employed for all purposes by the majority black community. Any further

growth in consumption of laundry soaps will impact also on citronella oil.

53. **Lemongrass** oil is employed in detergents and a range of other inexpensive fragranced industrial products. Again import statistics fail to distinguish this oil but current South African consumption is estimated at 40 tonnes annually with signs of a growth trend.

54. Amongst the other fragrance oils consumed by the soap and toiletries sector, rose and lavender are significant if on a much lower scale. Very small quantities of lavender are produced in South Africa and total current consumption is probably no greater than 2 tonnes annually if the import statistics in Table 5 are accurate. It is not presently possible to hazard an estimate of consumption of rose oil and rose water by the fragrance sector. There may be also a small usage of rose oil by the flavour sector (eg in fruit products and tobacco).

55. Import figures for geranium and vetiver oils (less than 1 tonne each) probably understate actual usage by the perfumery sector. It is likely that these two oils are present as components of imported, precompounded formulations.

#### **Consumption of Individual Flavour Oils**

56. **Citrus** oils are undoubtedly the most important in terms of volume in the flavour category. Precise figures for consumption cannot be estimated at present from available statistics. There is a very substantial production of orange and lemon oils in South Africa but a large proportion, if not the bulk, is exported in the raw form and then large volumes of processed 'terpeneless oils' are imported for incorporation into soft drinks, etc. Additionally, imports will be made of citrus oils, especially lime, in formulations for soft drinks and these are not distinguishable in published statistics.

57. **Mint** oils and **menthol** are almost certainly the next largest items consumed. The mint oils have a role in a range of flavour applications, including the substantial toothpaste and mouthwash market while menthol has a wide usage in confectionery and medicinal products (menthol-eucalyptus lozenges, etc) and in tobacco. The import statistics fail to identify menthol and the figures shown in Table 5 for 'peppermint' (35 tonnes) and 'other mint oils'

(12 tonnes) understate actual consumption; one major domestically owned company alone uses over 40 tonnes of true peppermint (*Mentha piperita*) and over 20 tonnes of spearmint (*M. spicata*). Many of the multinational companies can be expected to import pre-compounded formulations, incorporating mint oils and menthol, for their in-house needs and these appear under an undifferentiated group in the import statistics.

58. **Spice oil** consumption is of a significant volume in the flavour industry but this is not apparent from the trade statistics. Interviews indicated that the most important individual items in this group are ginger oil (for ginger ale and similar beverages) and coriander oil (for the meat industry); both items are possibly produced on a small-scale by some flavour companies for in-house use.

59. **Medicinal eucalyptus oil** (cineole type) consumption in South Africa is estimated as 20 tonnes per annum. This oil is produced and rectified to pharmacopaea standard domestically. (See also para 61 below and Appendix 7).

### **Domestic Production of Essential Oils**

#### **Current Production**

60. **Citrus oils** comprise the largest single group of essential oils produced by South Africa and they are co-products of the juice industry. The major products are cold-pressed orange and lemon oils but the range includes grapefruit and tangerine but excludes cold-pressed or distilled lime oil. No reliable figures could be obtained during the study on production volumes. A proportion of the output is further-processed (deterpenated) by Clive Tuebes Pty Limited in Johannesburg for the domestic market but the bulk is exported in the crude form. Imports are made processed, terpeneless orange and lemon oils (see Table 5) and these are likely to be substantially smaller than the crude oil exports.

61. **Eucalyptus oils** are second in importance in terms of domestic production volume and are significant in global trade (see Coppen and Hone, 1992; ref. 55). Two types of oil are produced: the 'industrial type' (piperitone/phellandrene composition from *E. dives*) and the 'medicinal type' (cineole rich composition from *E. smithii*). The major area of production is in East Transvaal, adjacent to the border with Swaziland. Eight farmer-distillers comprise the

industry and one of these operates in Swaziland but markets through South Africa (see Appendix 6A). South Africa now accounts for over 90 per cent of world supplies of *E. dives* oil with annual production and exports ranging around 180 tonnes; all exports are of crude oil and Australia and France are the principal markets. In the early 1990s, production of medicinal oil also was around 180 tonnes annually, of which domestic consumption was around 20 tonnes. The bulk was exported, over 60 per cent in the unrectified form, and the total volume corresponded to about 10 per cent of global trade in medicinal eucalyptus oil. Rectification of crude oil to pharmacopaea grade is undertaken for the domestic and international market by Clive Tuebes Pty Limited in Johannesburg. The main buyers for medicinal oil have been Spain, Australia and France. Over 1992-1994, producers experienced the effects of low pricing of medicinal oil by the world's major exporter, China along with an increased demand for the timber on the South African market. As a result, half of the distilleries have been mothballed and tree management regimes have changed from an annual coppice for leaf to a longer-term rotation, primarily for timber. The 1994 output of medicinal oil is estimated as 70 tonnes or less. (Further information on eucalyptus oil is provided within a regional case study in Appendix 7).

62. **Buchu oil** (from the leaf of *Barosma betulina*) is a product unique to South Africa which is employed in perfumery and flavours. Production is undertaken by four commercial farmers in Cape Province. The current annual output and exports could not be ascertained during the field study but is probably less than 10 tonnes.

63. **Tagete oil** production is export oriented and the estimated 2 tonnes annual output is mainly destined for the French perfumery industry. Half of the production was reported to arise from one farmer-distiller in the Orange Free State and the remainder from four others, some of whom are buchu producers while another is based near East London. The Orange Free State producer reported that tagete had proved quite profitable in his arid area and that he contracts neighbouring commercial farmers for supplementation of his raw material requirement.

64. **Other oils** are produced in small volumes by the tagete and buchu distillers but no reliable information could be secured on output and markets, other than that the range

included Lanyana (Artemisia), clary sage, camomile, iris, lavender and mint.

#### **Oils Produced in Former Years**

65. A wider range of oils were produced on a small-scale in earlier years by units of the Industrial Development Corporation and by the Roulan company in Rustenburg. Roulan's operation was run as an adjunct to its main medicinal plant activity and its output included the oils of citronella, lemongrass, eucalyptus, tagete, rose coriander and the solvent extracts (concretes) of cassie and jasmin. Production at this company was reported to have ceased.

#### **Exports**

66. The only significant export oils are those of citrus, eucalyptus, buchu and tagete. Estimated export volumes against production are listed in Table 6.

67. However, there is an additional hidden trade, conducted by multi-national companies, both in ready-to-use fragrance compounds and in consumer products which incorporate natural essential oils. Exports of compounded fragrances to countries within the Sub-sahalian region is expected to grow steadily, largely at the expense of Western European based fragrance companies in the short-term but also as a consequence of increased regional demand in the longer term.

#### **NAVAL STORES (PINE ROSIN AND TURPENTINE)**

##### **Market Demand**

##### **Rosin and Rosin Derivatives**

68. Rosin consumption by South Africa is currently estimated as 5,000 tonnes per annum (valued at approximately US\$3.5 million), of which gum rosin comprises 3,000 tonnes and tall oil rosin (TOR) accounts for the remainder. The major applications for the rosin lie in paper sizing and in the manufacture of adhesives (see Table 7, page 102).

69. The demand for rosin derivatives is in excess of 6,000 tonnes per annum.

70. Demand for rosin and its derivatives is expected to grow at about 10 per cent annually in the short-term.

## **Turpentine**

71. The turpentine market is currently weak at less than 100 tonnes per annum but a planned pine oil processing facility will consume over 800 tonnes annually from 1996.

72. In solvent applications, turpentine competes unsuccessfully with mineral turpentine/white spirit, both on a quality and price basis. The size of the market held by white spirit could not be determined.

## **Pine Oil**

73. The size of the domestic market for the turpentine derivative, pine oil is estimated as 650 tonnes annually. This product is employed in disinfectants and industrial cleansing materials. Usage is expected to grow steadily.

## **Sourcing of Materials**

74. The demand for rosin is now largely met by domestic production. Imports have recently amounted to 1,000-2,000 tonnes annually, of which Zimbabwe regularly supplied several hundred tonnes of gum rosin up to 1994. The remaining imports were sourced worldwide and were comprised almost exclusively of gum rosin.

75. Domestic rosin derivative production is presently adequate to demand for rosin size and dip rosin. Other derivatives are imported to supplement for shortfalls in current domestic production.

76. Domestic gum turpentine supplies the current small requirement while the pine oil market is presently totally dependent upon imports.

## **Production of Naval Stores**

### **TOR and Sulphate Turpentine**

77. Both products are recovered from factories which manufacture paper by the chemical ('sulphate') pulping process. Refining of crude TOR is undertaken by Industrial Oleochemical Products Pty Limited in Durban. Current output of TOR is 2,000 tonnes while that for sulphate turpentine is 600 tonnes; all of the former is consumed domestically while the latter is exported.

## Gum Naval Stores

78. Production of gum naval stores is undertaken by one company, Pinechem Limited which is based in Durban and has links with the TOR processor. The operation commenced in 1985 and by 1991 the annual output had reached 1,500 tonnes of gum rosin and 300 tonnes of gum turpentine from 2,000 tonnes of crude gum resin. Current production is 25 per cent higher but well below the installed processing capacity.

79. The gum resin is tapped by the company from pine forests in the neighbourhood of Lake St Lucia in northern Natal, mainly drawing on *Pinus elliottii* but using also *P. caribaea* var. *caribaea*. The owners of the forest resource are paid a royalty, calculated on the value of the processed material.

80. The scale of the tapping operation has been smaller than planned owing to the traditional aversion of foresters to non-timber activities, particularly from within the major owner of the resource - the national Forestry Department (SAFCO). Tapping is permitted of trees intended for pulping but not of those destined for saw-timber.

81. Pinechem are confident of expanding production in the coming years by changing attitudes of foresters and from the introduction of new, more productive tapping methods. A move to planting of high yielding *P. elliottii* x *P. caribaea* hybrids also would improve the situation. In theory, the resource could provide 30,000-60,000 tonnes of crude gum resin annually.

82. Within a few years, it is expected that the increased domestic production of gum naval stores will close the door to overseas imports and also South Africa will make a significant mark as an exporter. Successful exports have already been made of South African gum rosin, which has received a premium price for quality from buyers. The gum turpentine, is exported also (as a source of alpha- and beta pinene isolates for the chemical industries).

83. Pinechem have entered also into the production of rosin derivatives for the domestic market and has plans to expand this operation. Processing of turpentine to pine oil is expected to commence in 1996.

**Table 7: South Africa's Estimated Consumption, Production Imports and Exports of Naval Stores**  
(tonnes)

Item	Domestic consumption	Domestic production	Exports	Imports (principal suppliers)
Rosin (total)	5,000	4,000	300	1,000
- gum	3,000	2,000	300	1,000 (China, Indon, Zim)
- TOR	2,000	2,000	0	neg. (US, WE, NZ)
Rosin derivatives (total):	6,290	6,650	860	1,000
- esters	500	200	0	300
- resinates	1,500	1,200	0	300
- dip rosin	390	750	360	0
- rosin size	3,500	4,500	500	0
- other	400	0	0	400
Turpentine (total):	60	975	915	neg.
- gum	60	375	315	neg. (Zim., China)
- sulphate	0	600	600	neg. (WE, US, NZ)
Pine oil	600	0	0	600

Source: Pinechem Limited

Key:

neg. negligible

Indon. Indonesia

NZ New Zealand

WE Western Europe

Zim. Zimbabwe

84. The company wishes to promote regional production and trading for naval stores and it is presently in negotiation with Vipcor in Malawi on investment as a technical/marketing partner in developing gum naval stores in the Viphya forest. (See appendices 4A and 10 for further details). Also, it believes that there is future scope to further process gum naval stores from neighbouring countries in South Africa prior to export.

### **Exports**

85. As noted above, South Africa has exported small volumes of its gum rosin and rosin derivatives, plus most of its turpentine production. The planned expansion of production and further processing will lead to a growth in exports.

86. Export statistics show a small trade in turpentine and pine oil to neighbouring countries in the region; the latter commodity is presently a re-export item.

### **WATER-SOLUBLE NATURAL GUMS**

87. South Africa consumes a wide range of plant-derived, water-soluble gums in its food and non-food industries. However, quantification of the scale of demand proved impossible during the field study owing to time constraints for meetings with consumer industries and from the failure of import statistics to provide a detailed breakdown by commodity. The following notes summarise the information acquired on the market, mainly by indirect means.

### **Guar Gum**

#### **Market Demand**

88. There is a very substantial demand for guar gum by the South African mining industry and, probably, a lesser but significant usage by the food industries. Total demand has fluctuated according to the level of activity of the mineral mining industry and it underwent a depression during the late 1970s and early 1980s when sales of uranium ore declined. Current consumption of guar gum is probably of the order of many thousands of tonnes annually.

#### **Sourcing**

89. Processed and unprocessed (split seeds) material is sourced via domestic production and imports. While the

scale of trade is not identifiable from import statistics, the Indian sub-continent historically has been the main external supplier to South Africa.

90. Smaller, fluctuating volumes have been purchased from Malawi (approximately 1,000-2,000 tonnes in seed equivalents in 1994) and from Zimbabwe. It is understood that certain trading/processing companies in Malawi, Zimbabwe and South Africa are collaborating with the view to supplying the region's entire requirement (see also Appendix 4A, para 63).

#### **Domestic Production and Processing**

91. Domestic processing of imported guar seed was initiated in 1967 by the Stein Hall company, a subsidiary of the multinational Celanese Corporation. This was followed up by a R and D programme, financed by Stein Hall which was aimed at stimulating domestic production. In 1985, Stein Hall was acquired by Chemserve Limited which continued to actively promote the crop, particularly with smallholders in the Lowveld and as a component of mixed cropping systems. Neither the current scale of production - nor the extent of any involvement by commercial farmers could be established during the field study.

92. Trohall Pty Limited in the Midrand was reported as one of the companies currently engaged in gum processing.

#### **Gum Arabic**

##### **Market Demand and Sourcing**

93. South Africa has no indigenous *Acacia* species which are capable of providing a marketable quality 'gum arabic'. Demand is met, therefore, in its entirety by imports.

94. Import statistics for the period 1991-93 indicate an annual **demand** for true gum arabic of the order of several hundred tonnes per annum and valued at Rand 2 to 4 millions. The main **supply sources** are listed as Western Europe and the USA with only a small volume received direct from the major world source, Sudan. This suggests that imports are mainly of further-processed, high quality, food grade material.

95. Small quantities of low quality 'gum arabic', ex Zimbabwean *Acacia karroo* have been imported into South Africa in the past few years by the multinational, Bush Boake Allen. This trade is an historical overhang from

former activities in its now closed Bulawayo factory (see Appendix 3A, para 87). The material has found an outlet with South African lithographic companies and envelope adhesive manufacturers.

### **Other Gums**

96. Import statistics list agar gum (ex seaweed) and its derivatives, plus locust bean gum and its derivatives. The annual import value of locust bean products for 1991-93 ranged from Rand 3 to 9 millions.

97. No information was obtained on the existence of domestic production of agar or locust bean gums.

### **NATURAL COLOURANTS/DYESTUFFS**

98. The subject area of natural colourants/dyestuffs could be examined only at a superficial level during the field study owing to time constraints. Moreover, interviews were restricted to food industry application and import statistics only separately identify 'annatto colouring matter' and natural indigo; all other natural colourants (potentially ranging from food additives through cosmetic ingredients to textile/industrial dyestuffs) are combined in the import statistics under an undifferentiated group. The following notes summarise information gained in the field study, other than for paprika oleoresin which was discussed earlier (para 31).

### **Annatto**

#### **Market Demand**

99. Usage of annatto and its extracts within the South African food industry appears small and there is undoubtedly a degree of competition on a price basis from synthetic beta-carotene. Unilever is possibly the major individual consumer and it employs the water-soluble, non-bixin extract. Import statistics for 1989-93 reveal fluctuating annual figures for 'annatto colouring matter' with a volume in 1993 of just under 4 tonnes (valued at Rand 142 thousand).

#### **Sourcing**

100. The main import source of 'annatto colouring matter' is Ireland and, presumably, this is from Unilever's food

colouring subsidiary based in that country. Small quantities of seed have been imported irregularly from neighbouring countries in the region.

101. Domestic production was reported but its significance in relation to total demand could not be gauged.

#### **Domestic Production and Processing**

102. Industry sources reported that cultivation of annatto seed is undertaken in the north Transvaal and that up to three companies have been involved in processing operations. The Roulan company in Rastenburg and Colour-X in Brits both engaged in processing in the past but ceased operations owing to low profitability.

103. One domestic company advertises its interest in purchasing annatto seed in South African farming journals. This suggests that current crop production is not great.

#### **Marigold Meal**

##### **Market Demand**

104. South Africa has a substantial poultry industry which possibly incorporates marigold meal or its extract into feed. However, no information was gained during the study on demand and, moreover, it is likely that marigold consumption will fall in future owing to the competition being experienced by the poultry industry from imports of low priced broilers.

##### **Domestic Production and Exports**

105. Exports have been made in the past both of marigold meal and of the solvent extract but recent figures on production are not available. The Roulan company was reported to have formerly manufactured marigold extract and the Colour-X company is considering future production amongst other diversification options.

#### **Indigo**

106. Imports of natural indigo between 1989-93 fluctuated widely and the maximum annual quantity is recorded as 200 kg.

### **Cochineal-Carmine**

107. A small consumption of cochineal-carmine may be expected by the South African food and cosmetic industries but import statistics fail to separately identify this material.

108. The *Opuntia* cactus was introduced to South Africa for cochineal production in the late nineteenth century but an industry failed to develop. Instead, the cactus has proliferated as a major weed in number of arid areas. In recent years, Zimmerman et al (ref 74) have examined the potential for cactus control by reintroduction of the cochineal insect and has proposed that this be taken one step further to produce the insect pigment.

### **CASTOR SEED AND OIL**

109. Import statistics reveal an annual average import of 1,500 tonnes of castor oil (valued at some US\$ 1 million) over the period 1991-93 and a provisional figure of 1,800 tonnes for 1994. Exports over the same period averaged 20 tonnes.

110. Although the FAO publication *Commodity Review and Outlook* (1994) records a South African domestic production of 5,000 tonnes of castor beans from 8,000 ha in recent years, none of the industry sources contacted in the study were aware of any production.

### **OVERVIEW OF AGRICULTURE AND ITS TRENDS IN SOUTH AFRICA**

#### **Resources**

111. South Africa is a semi-arid country with scarce water resources. The average annual rainfall in South Africa is 483 mm/year, which is equal to 60 per cent of the world average. Rainfall is erratic, while vapouration is quite high, due to high summer temperatures. A very large part of the country is unsuitable for rainfed agriculture.

112. The total land area is equal to 122 million hectares, of which only 6 million hectares are classified as high potential arable land. Approximately 87 million hectares are pastures. Due to urbanization and resettlement of communities on land, the available high potential land for agriculture is under continuous pressure.

113. Approximately 1 million hectares of land is irrigated. Analysis by the Department of Water Affairs indicate that by the year 2010 a critical shortage of water in South Africa can be expected. Most conventional sources of water supply are already fully utilized. Pressure is building up rapidly to limit the use of water resources for agricultural irrigation purposes.

### **Structural Changes and Competitive Advantages**

114. The South African agricultural sector is currently in a process of structural change, which will not only influence the current production structure of agriculture, but also will reduce the competitive advantage of a number of agricultural industries. The major changes currently under way are summarized below.

#### **Land-reform**

115. The Government of National Unity has declared that one of its policy aims is to redistribute 30 per cent of land ownership in the next five years. It is widely accepted that most of this land will be used for community settlement and for small scale/part time farming. Various Government-programmes are in the process of enhancing the redistribution of land via the market mechanism.

116. It is acknowledged by the Department of Agriculture (Blignaut 1995; ref 8) that the redistribution of land will most probably result in a decline in commercial agricultural production.

#### **Market Deregulation**

117. The Marketing Act in South Africa is being amended, to lessen Government interference in agricultural marketing. It is expected that the new Act will be promulgated by Parliament in the second half of 1995.

118. The consequence of market deregulation in agriculture is that market forces will determine the price of products in the domestic market, while marketing boards can only intervene on a very limited basis (in some industries with a floor price). Government subsidies and cross-subsidization within an industry has been eliminated already to a large degree over the last two to three years.

119. In parallel South Africa has become a signatory to the Uruguay agreement of the W.T.O. and is in the process of implementing the agreement in agriculture. The result is that import permits (which were previously controlled by the Agricultural Marketing Boards), are in the process of replacement by import tariffs. It was made clear by Government that uncompetitive domestic industries will not be protected by high import tariffs. This policy is in the process of implementation and during 1994 the quantities of imports of a number of products increased in multiples.

120. The nett effect is that the South African agricultural industry is in the process of structural adjustment, and this will involve a scaling down of the production of traditional products. As most of the crops and horticultural products can be produced with a higher yield in most other SADC-members, it is widely expected that this will create market opportunities for neighbouring countries.

#### **Labour Cost**

121. The agricultural sector has been included in the new draft Labour Relations Bill which should be promulgated by Parliament before the end of 1995. Agriculture has also been defined as a "non-essential" service for the purpose of industrial action, disclosure of information, organisational rights and socio-economic strikes.

122. It is accepted by organised agriculture that the inclusion of agriculture (for the first time) into the Labour Relations Bill, will inevitably lead to much higher labour costs in agriculture. It is also expected that a minimum wage level for agriculture will come into effect in the near future.

123. The fact of the matter is that labour costs are much lower in the neighbouring countries (Zimbabwe, Malawi, Zambia) with less government prescriptions and interference. This will further increase the competitive advantage of agriculture in the neighbouring countries, especially for labour intensive agricultural industries.

#### **Population and Food Demand**

124. South Africa is the region's most populated country. Population statistics and socio-economic indicators of the four countries in this study, are shown in the following Table 8.

Table 8: Population and some socio-economic indicators

Country	Population Total (000)	Population Growth rate	Labour in Agriculture (%)	G.N.P. per capita <sup>(1)</sup>	Expenditure on food as % of G.D.P.	Food Market <sup>(2)</sup>
Malawi	9085	2,79	83	210	22,9	436,9
South Africa	41244	2,36	16	2670	12,4	13164,7
Zambia	8589	2,75	73	290	25,8	642,6
Zimbabwe	10352	2,87	73	570	25,6	1510,6

(1) US \$ in 1992

(2) Indication of Relative size of food market US \$ million.

Source: ABSA Bank (ref. 6) and own calculations

125. It is clear that while South Africa does not have the resource base, its population and food market is the largest. Market analysis (Agrifutura, 1994; ref 7) indicates that the projected growth in food demand will outstrip the production as early as the year 2000.

126. Furthermore, it is accepted that the supply of agricultural products from South Africa's neighbours (as part of SADC), will play an increasing important role to fulfil the demand of food in South Africa (Truter, 1995, ref 13).

127. Analysis of current production and consumption trends indicates that South Africa's demand for most food items will outstrip its production, as is shown by the following Table 9.

**Table 9: Demand and supply projections for the year 2000**

Products	Demand		Supply	
	Tons (000)	% <sup>(1)</sup>	Tons (000)	% <sup>(1)</sup>
Maize	7 050	6	5 279	-45
Grain	13 341	14	9 377	-23
Potatoes	994	20	1 649	26
Sunflower seed	759	66	486	4
Vegetables	2 213	22	3 678	15
Red Meat	1 057	5	977	1
Poultry	992	35	1 113	52
Eggs	280	37	326	27

Source: Agrifutura, 1994 (ref. 7)

<sup>(1)</sup> Percentage change on average of base years (1989, 1990, 1991), based on a 15 year trend.

128. It is evident, based only on the trend of the past 15 years, that South Africa will not be in a position to produce enough food for its own consumption. This does not take into account structural changes taking place in both demand and supply in the last few years. An example is the poultry industry, which is highly dependant on the supply of competitively priced maize and labour - and is currently in dire straits because of availability and costs of these two major inputs. The poultry industry is in the process of scaling down, and it is possible that its products can be produced more competitively in neighbouring countries. There are numerous similar examples.

#### **IMPLICATIONS OF AGRICULTURAL TRENDS IN SOUTH AFRICA FOR THE FOCAL COMMODITIES**

129. The trends in South African agriculture discussed above indicate that not only will there be a major decline in production of many major traditional crops but also the prospects for increasing production of most of the focal commodities are slim in the commercial farming sector. Moreover, experiences to date do not auger well for a substantial growth in production of the focal commodities from the smallholder sector.

130. The implication of the agricultural trends in South Africa are that the processors and end-users of most of the

focal commodities will become even more dependent upon imports to meet their requirements.

131. At the strategic level, Government and many sectors of industry in South Africa see the creation of the South African Economic Union as a developmental imperative. Since South Africa's role within this union will be largely as the provider of manufactured goods and services, a trade balance can be achieved only by increased sourcing from its partners of raw and processed agricultural commodities, including many of the focal commodities.

132. A number of South African companies, notably in the food sector, are already actively engaged in attempts to switch sourcing of raw materials to neighbouring countries within the region and some are considering investing in the relocation of their processing plants. For the focal commodities, some similar initiatives are in hand by South African companies but overall the movement has been at a relatively low key to date.

#### **ATTITUDES WITHIN THE SOUTH AFRICAN INDUSTRY TO SOURCING MATERIALS FROM AND INVESTING IN NEIGHBOURING COUNTRIES FOR THE FOCAL COMMODITIES**

##### **Extant Examples**

133. A number of examples of current initiatives by South African companies came to light during the study and these are summarised below.

##### **Paprika Sourcing**

134. Purchases have been made of paprika from Zimbabwe since the development of production in that country but this has been mainly by South African traders for re-export. More recently, however, the major South African processor - Agro-Trade International - has been actively seeking interested farmers in neighbouring countries for contract production of high quality cultivars. This initiative has been hampered by lack of knowledge of agriculture and individual commercial farmers/companies in Malawi and Zambia.

##### **Guar**

135. While no direct contacts were established with the industry in South Africa, information gained in Malawi indicated that a group of traders/processors from South

Africa, Zimbabwe and Malawi were actively collaborating to stimulate self-sufficiency in production within the region.

### **Naval Stores**

136. Pinechem of Durban is currently negotiating investment in a new development in Malawi and expects to import gum naval stores for processing in future years from neighbouring producers.

### **Soap and Toiletries Industries**

137. The multi-national, Lever Bros., was reported to be in the process of acquisition of Government-owned soap factories in Zambia.

138. A South African domestic company, Amka Products, was reported to have recently acquired a Malawian soap and toiletries company in Blantyre.

### **Other Prospects for Regional Sourcing**

#### **Spices and their oleoresins**

139. Companies interviewed in the retail spice and industrial flavour sector in South Africa expressed interest in principle in sourcing materials from neighbouring countries. However, it was stressed by all that suppliers would only achieve success by:

- (a) production and supply of guaranteed minimum volumes of high quality material; the latter implying the introduction of superior planting stock for many spices;
- (b) rapid response to the placement of orders; and
- (c) competitive pricing against established and reliable overseas suppliers.

#### **Essential Oils**

140. Consumers of essential oils in the flavour and fragrance industries also are interested in principle in regional sourcing, subject to the provisos listed above for the spices. The greatest volume demand would lie in the soap and toiletries sector and provision of consistent quality material would be particularly important for the

multi-national companies in this sector since they are aiming at a region-wide standardization in the quality of their products.

### **Castor Oil**

141. Good prospects may be expected also for regional suppliers of castor oil in view of the volume of consumption in South Africa. However, this market needs a more in-depth study.

### **Investment Prospects**

142. Apart from those giants which are already involved in the vegetable oil, soap and personal-care products industries on a regional basis, the impression gained from the majority of other multinationals consuming the focal commodities and based in South Africa was of poor prospects for their investment in processing in neighbouring countries and none for investment in agriculture. As noted earlier, most multinationals are now concentrating manufacturing and distribution operations for the Sub-Sahara region within South Africa and their branches within other countries have effectively been contracted to sales offices. Any future investment in manufacturing in particular countries within the region would be dependent on a proven track-record as a major producer of materials of particular in-house interest and where there was a clear competitive advantage of processing at source.

143. The most promising prospects for investment in both agricultural production and processing in neighbouring countries lie with large-to-medium scale domestically-owned South African companies. The major perceived constraint on this occurring in the immediate future is the lack of intimate knowledge and direct personal contacts by these companies with their prospective counterparts in neighbouring countries; this is an overhang from the apartheid era when trade and contact in the region was discouraged.

### **TECHNOLOGY TRANSFER AND COLLABORATION**

144. A strong capability exists within South Africa not only on management and marketing but also on agricultural production and processing. Transfer of these skills to neighbouring countries is recognized by the South African Government as of critical importance for the economic

development of the region as a whole and this has been spelled out in the published "White Paper on Agriculture 1995".

145. A considerable degree of management/marketing expertise and technology transfer may be expected from the South African private sector through co-ventures in the future. However, the process can be valuably supplemented by drawing on the resources of South Africa's research and development institutions. While a thorough survey of experience and capability for the focal commodities within these institutions was not possible during the study, the Institute for Tropical and Sub-tropical Crops at Nelspruit is a prime candidate for technology transfer with a range of crops.

**ORGANISATIONS VISITED AND PEOPLE MET IN SOUTH AFRICA****Multi-national Companies**

Bush Boake Allen  
(SA) (Pty) Ltd  
34 Diesel Road, Isando  
(POB 40, Isando-1600)  
Transvaal

Flavours and fragrances  
company

Tel (011)-974-1411  
Fax (011)-974-1311

Mr Derek Hatch, Export Director  
(Mr M Webber, Managing Director)

Quest International  
9-11 Brunel Road  
Tulisa Park  
Johannesburg 2001  
(POB 83027,  
South Hills 2136)

Flavours and fragrances  
company

Tel (011)-613-6211  
Fax (011)-613-2134

Mr Mohamed R Majid,  
Logistics Director

McCormick Glentham  
(Pty) Ltd  
Cnr, 16th Road and  
Bavaria Ave.  
Midrand, (Private Bag X64,  
Halfway House 1685)

Supplier of seasonings  
to the food industry,  
plus dehydrated soup  
packets, etc for  
wholesale sector

Tel: (011)-315-6530  
Fax: (011)-315-6538

Mr Jonty Eales, Managing  
Director

**South Africa Domestic Companies**

Robertson's (Pty) Ltd  
Prospection Factory  
POB 26095  
Isipongo Beach 4115  
(Durban)

Spice grinders and  
wholesalers

Tel (031)-902-1412  
Fax (031)-902-6164

Mr Will Wallace, Purchasing  
Manager, Raw Materials  
(Mr D Grove, Technical Manager)

Agro-Trade International  
108 Wierda Rd East  
Wierda Valley  
Sandton  
(POB 785462, Sandton 2146)

Manufacturer and  
exporter of ground  
paprika and chillies

Tel (011)-884-4763  
Fax (011)-883-7319

Mr Gunther Augenstein, Owner

Colour-X  
35 Piet Rautenbach St  
Brits  
(POB 1739, Brits 0250)

Paprika oleoresin  
manufacturer

Tel (012)-11-503-116/7  
Fax (012)-11-503-112

Mr Alex Bronkhorst, Production  
Manager  
(Mr Andre du Preez, Marketing  
Manager)

Mr W Aubrey Parsons  
POB 91182  
Auckland Park 2006

Consultant to the  
fragrance and flavour  
industries

Tel (011)-726-2376  
Fax (011)-726-3471

Pinechem (Pty) Ltd  
39 Inanda Road  
Hillcrest 3610  
(POB 1095, Hillcrest 3650)

Pine gum naval stores  
producer

Tel (031)-765-5820  
Fax (031)-751-688

Mr Graham Wilson, Managing  
Director

Eucatrade  
17 Clifton Road  
Pietmarisburg 3201

Consultant and exporter  
for eucalyptus oil  
industry

Tel (033)-147-3917  
Fax (033)-142-5857

Mr Vivian Davidson, Proprietor

**ADDITIONAL USEFUL NAMES AND ADDRESSES ACQUIRED**

**Multi-national Companies**

Colgate Palmolive (Pty) Ltd 528 Commissioner St. Johannesburg	Soap, personal care product manufacturers
---	--

Tel (011)-914-1300  
Fax (011)-914-3287

Dragoco (SA) Ltd 160 Boeing Road (POB 3498) Edenvale	Flavour and fragrance manufacturers
---	--

Tel (011)-453-7776  
Fax (011)-453-1164

Givandan-Roure Ltd Electron Ave. (POB 181) Isando, Transvaal	Flavour and fragrance manufacturers
---	--

Tel (011)-974-3637  
Fax (011)-974-36..

Haarman and Reimer Ltd Wrench Road POB 143 Isando, Transvaal	Flavour and fragrance manufacturers
---	--

Tel (011)-921-5911  
Fax (011)-921-5453

International Flavours and Fragrances Ltd 117 Main Reef Rd. West Johannesburg	Flavour and fragrance manufacturers
--	--

Fax (011)-760-2834	(Mr M Southern, Managing Director)
--------------------	---------------------------------------

Lever Bros Ltd/  
Unilever Foods  
POB 1091  
Durban

Soap, detergent and  
food manufacturers

Tel (031)-301-1576  
Fax (031)-300-9426

(Mr P Spence; Senior buying  
manager)

Coleman Foods  
Bayete Road  
N'Dabeni 7405

**South African Domestic Companies**

**Spice - Flavours Industry**

Buffalo, Cape Town

Spice grinder

Tel (032)-233-1050

Spicemans

Spice grinder

Continental Spice Works

Spice importer

Alifa Spice Works  
887 Umbilo Road  
Durban

Spice retail packer

Tel 252243

Packo  
Packo Street  
Verulam 4340

Spice retail packer

Osman Spice Works  
Durban

Spice importer

Crown National  
Johannesburg

Food processor, user  
of spices and flavour  
products

Tel (011)-613-2471

Fredi Hersch

Food processor, user  
of spices and flavour  
products

Colombart  
Cape Town.

Food processor, user  
of spices and flavour  
products

Tel (021)-511-1361

Belmay  
Aromatech

) Flavour manufacturers  
)

### **Soaps and Cosmetics**

Amka Products (Pty) Ltd  
14 Ellman St  
Sunderland Ridge 0157  
(POB 3504)  
Pretoria 0001

Manufacturer of  
toiletry, cosmetic and  
personal care products

Tel (012)-666-9044  
Fax (012)-666-8715

(Messrs Kalla)

### **Essential Oil Producers/Exporters**

Blyhoek Trust  
Cape Province

Eucalyptus oil  
(Mr D Donald)

Busby Essential oils  
POB 22  
2370 Lothair

Eucalyptus oil  
(Mr O P Pech)

Tel 013462, ask for 92  
Fax 013462, ask for 92

Eagle High Estate  
POB 237  
Colenso 3360  
Natal

Eucalyptus oil

Tel (036)-22-2349  
Fax 01341-98119

(Mr T Mason/Mr D Richmond)

Eucaforest (Pty) Ltd  
East Transvaal

Eucalyptus oil  
Mr C Rumble

Lothoil (Pty) Ltd  
East Transvaal

Eucalyptus oil  
(Mr C Rumble)

Guenther Pty Ltd	Eucalyptus oil
Tel (011)-786-2458	
Mankaina Estate (POB 55) 19 Alfa Building Piet Relief Transvaal	Eucalyptus (production operation in Swaziland, 50km from Piet Relief)
Tel 013-4-3-3601 Fax 013-4-3-2113	(Mr A Martin)
Taurus Estate East Transvaal	Eucalyptus oil (Mr C Landman)
Umpulsi Estate East Transvaal	Eucalyptus oil (Mr J Owen)
Waterfall Health Farms POB 75 Huguenot 7645 Cape Province	Buchu oil  (Mr E J Godfrey)
S Chicken and Co (Pty) Ltd POB 15 Paarden Eiland Cape Province	Buchu oil  (Mr E Chicken)
Grassroots Natural Products POB 16 Gouda 6821	Buchu oil, tagete oil  (Mr E Graven)
Clive Tuebes Pty Ltd 75 Walker Ave. Johannesburg	Rectified eucalyptus and folded citrus oils
Tel (011)-792-4451 Fax (011)-792-1110	(Mr Clive Tuebes)
Essential Oil Industries POB 1243 East London 5200	Tagete, artemesia, salvia and other oils
Fax (    )-435-8448	(Mr R G Davies)

Highland Essential Oils  
POB 35  
Ulakbult  
Clocolan  
Free State

Tagete, chamomile and  
other oils

Tel 051-932, ask for 3912  
Fax 051-943-0610

(Mr F Minnaer)

Dicken Hall )  
Granada Citrus )  
Valor )

lemon, orange,  
grapefruit and  
tangerine oils

Mr M Lilford  
Tel (015)-2296-2883

Horticulturalist with  
knowledge of essential  
oils

Colibri Laboratories  
Tel (015)-583-0084

Knowledgeable on  
essential oil projects  
and markets  
(Mr P La Rue)

#### **Annatto**

Mr Joop Hoek

Buyer

#### **Guar Gum Processor**

Trohall Pty  
248 Dyson Road  
Wadeville  
(POB 3933)  
Johannesburg  
East Rand

Tel (011)-824-1142  
Fax (011)-827-8471

#### **Government Bodies**

Institute for Tropical  
and Sub-Tropical Crops  
POB X 11208  
Nelspruit 1200

Tel (013)-11-52071  
Fax (013)-11-23854

(Ms R du Preez)

Industrial Development  
Corporation  
(POB 784055)  
19 Fredman Drive  
Sandton

Tel (011)-883-1600  
Fax (011)-883-1655

(Mr G Haillet/Mr R Hurley)

## ZIMBABWE: DETAILED COUNTRY REPORT

## COUNTRY POPULATION PROFILE

Population: 10.6 million

- 98 per cent black ethnic group, predominantly low income
- 2 per cent million European/Asian ethnic groups
- 75 per cent of total population rural dwellers

## SPICES AND HERBS SECTOR

Market Characteristics

## Market Structure

1. The spice and herb industry in Zimbabwe has retail and industrial flavour sectors; the latter is small compared to South Africa.
2. The retail market sector leader is a domestic, private sector company, Four Seasons Foods. Robertsons of South Africa hold the larger share of the remaining brand-name market. There is also an informal spice sector, largely dominated by the Asian community.
3. The industrial flavour sector is represented by a number of the multinationals but the activities of the majority focus on sales of imported flavour packages rather than manufacturing.
4. The multinational, Bush Boake Allen operated a flavour factory up until recently in Bulawayo but relocated all its manufacturing operations to Johannesburg following the change in the political regime in South Africa. This decision was taken on the basis of the failure of Zimbabwe to develop volume production of the range of spices which were needed to run its factory at high cost effectiveness and from a decision to focus its entire Sub-Saharan Africa operations in a more logistically sound point. Some other

multinational spice and flavour contemplated development of factories in Zimbabwe in 1980s but did not proceed for identical reasons.

### **The Market's Size and Growth Trends**

5. Quantification of Zimbabwe's market for spices, herbs and their extracts proved impossible during the study owing to time constraints and the absence of reliable production, import and consumer market data. The market, however, is disproportionately smaller than that of South Africa since the 'traditional', high consuming white and asian communities comprise a low proportion of the population, urbanization is not so great and the purchasing power of the majority black population is poorer. Moreover, there is no expectation of a substantial growth potential for spices in the medium term with the black population.

### **Sourcing of Materials**

6. Domestic production provides a significant proportion of the market's needs for chillies, paprika, coriander, turmeric and a range of herbs. The wider range of spices and herbs, especially high quality material, has to be imported; in part direct from source but also via South Africa (either in bulk or pre-packaged for retail sales).

7. Industrial flavour packages are imported via South-African based multinationals.

8. Spiced sauces are both manufactured domestically and imported; while the latter are mainly South African in origin, the ubiquitous Nali chilli sauce from Malawi is found also in supermarkets.

### **Domestic Production and Exports**

9. Prior to the mid-1980s, production of the commodity group was very limited in scale and range: chillies, turmeric, ginger and coriander by peasant farmers and kitchen garden cultivation of the more common herbs by the European community. In the subsequent period, trials have been conducted on an extensive range of spices and herbs by the commercial sector, led largely by Four Seasons Foods in order to achieve import substitution. Apart from those spices requiring a very humid climate, agronomic adaptation in general has been proven successful. However, the major

**Table 1: Spice and Herb Production in Zimbabwe**

Item	Av. annual production (tonnes)	Principal market outlet	Produced by
paprika (pods)	10,000	export and domestic	commercial farmers
paprika oleoresin	70	export	private company
Birdseye chillies	200	export	commercial farmers
other chillies	NA	domestic	smallholders
turmeric	100+	domestic	commercial/smallholder
ginger	NA/S	domestic	smallholder
coriander	NA	domestic (occasional exports to South Africa)	commercial/smallholder
*other spice seeds	NA/S	domestic	commercial farmers
** herbs:			
- dried	NA/S	domestic	commercial farmers
- dried, organic	NA/VS	export	commercial farmers
- fresh	NA/VS	export	commercial farmers
garlic	NA/S	domestic	commercial farmers
black pepper	} NA/VS	domestic	commercial farmers
cardamom			

\* range includes caraway, celery, dill, fenugreek, anise

\*\* range includes angelica, basil, comfrey, horseradish, marjoram, oregano, parsley, peppermint, spearmint, rosemary, savoury, sage, tarragon, thyme and yarrow

**export oriented developments** date from 1990 and have involved paprika and Birdseye chillies. The current production range, together with estimates of annual output, is shown in Table 1.

#### **Paprika and its Oleoresin**

10. Development of paprika in Zimbabwe followed on the heels of but largely independently of that in South Africa. There has been a progressive growth in the **scale of production** in spite of low international prices over 1992-94 and with a recent annual average output of 10,000 tonnes Zimbabwe is now a major world source. (1995 production is estimated as 8,000 tonnes owing to drought).

11. The industry is mainly geared to **export of dried pods** for the Spanish market but there is a significant offtake by the domestic **oleoresin** manufacturer which has an installed capacity to produce 70 to 80 tonnes annually.

12. Early development included involvement of smallholder growers on communal land but this proved a failure through their inability to adopt the demanding management techniques and preference for food crop production. Apart from a small, rather inefficient production by a few smallholder cooperatives, **the crop is grown by commercial farmers** with the north-eastern areas of Centenary, Manondera and Ruwa being the most important.

13. Considerable problems were encountered in the early phases of production with both agronomy and marketing. Even for experienced commercial farmers, there has been a major learning curve on changing from traditional, extensive crops to the more intensive, horticultural demands of paprika. Free-booting buyers from South Africa also exploited inexperienced producers up until recently, paying poor prices and in some cases defaulting on payment. This has led to a sceptical view on the crop amongst a surprisingly large sector of the commercial community; the experience-learned first or secondhand - has tended to entrench prejudices about new crops and middlemen in general but the attitude reflects also the poor knowledge of markets and of the extant, proven marketing systems within the country.

14. Those farmers who have adopted the crop find returns attractive, cultivation fits in well with tobacco management and tobacco infrastructure can be used. Dried pod **yields** per ha were reported to range from 2 tonnes for rainfed

conditions to a normal maximum of 5.5 tonnes with irrigation, while under very favourable conditions 7 to 8 tonnes have been achieved. Yields of 3 to 3.5 tonnes are considered readily achievable. These figures are superior to those of South Africa with the identical cultivars.

15. There are three principal purchasers of the crop which are - in descending volume of offtake - Hy-Veld Seed (pod exports only), Paprika Zimbabwe (the oleoresin producer) (but also exporting pods) and Lomag Exports (pod exports only). In addition, there are several smaller companies, some purchasing as agents for Spanish and other European companies. Each of these companies has differing purchasing arrangements with farmers and markets.

16. The Hy Veld Seed Company contracts to overseas buyers, mainly in Spain, one year in advance. It buys from farmers with or without prior contracts; for the latter, only those with irrigation are accepted and the deal includes issue of selected seed and extension support. Prices are paid according to the colour value of pods. The farmer receives a part payment after assay of the material as delivered to the factory but does not receive the balance until the material has been reassayed after receipt in Spain; ie the farmer bears the risk for deterioration occurring normally or through misadventure after delivering the crop.

17. Zimbabwe Paprika, a subsidiary of Astra Engineering, commenced commercial operations in 1993. It has a requirement for 1,500 tonnes of pods for oleoresin manufacture (output capacity of 70-80 tonnes/year) and plans also to export around 1,500 tonnes of pods. It presently markets, mainly to Spain, through a Botswana-based affiliate. Pod purchase is on the basis of a fixed price forward contract - with a sliding scale for colour quality - and in which selected seed and extension support is received by the farmer. Farmers are paid shortly after delivery to the factory when colour quality assay has been completed. The company, like paprika growers, has undergone a learning curve, both on processing techniques and on marketing, from a previous zero experience.

18. Lomag Exports Limited is different in character, being in effect a commercial farmers' cooperative. Additionally, it aims at production of only high flavour quality material for its South African associate, Agro-Trade International. Contracts are made only with producers in high yield areas on the basis of issue of selected seed, provision of

extension support and the return of the entire crop, including the seed. Payment is on a straight forward, pre-agreed price per kilogram, not on the colour value.

19. All three companies are independently striving to develop improved cultivars.

### **Birdseye Chillies**

20. Zimbabwe's entry into the international market as a Birdseye chilli producer dates from the latter 1980s and has been a signal success - at the expense of the prior dominant supplier, Malawi. The targeted average annual output is 200 tonnes but the quantity fluctuates: 260 tonnes in 1994 and 170 tonnes in the 1995 drought year.

21. Production and marketing is organised through Lomag Exports. Up to 16 commercial farmers with plots of 5-10 ha are involved in the Trelawney, Mvurwi, Darwendale and Lions' Den areas. If required by the farmer, Lomag makes a contract with an agreed minimum price.

22. Attempts were made in the first phase of the development to stimulate production by smallholder/communal farmers but these failed for similar reasons described above in paragraph 12 for paprika, even though Birdseye chillies are not so demanding as a crop.

23. Yields obtained by commercial farmers range from 2-4 tonnes/ha, averaging 2.5 tonnes; whereas smallholder farmers in Central Africa usually obtain less than 1 tonne/ha. The economic life-time of a plot is 5 years. Cultivation fits in well with the tobacco management regime and crop drying is carried out in the tobacco curing barns. Prices paid by Lomag for the dried chillies are around Z\$ 13 kg and returns to farmers are Z\$ 4 to 5 for every Z\$ 1 invested, which is superior to tobacco.

24. At the Lomag warehouses, women manually sort the dried chillies into three export grades, according to physical appearance: A - premium appearance material for the European retail market; B - mixed appearance for the USA, and C - off colour and broken for the chilli oleoresin extraction market. In the Trelawney area, competition is now being experienced for the female labour force from the rose industry and Lomag is considering the installation of automatic colour-sorting equipment.

25. A comparative advantage over Malawi has been achieved from two factors. Firstly, the crop is available for sale 3 to 4 months earlier than Malawi. Secondly, Malawi offers only one grade of superior appearance material and has not secured an outlet for its poorer quality material; the economics of production, therefore, are less good than those of Zimbabwe.

26. When possible, Lomag makes direct exports to end-users in Europe but also sells smaller volumes through dealers (principally in the UK). As with paprika, Lomag works in close association with Agro-Trade International in South Africa and this collaboration has recently opened up a new market in Mexico for the superior grades. Extraction grade material is mainly sold to the USA and Mexico. Small volumes are sold also to retail spice houses in South Africa (Robertsons, etc).

#### **Turmeric**

27. Production of turmeric is undertaken by some smallholders and commercial farmers in the northeast. One commercial farmer at Concession, who has regularly produced for Reckett and Coleman's mustard and curry powder manufacturing operation, estimated that the formal market demand was up to 100 tonnes annually. His yields under irrigation are around 2 tonnes/ha and while no disease problems have been encountered returns per megalitre of water are not very attractive. He regards the crop as being more appropriate for smallholder production in the higher rainfall/humidity areas of the Honde valley and in the Low Veld on the Mozambique border. The quality of product from the existing cultivars is mediocre.

#### **Ginger**

28. Ginger has been grown on a small-scale for many years by smallholders. In most areas, the crop suffers from drought stress and to a far greater extent than turmeric.

#### **Coriander and Other Spice and Herb Seeds**

29. There has been a traditional modest scale cultivation of coriander by smallholders and also by a few commercial farmers in recent years. The bulk is destined for the domestic market but exports have been made frequently to South Africa (126 tonnes in 1993).

30. The majority of the other common spice and herb seeds have been introduced and developed over the past decade by Four Season Foods for its domestic retailing activities. These are grown as winter crops and their individual performance has varied considerably.

### **Herbs**

31. Prior to the later 1980s, herb cultivation in Zimbabwe was small, informal and restricted to the mints, thyme and rosemary. In the subsequent period, Four Seasons Foods has introduced and developed an extreme range on its own farm and with outgrowers. The activity has expanded supplying the domestic market for dried herbs, mint jelly, etc. to **export of speciality items**: small volumes of fresh herbs to the UK and Holland, plus organic dried herbs to Europe and North America. One recent consignment of organic herbs to Canada consisted of 40,000 pre-packaged 10g units.

### **Pepper and Cardamom**

32. Cultivation of pepper and cardamom was initiated by the Eastern Highlands Tea Estate and others in the humid Honde Valley in the late 1980s. This was prompted by the then high prevailing domestic market price, approximately twice that of the world market. Production continues on a small-scale for the domestic market but appears uneconomic for export to the major overseas markets.

### **Public Sector Research and Development Activities**

33. Ministry of Agriculture R&D on spices and herbs was a low key activity throughout the colonial period and ceased during UDI. In the immediate period after Independence, all efforts were focused on food production and it was not until the later 1980s that attention was turned to spices and herbs by the executive body, the Department of Research and Specialist Services (DRSS). Activity was short-lived and limited to multiplication of pepper and few other spices. No current work on these commodities is in hand by the DRSS, nor is it foreseeable with its mooted privatisation.

### **ESSENTIAL OILS**

#### **Market Demand**

#### **Market Structure**

34. Usage of essential oils in Zimbabwe is fragmented between the soap-detergent, processed food and pharmaceutical industries. There is a very small aromatherapy market which is not considered further here.

#### **Market Size and Growth Trends**

35. Time constraints during the field visit for interviews with consumer industries and the absence of reliable, up-to-date statistical data on imports precluded an appraisal of market demand. However, it is probable that the major usage sector is the soap and detergent industry, followed by the processed food and soft drink sector and then by the pharmaceutical industry.

36. As elsewhere in the region, the greatest sales by the toiletries industry are of inexpensive laundry soaps in which citronella oil is the principal fragrance. By extrapolation of figures obtained for Malawi - which has a similar population - and since Zimbabwe also exports to Zambia, consumption of citronella oil is likely to be around 50 tonnes per annum. Lemongrass oil consumption also is probably significant in the soap/detergent sector. Usage of other natural essential oils in fragrance applications is expected to be comparatively small.

37. In flavour applications, citrus oils are likely to enjoy the highest demand, followed by mint oils and menthol and with spice and herb oils as the last of the significant groups.

38. Future , sizeable growth in consumption is more likely to be shown with fragrance oils than with flavour oils, other perhaps than those employed in soft drinks.

#### **Sourcing of Materials**

39. The consumer industries presently secure only minor quantities of their needs from domestic producers and medicinal eucalyptus oil appears to be the only item available in over half a tonne quantities. While citrus oils are produced in Zimbabwe, the crude oils appear to be exported and imports are made of folded (processed) oils by the flavour companies.

40. The great bulk of industry's needs, therefore, are obtained by imports; mostly from multinationals, based-in South Africa and in the form of precompounded, ready-to-use

fragrance and flavour packages, some of which incorporate synthetics.

### Domestic Production

#### **History and Industry Structure**

41. Between 1930 and UDI, a number of commercial farmers attempted to develop various essential oils, geranium being the most popular, but these ventures failed for various reasons. The sole exception was the citrus oil industry which developed along with juicing at Mazoe during the 1940s.

42. Interest in essential oils was rekindled in the mid-1980s amongst tobacco farmers through concerns over tobacco's future and from the need to earn FOREX. In the absence of any support (or expertise) being available from the DRSS, a number of individuals made investment in distilleries and learnt agronomy, processing and marketing skills by trial and error.

43. All of the commercial producers who initiated operations in the later 1980s are still active and there have been no new significant entrants. The industry is located in the Harare region and its structure and current product range are summarised below (see also Table 2 for production volume estimates):

<i>Producer:</i>	<i>location:</i>	<i>products:</i>
<i>Mazoe Citrus</i>	<i>Mazoe</i>	<i>orange and West Indian lime oils</i>
<i>Essen Oil Co</i>	<i>Marondera</i>	<i>tagete, tea-tree, Lippia, medicinal eucalyptus</i>
<i>Zimbabwe Aromatics</i>	<i>Concession, Mvurvi, Centenary areas</i>	<i>tagete</i>
<i>Four Seasons Food</i>	<i>Harare</i>	<i>tagete and organic herb oils</i>

44. The product range listed above represents the outcome of a wider number of earlier crop trials. Also, it should

be noted that Zimbabwe is now the largest exporter of Tagete (African marigold) oil in Southern Africa.

45. There has been a degree of informal collaboration and exchange of information between the non-citrus oil producers from the outset. However, each of the three groups has largely followed their own paths and through individual circumstances, experience and interests they have focused on different commodities. For this reason, each group is discussed separately below.

#### **Essen Oils Co**

46. This company is owned and operated by the Tippet family on their extensive, diversified farm at Marondera. The distillery was completed in 1988 and it is the largest in Zimbabwe, being equipped with four still vessels, each capable of taking a herb charge of around 4 tonnes. (See Coppen and Hone, 1992, for details; ref 55)

47. The initial focus of operations was medicinal eucalyptus oil, for which *E. cineria* was first planted on the basis of ill-informed advice from the Forestry Department. Some twelve other medicinal oil bearing species were then introduced for trials and although several appeared promising all but *E. smithii* were rapidly dropped. The choice of *E. smithii* was made from its clearly good field performance (250 kg of oil per ha from the second of the annual coppices) and knowledge acquired by that stage of its use in South Africa and Swaziland. Some 40 ha of this species were planted and output reached 10 tonnes per annum in 1990. Up to 1 tonne per annum found a local market but the bulk was sold to Clive Tuebes Pty Limited in South Africa (for rectification and re-export) and a little directly to Europe. During 1990, world market prices for medicinal eucalyptus oil declined significantly owing to a 'free-for-all', aggressive stance by new exporter companies in China and the Essen Oil Co. - along with counterparts in South Africa and Swaziland - experienced a reduction in returns.

48. Concurrent with the eucalyptus development, production trials were carried out with a number of other species. Five hectares of citronella were grown for two years and sales of oil were made to Lever Bros. for soap fragrancng. This crop was phased-out since yields were not as high as hoped and rust problems were encountered; neither were regarded as insurmountable problems but more attractive

**Table 2: Estimated Current Domestic Market Demand and Production of Essential Oils in Zimbabwe**

(tonnes)

Item	Domestic demand	Domestic production	Exports (principal markets)
<b>Fragrance oils</b>			
citronella	50*	vs	
lemongrass	NA	vs	
geranium	NA/VS	nil	
vetiver	NA/VS	vs	
linaloe	NA/VS	vs	
tagete	nil	5	5 (WE)
tea tree	nil	5	(WE, SA)
Lippia	nil	0.2	(WE)
<b>Flavour oils</b>			
orange	NA	50*	50* (SA)
lime	NA	10**	10** (SA)
peppermint	NA	nil	
spearmint	NA	nil	
d.m. Mentha arvensis	NA	nil	
menthol	NA	nil	
spice oils	NA	nil	
spice seed oils	NA	nil	
eucalyptus (medicinal)	1	5	4 (SA)
herb oils:			
- normal	NA	nil	
- organic	nil	NA/S	NA/S (WE)

**Key**

- \* very provisional estimate
- \*\* very provisional estimate; no production 1995 owing to lag time in replanting
- NA data not available
- NA/S data not available, small
- NA/VS data not available, very small
- SA South Africa
- WE Western Europe

alternatives for management inputs had by then arisen. Lemongrass was dropped for similar reasons while the geranium stock gave a poor quality oil and lavender and *Mentha arvensis* displayed very poor field performance. Of these early non-eucalyptus efforts, only *Tagete* oil survived and this has become a mainstay product.

49. Production of *Tagete* oil has continued at 0.2-1.0 tonne annually, the quantity dependent on rainfall and plant availability. Some 25 per cent of the raw material is grown on the farm and the remainder is bought from neighbours who harvest wild growing plants. Sales are made to mainstream buyers in South Africa, France and the UK.

50. In 1992, attention was turned to ~~tea-tree~~ (*Melaleuca* sp.) which, after some teething problems in provenance selection, has proved economically attractive. Unlike eucalyptus, tee-tree can be harvested mechanically and this significantly reduces production costs. Moreover, sales have not proved a problem on the mainstream market in South Africa and Western Europe with prices of around US\$ 50/kg. Essen Oils Co. aim now is to expand to 200 ha and an output of 10 tonnes per annum but under organic growing conditions in order to widen sales opportunities in the aromatherapy market, notably in Germany.

51. Attendance at an organic products trade fair in Germany generated interest in the oil of a previously unexploited indigenous *Lippia* species. Commercial (organic) production commenced in 1993 and the current annual oil output is 200kg from 10 ha. Aromatherapists in Germany purchase quantities of a few kg or less at a time and are presently prepared to pay around US\$ 200/kg. Production provides good returns through the combination of the high price and the crop's low maintenance needs, drought resistance and capability of being harvested mechanically.

52. On the basis of these experiences and the high management and labour demands on an already highly diversified farm, Essen Oils has decided to avoid bulk volume oils in future and to focus on niche market, high value oils. Eucalyptus oil production is being cut back owing to the combination of labour demands and past fluctuation in the market price; returns from eucalyptus, however, are superior to those of tobacco and could be considerably improved if mechanical harvesting were feasible. Some 20 ha of eucalyptus will be kept since polewood is a by-product which fuels the distillery steam

boilers and still leaves a surplus for fencing and sales to neighbours.

### **Zimbabwe Aromatics**

53. Zimbabwe Aromatics is in effect a marketing cooperative for the tagete oil produced by four farmer-distillers in the Concession/Centenary/Mvurwi areas: Messrs. Stuart, Nethersole, Martin and Ravenscroft. Each independently commenced production around 1988 and then encountered difficulties in selling a small volume demand commodity to a distant, conservative market. A decision was then taken to market collectively through an interested dealer in the UK under an agreement that their product would be offered to buyers before that of any other suppliers. This, combined with careful avoidance of overproduction, has led to success and sales of around 3.5 tonnes of oil annually.

54. Each member of the group is a tobacco farmer and they make use of their extant steam boilers for Tagete oil distillation, which conveniently occurs before the commencement of the tobacco season. A single distillation vessel of approximately 1 tonne herb capacity is installed on each of the farms.

55. Initially, the raw material was obtained from wild growing plants on the distillers' farms and by purchase from neighbours. Two of the group have recently turned to cultivation and fertilizer application has been found to double yields.

56. The composition and aroma character of the tagete oil differs according to the production area and two distinct types of oil are shipped, both finding separate end-users. While variations in production methods may contribute to these oil property differences, it is more likely that the primary cause is intrinsic: dominant chemotype variation between the wild provenances which are collected in geographically separated areas. A programme of plant selection - not previously contemplated by the group - would allow not only greater control in product properties but should also result in an increase in oil yields by 50 per cent in the first cycle.

57. Most members of the group conducted trials with other species in the first phase of their venture into essential oils but did not pursue them for a variety of reasons. Lemongrass suffered from rust while geranium cropping (five

times annually with irrigation) interfered with tobacco management and for both oils the minimum volumes required by overseas buyers was beyond the installed processing capacity. Mr Nethersole has produced irregularly small quantities for the local aromatherapy market of linaloe and vetiver oil, but with the latter crop better returns are currently being obtained by multiplication and sale of plants for erosion control programmes.

58. All members of the group are interested and involved in crop diversification. For example, Mr Stuart has planted oranges under irrigation in the recent period as part of a wider development with Outspan of South Africa as the purchasers; 1,000 ha are likely to be established by farmers in the next few years in the Mvurvi area. Interest was expressed in new essential oils, including volume items which would require installation of larger capacity distilleries (vessels and boilers). Preference would be given to perennial crops and the return per megalitre of irrigation water would be an important selection criterion; paprika, for example, has been rejected by Mr Stuart on the water consumption aspect.

#### **Four Seasons Foods**

59. This company differs from the others in that it is not primarily a farming operation. Instead it became involved in small-scale, in-house cultivation (and later contracting of farmers) as a means of securing herbs for its retailing activities. A small distillation unit (around 0.5 tonne herb capacity) was installed in 1986 on the company's farm on the outskirts of Harare as a perceived adjunct to the herb growing.

60. Distillation trials were conducted with a wide range of herbaceous plants. Citronella and lemongrass were reported to have given good yields in small-scale trials but were not pursued because of the volume production requirement. The geranium planting stock proved a producer of a mediocre quality oil while *Mentha arvensis* displayed poor field performance.

61. Commercial production turned to focusing on **tagete** oil with bought-in raw material. The company's average annual output has been 0.5 tonne and sales have been made through an agent in the UK.

62. More recently, small-scale production and export has been undertaken with organic herb oils (rosemary, thyme and oregano) for the German aromatherapy market where individual buyers purchase 2-20 kg lots annually. This venture originated from attendance at an organic trade fair in Germany where direct contact were made with buyers. The operation well matches the company's dried, organic herb activities (see paragraph 31 above) and along with tagete oil it will be the future focus for essential oil production.

### **Common Experiences and Knowledge of Markets and Marketing**

63. Each of the commercial producers experienced major problems at the commencement of their ventures in gaining information on markets and marketing and in identifying buyers. Moreover, the farmer-distillers possessed a prejudice against middlemen, even when these were the long-established and reputable dealers/brokers on which mainstream international essential oil trading depends. These problems remain today and pose a constraint on their reaching a positive decision on new essential oil crop diversification.

64. Knowledge which presently exists is based on irregular visits to Europe when a narrow range of traders/end-users have been met and discussions have been limited in scope. It appears that none of the producers have attended the annual seminars of the International Federation of Essential Oil and Aroma Trades (IFEAT), which provide the opportunity to obtain a world overview of markets and to meet representatives of virtually all the mainstream market traders. The only notable advance in recent years appears to have been the GTZ sponsored attendance by two of the producers at an organic products fair in Germany. This permitted direct contact with buyers/users in the fashionable but far from mainstream sector of the trade.

### **Other Contemporary Developments**

#### **University of Zimbabwe Programme**

65. The University of Zimbabwe's Chemistry and Pharmacy Departments have been undertaking a research programme on essential oils for several years. This has been supported by CIDA, UNIDO and GTZ in the form of provision of (analytical and processing) equipment and visits by consultants.

66. The thrust of this programme is the development of essential oil production from indigenous, drought resistant plants by smallholder/communal farmers. The GTZ project envisages processing by use of transportable distillation units.

67. It was not possible during the field visit to acquire first-hand information from University staff on the status of their knowledge on the socio-economic attitudes of the targeted producers to non-traditional crops, markets and marketing or on extension plans for the project.

### **Adjunct Developments**

68. The Zimbabwe Industrial Development Corporation has very recently approved a project on essential oil development. It is planned that commercial production and processing will be undertaken by parastatals while the University will provide technical and marketing expertise. If the venture proves successful, the IDC envisages contracting the cultivation of raw material to communal farmers.

69. Nature Nuture, a private sector company - involved in cosmetics, toiletries, perfumes, medicinal plants and some other activities - has contracted commercial farmers to grow lavender in 1995 and wishes to stimulate production by communal farmers of a range of both indigenous and well-known aromatic plants.

### **GUM NAVAL STORES**

#### **Market Demand**

##### **Gum Rosin**

70. Demand for gum rosin in recent years has totalled just under 1,000 tonnes per annum, of which the paper industry accounted for 80 per cent of the offtake and the bulk of the remainder was used by adhesive manufacturers.

##### **Gum Turpentine**

71. The major consumers of gum turpentine are the paint manufacturers. There is only a relatively weak demand of up to 150 tonnes per annum and sensitive to the competitive price of imported 'mineral turpentine/white spirit'.

## **Rosin Derivatives and Pine Oil**

72. Both rosin derivatives and pine oil are consumed in Zimbabwe but the demand could not be quantified during the field study.

## **Sourcing of Materials**

73. Up until recently, all gum rosin and gum turpentine was sourced from the domestic producer. Rosin derivatives and pine oil are imported, mostly via South Africa.

## **Domestic Production**

### **Origins and Structure of the Industry**

74. Zimbabwe was the first country in Africa to establish a gum naval stores industry. This occurred in 1976 during UDI in response to problems of importing naval stores products.

75. Throughout the industry's history, there has been one source of gum oleoresin, the Chimanimani area of the Eastern Highlands and one processor, Zimbabwe Phosphate Industries Limited - a diversified chemicals operation - in Harare. The installed processing capacity of the factory is for 1,200 tonnes of gum oleoresin per annum.

76. The gum tapping operation is run independently by Border Timbers Limited as a part of its overall forestry operation. The species exploited is *Pinus elliottii* and tapping commences when the trees are 18 years old. The gum oleoresin is transported by road from the forest to Mutare and then by rail to Harare.

### **Production History**

77. The supply of gum oleoresin built up slowly and peaked in 1985 at 1,000 tonnes annually. Although considerable areas of pine exist in Zimbabwe - mainly owned by the Forestry Commission - only the Chimanimani area has the conditions which make tapping economic and this resource has been limited in size.

78. During the 1980s, improvements to tapping productivity were developed by Border Timbers with the active assistance of the Zimbabwe Forestry Department and of the UK's Oxford Forestry Institute (OFI) and Natural Resources Institute

(NRI). This work covered selection and breeding of higher yielding/higher gum quality trees, improvement of tapping methods and formulation of gum flow stimulants for local manufacture. However, these initiatives could not make more than a marginal influence on supply levels to Zimbabwe Phosphates in the short-term.

79. In fact, the actual supply level has progressively dwindled and reached 600 tonnes in 1994, some 40 per cent of the factory's requirement. The main cause was the shortage of suitable trees for tapping but it is understood that Border Timbers has recently been exporting gum oleoresin to Pinechem in South Africa.

80. The impact on Zimbabwe Phosphate has been very serious. The output of rosin was inadequate for its major customer, the paper factory which switched to an alternative for sizing. This led to the accumulation of unsold stocks of rosin, in addition to those of turpentine which had developed through very price competitive imports of white spirit. From early 1995, the factory has operated two months on and two months off, which has allowed reduction of rosin stock levels. Turpentine stocks have been reduced by price cutting.

#### **Future Prospects**

81. The future looks yet more bleaker for the factory since Border Timbers have decided to phase out its tapping operation over a period of a few years. The operation is no longer considered core business by Border Timbers and the focus in future will be on timber production, for which demand is increasing steadily.

82. The problem for Zimbabwe Phosphates might be ameliorated in the short-term if sales of rosin could be developed to soap manufacturers but this is unlikely when the supply trend becomes transparent. The answer could lie either in persuading Border Timbers to adopt the innovative and more productive tapping method reported by Pinechem or by sourcing of oleoresin from Malawi or Zambia. (See Appendix 10 for a wider discussion on this regional strategy).

## **Exports**

83. Up to 1993, Zimbabwe Phosphates exported up to 200 tonnes of rosin in a year to South Africa when prices were attractive.

84. There have been minimal shipments of turpentine to South Africa. Also, there have been no apparent attempts to export overseas, although the material possesses a good composition for isolation of alpha- and beta-pinenes, possibly since shipment costs make the activity uneconomic. (Purchasers require minimum shipments of 200 tonnes per lot and, preferably, of over 500 tonnes).

## **WATER SOLUBLE NATURAL GUMS**

### **Market Demand and Sourcing**

85. A demand exists within Zimbabwe for water-soluble gums for use as food emulsifiers, in adhesives and in mining. Assessment of the demand for the various natural products could not be made during the field study.

86. Zimbabwe is not naturally endowed with wild species, capable of providing highly marketable gums and no evidence could be found of any current cultivation of guar seed. It is presumed, therefore, that all major requirements are met by imports.

### **Production of Acacia Karroo**

87. *Acacia karroo* occurs wild in the Southern part of the country and a small-scale operation for collection of its gum exudate commenced around Bulawayo in 1987. This was a mixed initiative involving the local forestry stations, NGOs and womens' organisations, plus the flavour compounding factory owned by Bush Boake Allen (BBA) in Bulawayo.

88. Although *A. karroo* provides a much inferior quality material to authentic gum arabic (ex. *Acacia senegal*), BBA were prompted to examine the possibility of upgrading and use in some of its formulations as an alternative to expensive, imported Sudanese gum arabic. This proved successful and some 10 tonnes per annum were eventually used by BBA while the remainder of the crop found a local market, mainly for use in printing inks and with a little to the pottery industry for glazing purposes.

89. No formal marketing system developed but word spread via cooperatives, newspapers and the Forestry Department. Collection was taken up mainly by women and children and sales were made to the BBA factory; some collectors travelling a 100 km or more by train into Bulawayo. The individual delivery ranged in size from 15 kg to 50 kg, usually collected over the hot, high yielding season of August-October.

90. At the factory, the consignment was sorted into lumps, finer material and rejects. The latter included any dark A. karroo, brittle dark A. nilotica and another pale but pliable gum (umswiri). Experienced collectors had little or no rejects. In 1991, a typical one month collection by an individual or family group comprised 10-13 kg of lump gum and 0.5-2.0 kg of sifted material. Prices paid then were Z\$ 2/kg for the former and Z\$ 1/kg for the latter type of material, making a total of Z\$ 20-30 from which their net income could amount to Z\$ 8 to 18 if a train fare had to be covered,

91. Supply of the gum grew to exceed demand and on the closure of BBA's factory in Bulawayo the unsold stock was shipped to HQ in Johannesburg where sales have been made to lithographic and envelope adhesive companies. Purchasing of gum continues in Bulawayo by a former BBA employee, who resells to BBA's Harare office. While still supporting this trade, BBA has now resumed use of food grade Sudanese gum arabic in its own manufacturing operations.

#### **Guar**

92. In 1986, the Chiredzi research station (DRSS) undertook at the prompting of Shell a programme on guar; a crop which had been grown on a small-scale in Zimbabwe for many years previously. The work involved both commercial farmers and smallholders in the Chiredzi neighbourhood. Yields obtained by smallholders ranged from 1 to 2.5 tonnes/ha while commercial farmers obtained up to 3 tonnes with irrigation.

93. A new programme with smallholders was undertaken in 1986, mainly near Masvingo, following proposals for a joint-venture between the Zimbabwe Industrial Development Centre and the Swiss-owned multinational, Hahn. Superior seed stock was reported to have been used in these trials. This apparently petered out through lack of smallholder interest.

94. No current activity with guar could be ascertained during the field study. However, a trader in Malawi reported that an unnamed Zimbabwean company wished to promote production and has processing facilities.

#### **NATURAL COLOURANTS**

95. In 1988, trials with **annatto** were underway at the DRSS's field stations at Chiredzi, Chipanga, Yanga and Marondera with view to identifying the most suitable areas for cultivation. This work was prompted by Unilever which is one of the world's major consumers of annatto. Independently, and during the same period, Four Seasons Foods carried out limited trials in the Harare region on cultivation and extraction. No commercial development has subsequently occurred. In the case of Four Seasons Foods, attention focused on more immediately promising projects. However, the outcome of the DRSS exercise could not be ascertained during the field study.

#### **CASTOR AND OTHER FATTY OILS**

##### **Castor**

96. No information was obtained during the field study from any of the interviewees on current research or commercial production of castor seed and its oil. However, it was learnt second-hand that Trinidad Industries Limited in Harare are significant consumers of castor oil and have an interest in new sources of supply.

##### **Other Fatty Oils**

97. Considerable local interest on *Jatropha* was reported by a representative of the Plant Oil Producers Association but no details were furnished on the status of its development.

98. A 'Village Oil Press Project' is known to exist but contact could not be established during the visit with the Director. It is believed that this project focuses on small-scale processing of edible oils for consumption within a village.

## **AN OVERVIEW OF TRENDS IN ZIMBABWEAN AGRICULTURE**

### **The Commercial Farming Sector**

#### **Market Deregulation**

99. Agricultural marketing of the main crops in Zimbabwe is in the process of deregulation, with market forces dictating prices. This has created some uncertainty and a new stimulus to consider diversification into foreign-exchange earning non-traditional crops.

#### **Tobacco**

100. Most commercial farmers are engaged in flue-cured tobacco production and while the average planted area is 45 ha the overall investment in infrastructure is high. Many farmers have reservations over the longer-term future of tobacco but perhaps the majority see it remaining as the core business. Therefore, any consideration of crop diversification tends to centre around how a new crop will impact (positively or adversely) on tobacco labour utilization and tobacco physical infrastructure.

#### **Irrigation**

101. Many commercial farmers already have built dams and installed irrigation facilities and the general move is in this direction, not simply as a means of counteracting drought but rather as an enabling step for new crop development.

#### **Attitudes to Crop Diversification**

102. Since the majority of commercial farmers are engaged in tobacco production, this entails not only acceptance of but considerable expertise in diversified crop management - if traditionally of a rather limited range.

103. Virtually all farmers now express an interest in new crop diversification but this encompasses a spectrum from the few innovative risk-takers to the very conservative. However, the overall mood may be best described of interest, tempered by caution which is the consequence of two main factors:

- (a) the lack of knowledge of external markets and marketing, particularly for the focal ('minor')

crops which are the subject of the present study;  
and

- (b) many instances of farmers falling foul of unscrupulous foreign buyers, most notably from certain South African traders during the paprika development.

104. It is noteworthy also that there is a surprising degree of unawareness of extant marketing channels and opportunities within the country. During the visit to a very well-organised and professional farmers group, it was found that several had produced paprika for the first time in 1994 on the encouragement of a South African contact but sales had not been achieved subsequently. The farmers concerned were unaware that two major domestic buyers were resident one hour's drive away in Harare and were desperate to buy material owing to the short crop in 1995.

105. Other important aspects emerging in discussions on markets with all farmers were:

- (a) the 'export market' invariably meant the overseas and, particularly, the European market; and
- (b) there is little appreciation of the scale of the South African market, negligible knowledge of the market opportunities which it presents - even for fresh vegetables during South Africa's winter season - or of marketing channels/contacts.

106. This general poor awareness of markets and opportunities arises from the 'isolation' of traditional Zimbabwean agriculture from market forces.

107. With regard to criteria for selecting or rejecting new crops, the following attitudes emerged:

- (a) compatibility with tobacco activities and utilization of extant infrastructure is a very important consideration;
- (b) with the high interest rate structure in Zimbabwe, linked to the uncertainties of diversification, commercial farmers are hesitant to risk capital in 'unknown industries';

- (c) views on new crops are strongly influenced by returns compared with traditional crops - whether or not these latter show signs of a possible decline in future; the 'tobacco standard' is the common benchmark since it is perceived as still offering the best return per Zimbabwean dollar invested in direct costs;
- (d) a new benchmark, the 'return per megalitre of water' is prominent amongst those with irrigation facilities;
- (e) perennial crops, particularly 'sound' ones (ie reasonably well-known) such as citrus, are gaining interest;
- (f) comparatively low unit value products - as against exceptionally high types - can be rejected from consideration before serious analysis is made of returns;
- (g) there is a difficulty of acceptance by some farmers of regular annual fluctuation of prices on the international market; and
- (h) any trade which involves a 'middleman' is subject to suspicion.

#### **Extant Diversification into the Focal Commodities**

108. Within the focal group, several export commodities have been developed successfully in Zimbabwe by tobacco farmers, namely paprika, Birdseye chillies and certain essential oils. These provide an income which appears to compare favourably with the returns on tobacco (at current prices), both in terms of the return per dollar invested in direct costs and the gross margin per hectare.

109. Paprika, Birdseye chillies and tagete oil production fit in well with the tobacco activity schedule and increase the utilization of the labour force needed for tobacco. Also, each can draw on various existing items of infrastructure: seed beds, tobacco barns (effectively a dehydration system), steam boilers, storage and handling facilities.

110. Even in the case of the Essen Oil Co. which invested in a large purpose-built distillery, production of a range of

essential oils has proved profitable, including medicinal eucalyptus oil which commands a low unit price compared to the company's other products.

111. In addition, success has been achieved in production for the domestic market by commercial farmers of dried herbs, some spice seeds and, surprisingly, turmeric which in most countries is considered as a low profit, smallholder crop.

#### **Research and Extension Support for the Focal Commodities**

112. Research and development work on the focal commodities by the DRSS has in the past been sporadic, underfunded and a cadre of knowledgeable and experienced staff has not developed. Consequently, all of the successful new crop ventures listed above have occurred through farmers (and in the case of paprika, also the major buyers) falling back on their own resources to develop the necessary technology, often by trial and error. This situation shows no sign of changing in future.

#### **Extant Internal Marketing Systems for the Focal Commodities**

113. Paprika and Birdseye chilli marketing was initially a haphazard affair with farmers making sales to local traders inexperienced with these products and to South African traders, many of whom had no superior qualifications. Now, there are a number of specialist domestic purchasers, some of which provide in addition contract growing, seed and extension support facilities.

114. A positive step towards improving market awareness and infrastructure in a deregulated market has been taken by the establishment of Zimace (Zimbabwe Agricultural Commodity Exchange). The crux of this system is a self-regulating trading floor (with shareholders), where regulated brokers/traders can operate. It acts as a market place where farmers can sell their products through traders, while the public reporting system of bids and offer prices creates transparency and market information. The brokers/traders also act as a go-between, to facilitate trade between local producers and domestic or international buyers. Some of the local products (paprika, chillies, coriander, ginger and garlic) are quoted on the Zimace floor. It was not possible to investigate the effectiveness of the system but, according to the General Manager, volumes passing through Zimace have doubled from the previous year.

115. For essential oils, there are no domestic dealers or brokers and producers must undertake direct marketing. Small volumes of some items are sold to domestic consumers but for export reliance is placed on established dealers or brokers in the major markets.

#### **Investment Finance for the Focal Commodities**

116. None of the major loaning institutions present in Zimbabwe appear to have listed any of the focal commodities - or their further processed products - as potential candidates for investment loans in their current portfolios. This is almost certainly due to lack of knowledge of markets and potential, plus the 'minor crop' connotation. However, certain of the crops discussed later (paragraphs 136-137) would meet, for example, the conditions set out for loans in the agricultural fund being considered by the Commonwealth Development Corporation.

117. Another avenue - which is expected to develop quickly - is investment under a variety of forms by the private sector in South Africa. Food companies in particular wish both to source raw materials and to develop processing plants in Zimbabwe. The major current constraint here is the lack of intimate knowledge by these companies of Zimbabwe.

#### **Comparative Advantage with the Focal Commodities**

118. Zimbabwe possesses a mixed set of **comparative advantages/disadvantages with respect to existing or aspiring producers worldwide**, according to the particular commodity. In the longer-term, world demand/supply imbalances for certain commodities are likely to work in Zimbabwe's favour. However, a critically important immediate advantage for Zimbabwe lies in the management expertise of its commercial farmers.

119. With regard to **South Africa**, this brief study drew the conclusion that Zimbabwe possesses a comparative advantage for a wide range of crops, including a large number of the focal commodities. Therefore, Zimbabwe should be able to compete favourably against South Africa's own producers in that country's large and growing domestic market. It is for this reason that many agri-businesses in South Africa are actively considering investment in Zimbabwe. Particular advantages present in Zimbabwe by comparison with South Africa include:

- (a) an overall superiority in climate, soil quality and, most importantly, the availability of irrigation water; and
- (b) the quality and costs of labour for labour intensive agro-industries.

### The Smallholder/Communal Sector

120. It was not possible during the brief duration of the visit to directly investigate the smallholder/communal sector in relation to crop diversification. However, opportunities and constraints clearly apply for the focal commodities.

121. Major constraints in relation to smallholder and communal producers may be summarised as:

- (a) land limitations (and its quality) and an understandable emphasis on food production are not conducive to the general adoption of unknown cash crops;
- (b) past experience strongly suggests that highly demanding horticultural management systems will not be taken up by smallholders, even if adequate extension services were available;
- (c) similarly, any added-processing step which requires the production of a consistent, high quality product for market acceptance has a risk of failure; and
- (d) the crop range in many areas will be limited by the absence of irrigation facilities and the drought frequency.

122. Crop selection, therefore, should focus on those for which:

- (a) management demands are low and compatible with existing, traditional agricultural activities;
- (b) production can be undertaken by individuals on a relatively small-scale and where a marketing system can be readily established for purchasing

and bulking up lots to make a commercially viable consignment; and

- (c) product quality is largely governed by the germplasm used rather than by skill in cultivation and post-harvest handling.

## **NEW CROP DEVELOPMENT POTENTIAL AND NEEDS**

### **Needs to Facilitate Development**

#### **Market Information**

123. Improvement of market knowledge on the focal commodities is the priority need. Without this neither farmers nor traders can identify opportunities or take informed decisions on new ventures.

124. For many of the focal commodities, there are accessible published sources of market information on the **world markets** which, if not completely up-to-date, provide the essential necessary background. These publications should be acquired by an organisation such as Zimtrade and their availability should be disseminated within the farming and trading communities. In addition, interested individuals can acquire valuable current market information and contacts through attendance at international trade meetings. With essential oils, for example, the annual/biannual IFEAT seminars (various venues) and the Aromatic and Medicinal Plants conferences in Nyons, France are key events.

125. The immediate and pressing need, however, is acquisition of information on and establishment of personal contacts within the large, neighbouring **South African market**. It is ironic that many prospective South African buyers/processors/investors are equally ill-informed about Zimbabwe. A high priority should be assigned to compilation of a directory on buyers of the focal commodities in South Africa, together with seminars in which interested South African companies participate. Production, trade and investment opportunities can flow out of these two actions.

#### **Trade Barriers with South Africa**

126. Some constraints remain in place on the export by Zimbabwe of some commodities to South Africa. It is expected that this situation will be eased in future. However, ZimTrade and similar organisations should monitor

whether any barriers remain with the focal commodities, particularly through oversight of 'minor products'.

### **Investment Funds**

127. Loaning institutions in Zimbabwe should be encouraged to include appropriately qualified focal commodity projects amongst those eligible for low interest rate investment funds. This would overcome an important disincentive for farm diversification.

### **Technical Know-How Acquisition**

128. A substantial corpus of information on the focal commodities has been published internationally and this, together with similar market information, should be acquired by trade associations to form a library.

129. However, specific and detailed information acquisition will be dependent, in many cases, on the commissioning of highly qualified consultants or on technology-transfer through co-ventures with foreign companies.

### **Germplasm Acquisition**

130. The success of many new ventures within the focal commodity group will be dependent on achieving high crop yields and an end-product of an acceptable market quality. The two factors are intimately linked to the intrinsic characteristics of germplasm. Since the quality of the domestically available germplasm for a number of the focal crops is known to be mediocre, the introduction and bulking of elite material is a priority.

### **Candidate Crops for Further/New Development**

#### **The Provisional List**

131. Table 3 list a number of commodities which deserve closer examination as candidates for development in the immediate future by either commercial farmers or smallholder/communal farmers. This list was formulated, firstly, on the basis of perceived regional and international market opportunities and, secondly, with regard to the criteria discussed earlier on suitability for adoption within existing farming systems and other constraints.

### **The Smallholder Selection**

132. This list is fairly short and focuses on those crops which could be produced without high management skills and are not unduly demanding on labour inputs.

133. **Ginger and turmeric** would be best suited for the more humid, higher rainfall areas. Introduction of superior germplasm is imperative for turmeric.

134. **Guar and annatto** are suitable for drier areas. The latter has an attraction also as a perennial which can be grown on an extensive widely-spaced basis and, apart from at harvesting, it requires little attention after establishment.

135. Dried herbs and essential oils are presently omitted from these proposals for smallholders since it is questionable that either a marketable quality or an adequate marketable volume could be produced for the mainstream market.

### **The Commercial Farmer Selection**

136. **Certain spices and herbs** offer a potential for commercial farmers and the candidates are:

- (a) **Paprika** appears to offer scope for further production development, if at a carefully judged rate. The reason is that trends within agriculture in South Africa seem likely to result in a reduction in its production and a supply gap opportunity might ensue. Emphasis should be placed in future on improvement in overall product quality - through cultivar selection - and on management for yield enhancement.
- b) **Dried onions and garlic** are in high demand by the South African food industries and there is a substantial, if yet inadequately quantified, consumption of **dried herbs**. Processing of the raw materials could be carried out on farm after installation of drying equipment, perhaps using tobacco infrastructure to some degree. Alternatively, sales might be made to a nearby specialist vegetable dehydration plant. It is presently questionable whether these items would

**Table 3: Candidates for Further or New Development**

	Target market:	
	regional	international
<b>For Commercial Farmers:</b>		
(a) Spices and herbs -		
bulk { paprika		✓
volume { dried onion and garlic	✓	
smaller { dried herbs	✓	
volume { spice seeds	✓	
(b) Essential oils -		
small { mainstream herb oils	✓	
volume { spice seed oils	✓	
medium { lime		✓
volume { geranium		✓
{ vetiver		✓
{ citronella	✓	
bulk { lemongrass	✓	
volume { Piper (sassafrass)		✓
{ eucalyptus		✓
<b>For Communal/Smallholder Farmers:</b>		
guar	✓	
turmeric	✓	
ginger	✓	
spice seeds	✓	
annatto		✓

be attractive for export to the international market owing to their relatively low bulk density and high transport costs.

- (c) **Spice seeds** (coriander, etc) might similarly present an opportunity for the South African market but the economics require closer examination.

137. **Essential oils** offer a range of opportunities, both for the regional and international markets. However, the farmer must choose whether his operation is to be on a small-scale with minimum investment in equipment and maximum integration with tobacco operations (eg the existing tagete oil model) or if it is to aim at the bulk volume market, in which case there must be a commitment to higher investment and providing the additional management and labour. With regard to the products suggested in Table 3:

- (a) Small-scale production is possible with **herb and spice seed oils** and this activity could be linked with a dried herb and spice seed operation. Initial sales should be targeted at South Africa.
- (b) **Lime oil** (distilled, West Indian type) is included in the list because of the expected global growth in demand, its proven suitability for cultivation in the area north of Harare and the potential for incorporation in the existing citrus development. Processing by individual farmers could be on a small or large scale but investment costs would be higher than for herbaceous oils since there is a requirement for a purpose designed distillation vessel for liquid charges and for screw-presses, plus the lag-time before harvesting commences.
- (c) **Geranium and vetiver** present opportunities for modest-scale penetration of the international market. With the former, however, the producer must accept a commitment to undertake harvesting and distillation repeatedly during the year and this implies provision of additional labour during the tobacco season and expansion of steam boiler facilities.
- (d) The other oils listed in table 3 are **bulk volume market types** and all would involve virtually year-

round harvesting and processing. By appropriate management, a basket of oils could be produced and this would provide a buffer against price fluctuations. Moreover, citronella, lemongrass and *Piper* (sassafrass) could be mechanically harvested.

- (e) New trials are merited with *Eucalyptus polybrachtea* as a source of medicinal eucalyptus oil. This is a bush or 'mallee' species which is the source of Australian commercial oil and is harvested mechanically. It is also very drought tolerant.
- (f) Sassafrass oil, ex. *Piper hispidinervium* is included since market prospects for new suppliers are uniquely good and the crop is likely to prove adaptable to the conditions in the northeast of Zimbabwe. The primary requirement here is to acquire seed for trials from Brazil.

#### **Exclusions and Cautions**

138. On the basis of small-size of their markets, general encouragement should not be given to expanding production of **Birdseye chillies and Tagete oil**. Any growth in demand could be readily catered for by existing suppliers in Zimbabwe and in the case of Tagete oil production/ productivity could be readily increased by selection/ breeding and improved management systems.

139. Although a shortage has occurred in 1995, the **orange oil** market has been oversupplied for a number of years and production of this commodity might not prove attractive. Any development would be an adjunct to juicing.

140. Some scope may exist for expanding exports of high quality **fresh herbs and organic dried herbs**. However, demand for both is finite and there are many other existing or prospective suppliers. It is probable that this export market will become highly competitive.

141. A similar situation exists in the overseas **aromatherapy/organic essential market**. Prices are presently highly attractive but the bubble could rapidly collapse with the entrance of a small number of new producers. The best strategy here is perhaps to produce these oils is a 'bolt-

on' at low cost to an existing operation and 'to make hay while the sun-shines'.

142. The **paprika oleoresin** market is highly competitive and the region as a whole probably has surplus processing capacity for the short-term. Investment in new facilities, therefore, would be a high risk venture. Development of a wider range of products from the existing domestic facility would be wise.

**ORGANISATIONS VISITED AND PEOPLE MET IN ZIMBABWE**

**Commercial Producers of Essential Oils, Herbs and Spices**

Four Seasons Foods 1 St James Building Borgward Road Msasa POB AY56 Amby, Harare		Producer/exporter of tagete and herb oils and organic herbs; supplier to the domestic market of herbs, spices and their processed products.
Tel 497-788/487-832 Fax 4-497788		Mr Mike Jack, Managing Director and Mrs Anne Jack
Mr Peter Stuart Gem Farm POB 94 Concession	}	
Tel 175-6-27819	}	
Mr Colin Nethersole POB 60 Centenary	}	Zimbabwe Aromatics: Tagete oil producers
Mr Alan Ravenscroft	}	
(Mr B Martin Arda Farm POB 120 Mvurwi	}	
Essen Oils Co (PVT) Ltd PO Box 474 Marondera		Producer/exporter of oils of Tagete, Tea Tree, <i>Lippia</i> sp. and medicinal eucalyptus
Tel 179-342019/342023/ 341021 Fax 179-24279		Stuart and David Tippet (Chris Tippet, owner)
Mazoe Citrus Limited Mazoe Estate Mazoe		Citrus oil producer (inc. lime)
Tel 175-2431		Mrs Mosley (Mr John Mosley, Marketing Manager)

### Commercial Farmers in Chinhoyi Area

Lions' Den Syndicate  
POB 251  
Chinhoyi

Chairman: Mr Les de Jager  
(Ormston Farm;  
tel 269315/269420)

Tel 167-22838/22166  
Fax 167-22219

Members:  
- Mr A Greyling  
- Mr J.v.d. Westhuizen

### Paprika and Chilli Buyers/Exporters

Hy-Veld Seed Co (Pvt) Ltd  
181 Munhondo Road  
Ruwa Growth Point  
Private Bag 2008 Ruwa

Paprika exporter

Tel 73-2684/5  
Fax 73-2658;  
4-722534

Mr T Hedge, plant  
pathologist  
(Mr G Gollach, M/D)

Paprika Zimbabwe (Pvt) Ltd  
174 Harare Drive  
Beverley East  
POB AY4  
Amby, Harare

Paprika oleoresin  
manufacture and exporter

Tel 487-636/876  
Fax 487-879

Mr Paul Elliot, General  
Manager

Lomag Exports (Pvt) Ltd  
14A Derby Road  
Avondale West  
Harare

Exporter of paprika,  
Birdseye chillies, Rhodes  
grass seed and other  
commodities

Tel 4-335407/333979  
Fax 4-333979/339526

Mr Alan Elliott  
Export Manager

### Naval Stores Industry

Zimbabwe Phosphate  
Industries Limited  
PO Box AY120  
Amby, Harare

Tel 4-498051  
Fax 4-495393

Mr H Mujinga, naval stores  
production manager  
(Mr D Rock, General Manager)

Others in the Private Sector

Commonwealth Development  
Corporation  
101 Union Avenue  
POB 3758, Harare

Tel 724286/7/8  
Fax 705503

Ms Sue Haley, Portfolio  
Executive

Plant Oil Producers  
Association  
POB UA518  
Union Avenue  
Harare

Tel 173-25784

Mr Geoff Oliver, Executive  
Officer

Zimbabwe Tobacco Association  
ZTA House  
Baker Avenue  
POB 1781  
Harare

Tel 727441  
Fax 724523

Mr C Molam, Chief Executive

Nature Nurture  
POB 2003  
Ruwa

Traders in flowers,  
medicinal plants, fragrance  
oils and cosmetics

Tel 73-2771/2  
Fax 73-2321

Mr Alan Taylor

Horticulture Promotion  
Council  
Agriculture House  
Leopold Tucker Weara St  
Harare

Zim Trade  
4 Floor, Kurima House  
89 Baker Avenue  
POB 2738  
Harare

Export promotion association

Tel 4-706772/731020  
Fax 4-706930

Mr Perry McQueen, Market  
Adviser

Zim Ace  
POB CY2277  
Causeway  
Harare

Agricultural commodity  
exchange

Tel/fax 734649

Mr Ian Goggin

**Government/Parastatal Bodies**

Industrial Development  
Corporation Limited  
93 Park Lane  
Harare

Tel 4-706971  
Fax 4-796028

Dr C T Chitsora, Projects  
Manager

Dept. of Research and  
Specialist Services  
POB CY550  
Causeway  
Harare

Tel 14-704531/704541  
Fax 4-728317

Dr J N Mushonga, Head of  
Crop Breeding Institute

**Donor Community**

World Bank Office  
Finsure House  
Fifth Floor  
Union Ave/2nd St  
POB 2960  
Harare

Tel 729611/2/3  
Fax 708659

Ms Gillian Williams,  
Visiting Missions Secretary

German-Zimbabwean  
Business Cooperation  
Programme  
Advisory Service for Private  
Business Promotion (ASPB)  
4th Floor, Fidelity Life  
Tower  
Cnr. Raleigh/Luck Street  
Harare

Tel 739833  
Fax 750953

Mr Heinz Hoehmann,  
Zimbabwe Coordinator

**ADDITIONAL USEFUL NAMES AND ADDRESSES ACQUIRED**

**Private Sector**

Lever Bros (Zimbabwe) Ltd POB 56 Harare	Manufacturers of soap. detergents, etc
Tel 61941/61841	Mr Nyeregona, M/D
Bush Boake Allen Zimbabwe Limited Club Chambers Baker Avenue POB HG66, Highland Harare	Multinational flavour and fragrance house
Tel 4-703681 Fax 4-738774	Mr Oliver Ryder, M/D
Tanwood Trading Limited Galloway Road Norton	Paprika buyer/exporter
Tel 162-2642 Fax 162-2679	
Commodity Trading Ltd	Paprika buyer/exporter
Trinidad Industries Ltd 7 George Ave Amby POB AY60 Harare	Buyers and users of castor oil
Tel 486740 Fax 486673	Mr D Chakrass, M/D
Minequip Limited Harare	For information on guar gum
Tel 486565	

Organic Products Technology  
Limited  
Msasa

Guar

Tel 738-077

Agricura (Pvt) Limited  
POB 2742  
Harare

Chemical company, extractors  
of pyrethrum

Tel 62571

**Government/Research**

Zimbabwe Village Oil Press  
Project  
Harare

Small-scale oilseed  
production

Tel 702760  
Fax 725640

Mr Mupunga, Director

University of Zimbabwe  
Harare

Essential oils research:  
Dr Chigonda, Dept. of  
Chemistry  
Prof. Gungdiza, Dept. of  
Pharmacy

**MALAWI: DETAILED COUNTRY REPORT**

**COUNTRY POPULATION PROFILE**

- Population:
- 9.5 million
  - 99 per cent, black ethnic group, predominantly low income
  - 1 per cent, European/Asian ethnic groups
  - 87 per cent of total population are rural dwellers

**SPICES AND HERBS SECTOR**

**Market Characteristics**

**Market Structure**

1. Spices and herbs are retailed in Malawi by three channels. There is a small, supermarket operation which sells pre-packaged, imported brand-names (dominated by Robertsons of South Africa) and is aimed mainly at the expatriate community. The volume sales, largely of curry powder, appear to be made through the Asian community which has three or four traders/grinder companies in Blantyre. There is also a significant but unquantifiable informal market sector which sells a very limited range of domestically grown spices: chillies, coriander and a little turmeric, ginger and garlic.

2. Fresh herb sales are minute and are virtually restricted to restaurants and hotels which have direct contacts with the few, urban growers in Blantyre and Lilongwe.

3. Malawi has a small processed food sector which employs spices and herbs as ingredients.

**Market Demand**

4. It is not possible to quantify the market demand for spices owing to the fragmentation of the market and the lack of any prior surveys or reliable published statistics. However, it is fairly small since the majority black and mainly rural population do not have a developed taste for 'spicy' foods.

5. Coriander is probably the largest item consumed and it is followed in importance by chillies. Consumption of the former is perhaps several hundred tonnes annually. However, no firm figures can be placed on these items since they are produced domestically and much passes through informal trade. One of the Asian spice trading companies reported that it imports two containers of coriander and cumin a year, plus smaller quantities of the general range of spices. On the basis of reported import shipments for turmeric and a small domestic production, demand for this spice may be of the order of 100 tonnes annually.

#### **Sourcing of Materials**

6. Domestic production provides the market with its bulk needs for coriander and chillies. However, the supply of coriander has been declining and Asian traders believe that imports may become necessary if this trend is not reversed. Domestically produced turmeric and ginger were reported by all spice traders as difficult to purchase in significant or regular quantities.

7. Most imported spices originate from India.

8. Food processing companies, such as Lever Bros., import precompounded flavour packages, mainly via South Africa.

9. Apart from one renowned producer of a Tabasco type sauce, all brand-name spiced sauces and preserves are imported and again mainly from South Africa.

#### **Production**

10. Volume production of spices over the past decade has been confined to coriander and mildly pungent chillies for the domestic market and to Birdseye chillies for export. Production of paprika for the export market commenced in 1994 and it is expected to grow and outstrip all other spices in volume terms by a factor of ten within a few years.

#### **Coriander**

11. This spice has been grown for many decades by smallholders, mainly in the Bvumbe and Thylo areas to the South of Blantyre. The traditional main purchasers were Asian traders who served the domestic market and engaged in exports. Following independence, however, Asians were not

permitted to engage in trade in the rural areas. The primary buyer in the growing areas became the newly created parastatal, Admarc (Agricultural Development and Marketing Corporation). As a result of this organisation's pricing structure, coriander production leapt to an estimated several thousand tonnes around 1974 but then fell soon thereafter when the extent of demand became apparent and Admarc prices were adjusted accordingly. All of the surplus Admarc stock was purchased by Asian traders and this proved sufficient to supply the domestic and export markets for some two years. In some years during the early 1980s, domestic production was inadequate for demand and imports were made from India.

12. During the 1990s, production has been no more than adequate for domestic demand and, as noted earlier, Asian traders are concerned over future supply levels. Admarc reported that it was no longer trading in this commodity, although aware of the demand from the urban-based Asian buyers.

13. The Malawian spice is a European, small-fruited type with a high volatile oil content.

#### **Mildly Pungent Chillies**

14. Medium-sized, mild to moderately pungent chillies have been grown traditionally by smallholders in Southern Malawi. Admarc was assigned monopoly rights for purchase during the 1970s and annual production increased to some 600 tonnes. Large, unsold stocks were accumulated by Admarc which then cut producer prices and this led to a dramatic fall in production. By 1982, the stock available for export was around 50 tonnes only. The shortage forced the domestic chilli sauce manufacturer (Nali) to employ the higher value Birdseye chillies as an ingredient.

15. Admarc relinquished its monopoly for purchase of chillies in the latter 1980s and a number of black ethnic group traders engaged in limited purchases, together with the traditional Asian traders. Current production is unquantified but low and Admarc, the buyer of last resort, purchased only 5 tonnes in 1994.

#### **Birdseye Chillies**

16. The small-fruited, highly pungent Birdseye type of chilli has been grown also for many decades by smallholders;

**Table 1: Malawi's Demand, Production, Imports and Exports of Some of the Focal Commodities (Estimates)**

tonnes

Item	Domestic demand	Imports	Production in 1994	Exports in 1994	Production trends
Paprika	VS	VS	150	....	Growth, expectations of 1,000t. in 1995 and 2,000t in 1996
Nali (chilli) sauce	NA	nil	NA	3 containers/month	Growing
Birdseye chillies	S	nil	300	250-300	Growth, particularly in non-traditional areas
Mild chillies	NA/M	neg	100?	30 (ground)	Static, export market promising for ground
Turmeric	100?	70	NA/S	nil	Static/decline. Inadequate supply
Ginger	NA/M	neg	NA/S	nil	Static/decline.
Coriander	300?	occasional	300?	nil	Decline. Was 3,000 tonnes in 1974
Other spice seeds	50-100?	50-100	nil	nil	
Pepper	NA/M	NA	VS	nil	} minor production by estate, mostly stolen
Cardamom	NA/M	NA	VS	nil	}
Citronella oil	70	70	nil	nil	Short-term estate production over 90/93
Guar seed	NA/S	nil	2,000	2,000	Decline. Was greater than 6,000t in 1982
Castor	NA/M	NA	NA/S	NA	Static, decline. Resource is substantial.
Annatto	NA/VS	NA/VS	2	2	Interest shown in development. Wild trees and some small estate plots available
Gum turps	Pot 100	neg	nil	nil	} Production mooted for 1996; Output: 800t rosin, 150t turps
Gum rosin	Pot 800	<10	nil	nil	}
Colombo root	neg	nil	120?	90	Wild crop. Harvesting responsive to demand

Key: NA not available  
M moderate

S small  
VS very small

neg negligible  
? informed guess

originally on a much smaller-scale than the less pungent, larger-fruited types. The first serious interest in bulk volume exports developed in the latter 1970s when a supply gap became apparent in the market (see Appendix 8).

17. In 1982, Admarc were exporting around 20 tonnes of Birdseye chillies which were sourced from smallholders and on its own estates. Simultaneously, estate cultivation was underway by Nali Farms and Namingomba Tea Estates, both producing about 20 tonnes. In the following years, large scale smallholder production developed in the Southern region while Namingomba ceased production (as insufficiently profitable) and Nali Farms reduced its cultivated area. By 1988, Malawi had assumed the position of the world's major supplier of Birdseye chillies with annual exports fluctuating around 300 tonnes.

18. Cultivation by smallholders occurs as both pure stands and as an intercrop (usually with maize). Sales are made by farmers of kilogram quantities or less, either to an Admarc purchasing point or to a hawker on a bicycle who resells to private sector exporters. Around 300 rural suppliers service the private sector, which purchases only premium grade material and was paying Kw. 11 to 12 in 1995. Admarc accepts both the premium grade at a price of Kw. 9/kg and the off-colour, second grade at Kw. 4.5/kg; the latter is not exported but instead is sold to Nali Farms for use in its chilli product manufacturing operations.

19. The export trade is now dominated by Blantyre-based private traders from the black community who have received support from US AID in the formation of a Herbs and Spices Association. Admarc follows next in importance while Group Commodity Traders, a sister company to Namingomba Tea Estates and formerly a major exporter, is now a minor in the Birdseye export trade. The major market for all exporters is Europe (Holland, followed by the UK) but with significant sales in South Africa. Admarc has sold through South African companies since its trade commenced.

20. None of the traders interviewed during the study were prepared to estimate the scale of recent production or exports. The principal exporter, Nali Farms, shipped 162 tonnes in 1994 but owing to the recent drought did not expect to handle more than 112 tonnes in 1995. Admarc reported purchase of around 200 tonnes of all grades while Group Commodity Traders exported 24 tonnes in 1994. Concern, if not pessimism was expressed within the private sector over

increasingly serious competition from Zimbabwe (see Appendix 3A, paragraphs 20-26) and the re-emergence of Uganda and Mozambique as suppliers.

21. In contrast to the exporters' fears for the future, the production trend was reported as on the increase and, most significantly, there has been an entrance of new suppliers in non-traditional growing areas, including the north. This indicates a poor market awareness at the producer level generally and growing economic pressures for cash crop diversification in the new areas. Also, it is worth noting that during the November 1994 Fora a clear impression was obtained from participants who were resident in non-traditional Birdseye growing areas that they considered the crop to have virtually unlimited potential.

### **Paprika**

22. Paprika cultivation on a significant scale commenced in Malawi during 1994, although Nali Farms stated that it had grown the crop for some years as an ingredient for its processing operations. The introduction of paprika is attributed to the promotion activities of a Zambian based company, PIPO (see also Appendix 5A, paragraph 9).

23. Several estates (including Press, Namingomba and McPhersons) plus some smallholders planted 100ha or more in total during 1994. Shortly after the end of the season, PIPO collapsed as a trading company and the producers were variously left with unsold stock or being unpaid for material received and shipped by PIPO. Subsequently, sales of some material have been made to Spanish buyers who visited Malawi in February 1995 and to a Zimbabwean company operating in the Zomba area.

24. In spite of this early set-back in marketing, interest in the crop has been maintained, some 450 ha are expected to be cultivated in the current year and the 1996 planting is predicted as 1,000-1,500 ha. The 1994 experience revealed that the crop was suitable in many respects for Malawi: ease of integration with Burley Tobacco production; no major problems of management even by tenant farmers; fair yields for the first ever harvest (1.6 tonnes/ha average for rainfed and 2.5-3.0 tonnes/ha under irrigation); and an income potential considered comparable to tobacco.

25. A part of the stimulus to continue has come from a new Zambian-Malawian owned company, Cheetah Limited which was

established by one of the former partners in PIPO. This has an office and a warehouse (under construction) in Lilongwe and is providing seed and technical guidance to growers on the condition of sell-back of the crop. The purchase price will be set on product colour quality with a part payment on delivery and the balance received 8 to 12 weeks later on completion of assays in Cheetah's Lusaka laboratory. Some 80 ha are likely to be grown for the company in Malawi in the current year.

26. Other estates are proceeding independently, notably Press Agriculture which is expanding to 350 ha in 1995 and is planning for 650 ha in 1996. Performance by Press' tenant farmers was good in 1994 and direct contact with Spanish buyers has bolstered confidence.

27. Assuming modest yields and actual plantings of the order indicated above, production in 1995 and 1996 perhaps will be of the order of 1,000 and 2,000 tonnes, respectively.

#### **Turmeric and Ginger**

28. Smallholders, mainly in the Thylo area to the South of Blantyre, have traditionally grown ginger and turmeric; the former is marketed both in the fresh and dried forms while the latter is dried, but not pre-boiled or finished by polishing. Admarc does not purchase these commodities and, owing to the problem of transport for sales to buyers, production appears to have declined over the past decade.

#### **Onion and Garlic**

29. These two crops are fairly widely grown in Malawi for the domestic, largely informal market.

#### **Black Pepper and Cardamom**

30. Small quantities of these two spices have been grown on the Namingomba Tea Estate since the early 1980s for sale on the domestic market. Development of larger scale production has been discouraged to a significant extent by the rate of theft; both spices command a high local price.

#### **Herbs**

31. Parsley and other common herbs (thyme, etc) are grown on a kitchen-garden scale in the major towns.

## **Processed Spice Products**

32. **Curry powder** has been a traditional manufacture of the Asian companies in Blantyre, both for the domestic and regional markets (especially Zimbabwe and Zambia). Shortages of domestically grown base ingredients have posed a constraint on what was once a significant export item and is still regarded as of high potential by Asian traders.

33. However, this sector provides a contrasting and remarkable example of the successful development since 1980 of a product which is now a household name in Southern Africa and in parts of Western Europe, **Nali Sauce**. This is a tabasco type, chilli sauce which is retailed in distinctive 450 kg bottles. Production was initiated by Mr Khoromana, the owner of Nali Limited, for the domestic market and soon it attracted the attention of the Portuguese and French markets. In 1982, demand was estimated at 3 tonnes per month but production was constrained by shortages of mild chillies and packaging materials. By 1988, the operation had developed to the export of one container per month to South Africa and smaller but growing sales in Western Europe. Today, the operation is a major business with an export of 3 containers a month and continued signs of growth in demand. Sales are made across the region (South Africa, Zimbabwe, Zambia, Tanzania) and in Europe. Nali sauce is marketed in the UK by an Asian-owned firm, Transglobe Produce Exports of Blantyre.

34. Nali Limited have also steadily built up an export trade in **ground cayenne pepper**, using the traditional moderately pungent Malawian chilli as the raw material. The South African market has been taking 30 tonnes annually and more recently orders have been received from Turkey. The company expects this product to assume greater importance in future than its trade in Birdseye chillies.

## **Research and Extension**

35. Research on spices is the responsibility of the Ministry of Agriculture and particularly the Bvumbe Agricultural Research Station, near Limbe. During the Colonial period, a wide range of germplasm was introduced (pepper, cardamom, turmeric, ginger, cinnamon, vanilla, etc) and established on research station plots around the country. Post-independence, no priority was assigned to these commodities within the Ministry of Agriculture and work on the research station has been limited to plot maintenance and the occasional small-scale multiplication of stock for interested parties in the

private sector. There is no capability within the Extension Service on spices.

## **ESSENTIAL OILS**

### **Market Characteristics**

#### **Uses and Demand**

36. The major demand for essential oils in Malawi lies in the soap and detergent industry, based in Limbe. There are three manufacturers which range in size from the giant, Lever Bros. (20,000 tonnes of soaps annually) to the very small operation of Royale Chemicals. As elsewhere in the region, **citronella oil** is the main fragrance ingredient for the volume market, inexpensive laundry soaps. Lever Bros. consume 50 tonnes of citronella oil annually and total demand is tentatively estimated at 70 tonnes.

37. No firm data could be obtained for consumption of other essential oils. However, it is evident that lemongrass is used in various fragranced products, mint oils in toothpaste and citrus oils in some beverages.

38. A growth in fragrance oil usage may be expected on the basis of trends elsewhere in the region. This is supported by the (uncorroborated) report of the recent acquisition of a domestic toiletries/cosmetics company by the South African firm, Amka Limited.

#### **Sourcing**

39. All essential oils are currently imported and the majority probably are received in pre-compounded, ready-to-use formulations for fragrance or flavour applications.

40. Citronella for soap is sourced by Lever Bros. from its sister company, Quest in the UK in the form of a ready-to-use fragrance compound (with a 90 per cent citronella oil content).

41. The Commercial Director of Lever Bros. stated that it was company policy to source locally when possible, paying import parity prices. It had in fact purchased between 1990-93 citronella oil of acceptable quality which was produced by the Central Africa Company's Makande estate. Supply was terminated by the producer as Lever's price was insufficiently attractive within the estate's cost/return structure.

## **Production**

### **Current**

42. There is no current commercial production of essential oils in Malawi and the citronella venture mentioned above is the only known attempt since the mid-1970s. However, interest in the subject by some estates was reported, including that of the Central Africa Co. which apparently has not been deterred completely by its recent experience with citronella.

### **Previous Production**

43. A commercial-scale distillery was commissioned at Mbawa, near Mzuzu in 1968 for the production of oil from a previously unexploited, indigenous flowering shrub; **ninde** (*Aeolanthus gamwelliae*). Raw material was produced by a nuclear estate and by smallholder outgrowers. The initiative followed an extensive series of pilot-processing, marketing and cultivation trials conducted by Ministry of Agriculture research stations with the assistance of the UK's Tropical Products Institute (the precursor of NRI), see Ames and Matthews, 1970; refs.38 and 39.

44. Ninde oil possesses properties similar to Indian palmarosa oil and captured a market in Europe, both as a palmarosa-like oil *per se* and as a source of isolates. Although production lasted for only a brief period (1968-73), some former buyers still express regret at its demise.

45. Several factors contributed to the cessation of production; one being nematode problems and reduced crop yields but this is a management problem which should not be insuperable. The main cause was that Admarc insisted that it take on a monopoly for oil exports and then failed to ship promptly against orders placed by buyers. This behaviour is fatal for any new supplier to the very conservative, mainstream essential oil trade and also undermines all the hard work invested in developing a market for a previously non-commercial oil.

### **Prior R&D on Other oils**

46. During the period 1960-1973, the Bvumbe research station and TPI collaborated on investigation of the potential for production of a range of mainstream market oils and the results are summarised below:

- (a) **Geranium** (Kenyan origin) showed promise in trials. Nkata Bay and the Lower Shire Valley were considered potentially suitable cultivation areas.
- (b) **Vetiver** provided good oil yields and the quality, if not the best, was acceptable.
- (c) **Tagete** provided an acceptable, African type oil.
- (d) **Patchouli** gave fair yields and was considered a candidate for the Nkata Bay area.

47. None of this work was followed up, partly as a result of the after-taste left by the ninde experience.

48. One other oil, **Mulange cedarwood** (*Wridlingtonia whytei*), was evaluated in the 1980s (see Green et al., 1988; ref. 40) or, rather was re-evaluated as a follow up to the first study in 1934 by NRI's first incarnation, the Imperial Institute. The tree is unique to the Mount Mulange area and is valued as a source of timber which, also, possesses a pleasant cedarwood aroma. In the course of harvesting on Mt Mulange, much sawdust accumulates as waste in the sawpits and this could be used as feedstock for a small distillery sited in the area. The 1980s study revealed that 1 tonne of oil could be produced annually. However, the oil composition was different from established, commercial cedarwood oils and no interest could be generated in the mainstream market owing to this fact and that only a small production would be possible. Attempts to interest Lever Bros., Blantyre in producing a speciality 'Mulange cedarwood soap' failed since it focusses on bulk volume products.

49. No trials appear to have been conducted on the production by the coppice system of **Eucalyptus citriodora** oil, a close relation of citronella oil, although the tree clearly grows well in the Blantyre area. (No medicinal eucalyptus species are grown in Malawi).

## **NAVAL STORES**

### **Market Demand**

#### **Rosin**

50. The only current consumer of rosin in Malawi is Valmore Paints Limited which imports small quantities of derivatized

rosin as a tackifier in adhesive manufacture. This company also might employ rosin for alkyd resin production in future, bringing its demand up to 15 tonnes.

51. However, there is a much greater potential for consumption and import substitution:

- (a) Lever Bros. confirmed during this study that it could employ gum rosin as a partial (5 per cent) substitute for its imported Malaysian palmsterine in soap manufacture. (Tallow is no longer used for soaps owing to odour problems). Levers presently consumes 1,000 tonnes per month of palmsterine and the substitution potential by rosin is some 500 tonnes per annum.
- (b) If a paper industry is established in Malawi - as currently mooted - then this would create a further demand for rosin, estimated by Coppen (1995; ref. 64) as likely to be some 800 tonnes per year.

### **Turpentine**

52. Valmore Paints have indicated that there is a potential for its consumption of 100 tonnes or more of turpentine annually as a substitute to imported white spirit, subject to price and quality (Coppen, 1995).

### **Prospects for Gum Naval Stores Production**

#### **Resource Potential Assessments**

53. A series of appraisals have been made by NRI of the potential for establishing a gum naval stores industry in Malawi. (Green, 1982; Smith and Coppen, 1983, Coppen and Greenhalgh, 1985, Coppen, 1995; refs. 14, 63, 64 and 60). This work concluded that it would appear viable to operate a factory with a 1,000 tonne annual throughput of pine gum oleoresin, drawing on the existing, if finite *Pinus elliotti* resource in the northern, Viphya forest. This would produce annually some 800 tonnes of gum rosin and 150 tonnes of gum turpentine, of which all but a portion of the turpentine would command a local market. Other pine resources exist in the Southern region but a question mark has been raised in the NRI studies over the potential to support a separate and viable factory owing to uncertainty of gum tapping yields and some other factors.

54. Over 1992-94, Pinechem Limited of South Africa has conducted its own tapping trials in the Viphya. The results were sufficiently promising for the company to propose a co-venture with the Viphya Pulp and Paper Corporation (VIPCOR), the parastatal charged with responsibility for development of the Viphya Forest.

#### **Present Status**

55. Pinechem Limited and Vipcor have negotiated an agreement for a co-venture (the Malawi Pine Resin Co.) in which the South African company will provide a small part of the equity but, more importantly, will supply the technology know-how and the marketing expertise. The major financial investment would be made by Vipcor, Indebank and the Malawi Development Corporation. Processing would be undertaken in a 1,000 tonne capacity factory, sited in the Viphya and the targeted market is Malawi itself. Subject to approval of the tapping plan by the Forestry Department (which has reservations over the tree requirement), tapping would commence in late 1995 and a factory (largely constructed domestically) would be build in 1996.

56. It is understood that a Lilongwe based company, International Commodities - with financial backing from Japan - also has made proposals to establish a naval stores factory (2,000 tonnes capacity) which would draw on gum from both the Viphya and the Southern region forests. If both this and the Pinechem-Vipcor venture proceed, the local market would be oversupplied in the medium-term and, more importantly, the tree resource would seem inadequate for the operation of two factories at full capacity.

#### **WATER SOLUBLE GUMS**

##### **Market Demand**

57. The consumption of gums by industry in Malawi could not be established during the mission. However, it is probably small.

##### **Guar Production and Exports**

58. Commercial-scale cultivation of guar commenced in 1976 in the Lower Shire Valley, to the South of Bangula. This was an initiative by the Ministry of Agriculture and Admarc and with the encouragement of the US Cellanese Corporation.

59. Production initially involved some estates but then developed with a clarity as a smallholder crop. Between 1978 and 1982, annual production of guar seed fluctuated between 3,500 and 5,000 tonnes a year, depending upon rainfall. All purchases were made by Admarc which then had sole rights for the crop. Sales of the crop were made both to the USA and South Africa.

60. Around 1983, Admarc constructed a factory at Bangula to process 3,000 tonnes or more of seed into splits. This stimulated a further expansion of smallholder production. However, the quality of the processed splits proved poor and the return from sales proved less than exporting the unprocessed seed. In 1985, Admarc had accumulated an unsold stock of some 15,000 tonnes owing to this problem and a global recession in the petroleum industry.

61. This situation prompted an Asian-owned company, Transglobe Produce Exports, to purchase seed from Admarc and to export to South Africa. Investment was made subsequently by this company in processing facilities for the production of splits and for second-stage refining. This material was of a high quality and found a ready market in the region. Transglobe's annual processing capacity is now 8,000 tonnes.

62. Since 1990, the Admarc factory at Bangula has run down and has now ceased operation, owing to product marketing problems, lack of funds for refurbishment of equipment and most recently inadequate supplies of seed. Admarc prices for seed have been low for several years and production by smallholders fell to 2,000 tonnes in 1994. The competing crop in the Shire valley is cotton which commands a good price and a stable market.

63. Transglobe has developed collaborative links with traders and processors in Zimbabwe and South Africa and jointly they have developed a strategy to achieve total import substitution in the region. The company is prepared to further expand its processing capacity and to manufacture fully refined gum. This phase, however, is frustrated by shortage of supplies. In spite of offering farmers twice the Admarc price for seed (currently Kw. 0.45/kg) and seed for planting, the failure of the Government to revoke the ban on Asians trading in rural areas has foiled Transglobe's attempts to stimulate production. Many farmers appear unaware of the Transglobe price or find it impossible or uneconomic to transport their seed to towns and are dependent on sales to the area Admarc

purchasing point. Transglobe, therefore, must purchase when and where it can and, also, buy in from Admarc.

64. Admarc's export of seed is now at a low level, purchases of seed over the past two years have been around 200 tonnes which is a mere fraction of purchases by the private sector. Formerly, unprocessed seed was exported by Admarc to Kumix in Switzerland and to South Africa. Its splits were sold on the Agricultural Products Exchange in South Africa while meal found an outlet both in that country and with the domestic animal feed industry. Admarc is presently considering a doubling of the producer price and promotion of production via radio advertisements.

#### **Karaya Gum**

65. Wild sources of karaya (*Steraculia*) gum occur in a number of areas of Malawi. Export oriented harvesting has been mooted for many years with the Forestry Department displaying interest.

66. There is currently a limited production on some small private estates. Admarc has separately dipped its fingers into stimulating production on customary land since 1990 but has been unable to accumulate sufficient material for a commercial shipment to a known interested buyer in France. Its operation involves one extension officer whose training is not great and some opposition has been encountered from the Forestry Department over conservation risks arising from inappropriate tapping methods.

67. There is currently no active coordination between Admarc and the Forestry Department on developing expertise for sustainable production.

#### **CASTOR SEED**

68. Castor occurs wild in Malawi and is informally cultivated in some areas, notably along the Lakeshore. The resource is potentially great but has not been quantified.

69. Formerly, there was a significant scale of production and exports of seed were made by Admarc, mainly to South Africa, up until 1990. Admarc purchases in recent years have been of the order of a few tonnes annually.

70. The major current buyer is Valmore Paints which employs the oil in its manufacturing operations. The seed is pressed for Valmore by Namingomba Estate.

71. Lack of awareness by smallholders of the market potential, physical problems of transporting the crop to a purchasing point - an Admarc branch is the sole outlet in many areas - and the Admarc price appear to be major constraints on further development.

## **NATURAL COLOURANTS AND SOME OTHER MATERIALS**

### **Annatto**

72. There appears to be a small market demand by Unilever and the cheese industry for annatto, which is imported in the form of the nor-bixin extract. The scale of demand and annatto's market share vs synthetic beta-carotene could not be ascertained during the study.

73. Annatto occurs wild in many areas and is estate grown on a small-scale by the Central Africa Co. and the Namingomba estate. The latter recently exported two tonnes to South Africa but there has been no follow-up by the buyer.

74. Interest was expressed by the above named estates and by Press Agriculture in this perennial crop with its potential for added-value processing. Knowledge of markets, however, is presently slim.

75. Admarc appears never to have expressed interest in the crop.

### **Marigold and Pyrethrum**

76. Press Agriculture reported that visiting Spanish paprika buyers had expressed interest in stimulating the development of marigold meal or its extract. The latter was prompted by the fact that Press has a extraction unit already installed for pyrethrum.

### **Colombo Root**

77. Colombo root is a traditional export crop, harvested from wild shrubs, mainly near the Lakeshore. It has a history of medicinal use for stomach and intestinal disorders in Europe, mainly in Germany, but UK traders report that demand is irregular and showing signs of a downward trend.

78. During the 1994 season, several containers were shipped each by Group Commodity Brokers and Tabawera Investments and some other exporters are known to be engaged in the trade. No

figures on total production and exports are presently available, but several traders are known to be holding unsold stock from the 1994 season.

79. Harvesting, slicing and drying of the root is undertaken by rural dwellers who sell to the private sector traders in small quantities either through an agent in the area or directly to the warehouses in Blantyre.

## **AN OVERVIEW OF AGRICULTURE AND ITS TRENDS IN MALAWI**

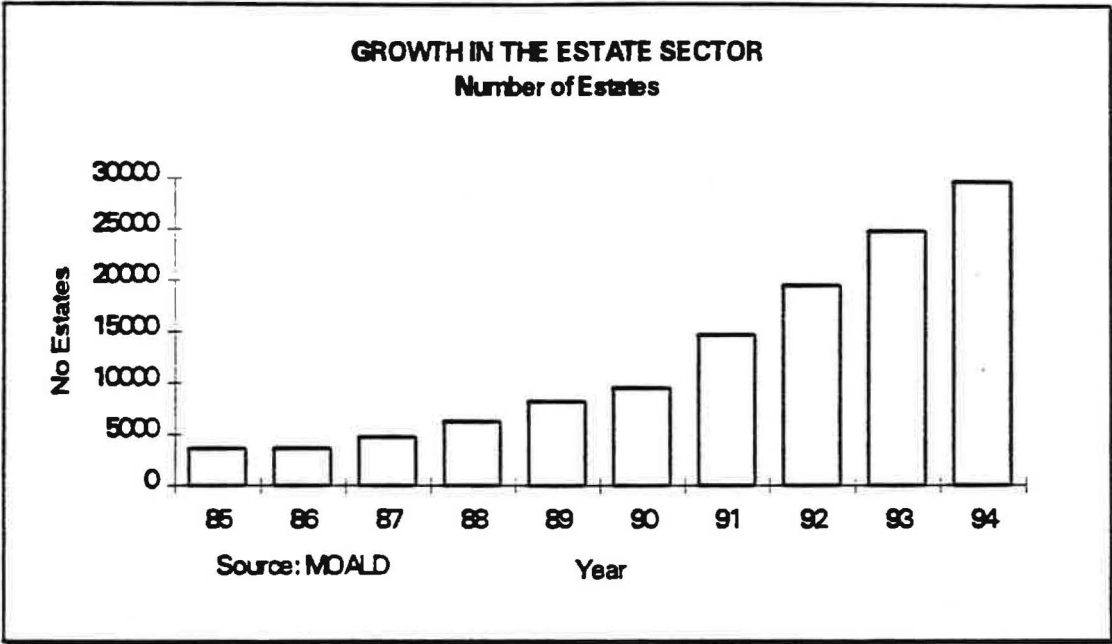
### **The Estate Sector in Malawi**

#### **Definition and Scale**

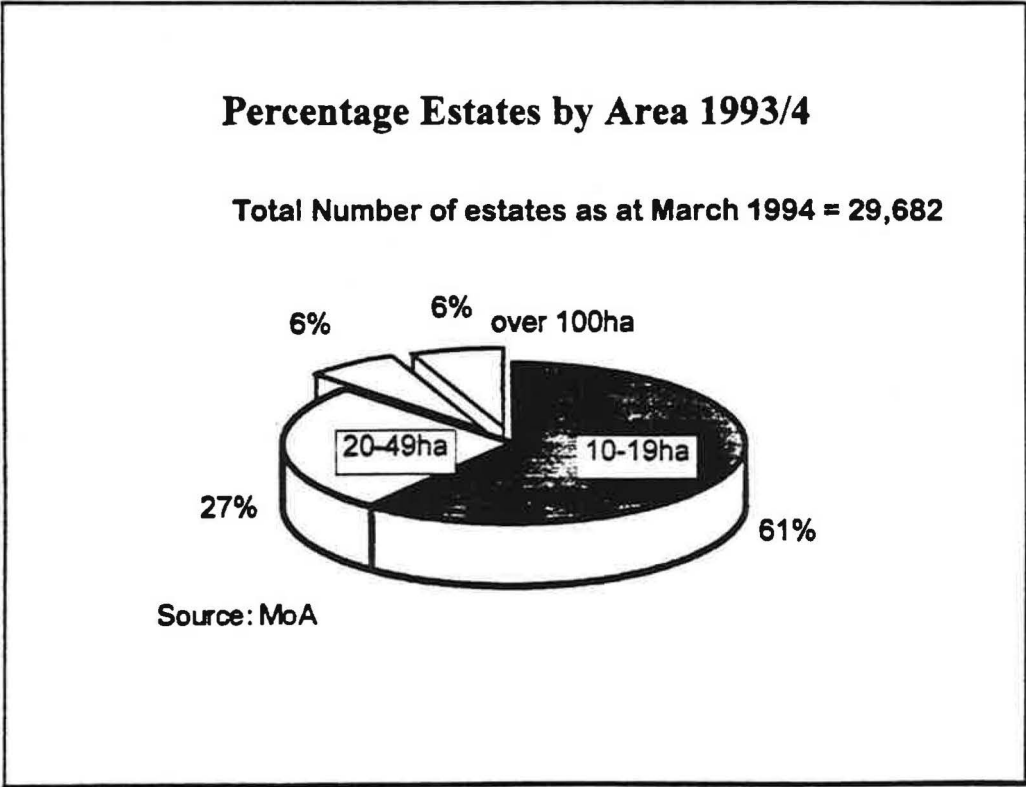
80. An estate in Malawi is a legal concept, not associated with farm size, where cultivation takes place on leasehold or freehold land rather than on customary land - which is administered through Chiefs and village headmen and designated for smallholder farmers. A relatively few number of estates grow coffee, sugar or tea. These older estates are based on plantation systems, whereas the great majority of estates (approx. 95%) in Malawi depend upon tobacco, and may be considered as commercial farms rather than estates in the usual sense.

81. Prior to 1980 the estate sector comprised less than 1,500 farms averaging over 200 ha in size compared with 1.3 million smallholder farms with an average area of about one hectare. By the 1994/5 season MOALD figures gave the number of estates as 29,642 units covering some 1 million hectares of land.

82. Production of burley and flue-cured tobacco has been closely controlled in Malawi, to maintain quality and avoid oversupply onto the world market. A system of production quotas has been in operation, with production restricted to the estate sector until very recently. Accordingly there has been a considerable incentive for emergent farmers in the **smallholder** sector to become registered as **estates** in order to gain access to a production quota for tobacco. (In 1994/5 one hectare of reasonable burley could provide a gross margin of K8,500; ARET, 1995 ref. 2) This movement of smallholder farmers into the estate sector has been only been constrained by the requirement that estates must have a minimum size of 10 ha.



83. As a result of the influx of small growers the average size of estates declined from over 200 ha in the 1970s to about 50 ha by 1990. Most of the estates registered in recent years have been less than 20 ha in total area. Not surprisingly the character of the estate sector has changed, with the majority of estate owners having limited resources and technical expertise compared with the large commercial farms which once dominated the sector.



## The role of the estate sector in agricultural development in Malawi

84. Although previously also known for its tea, rice and groundnut exports, Malawi is now heavily dependant on tobacco. On tobacco estates alone, it is estimated that there are about 250,000 tenant farmers and over 400,000 farm workers (TAMA 1993). Assuming 4 persons per breadwinner represented by these figures, a rough estimate suggests that one third of Malawi's rural population is dependant on the estate sector, which in turn is driven by tobacco production.

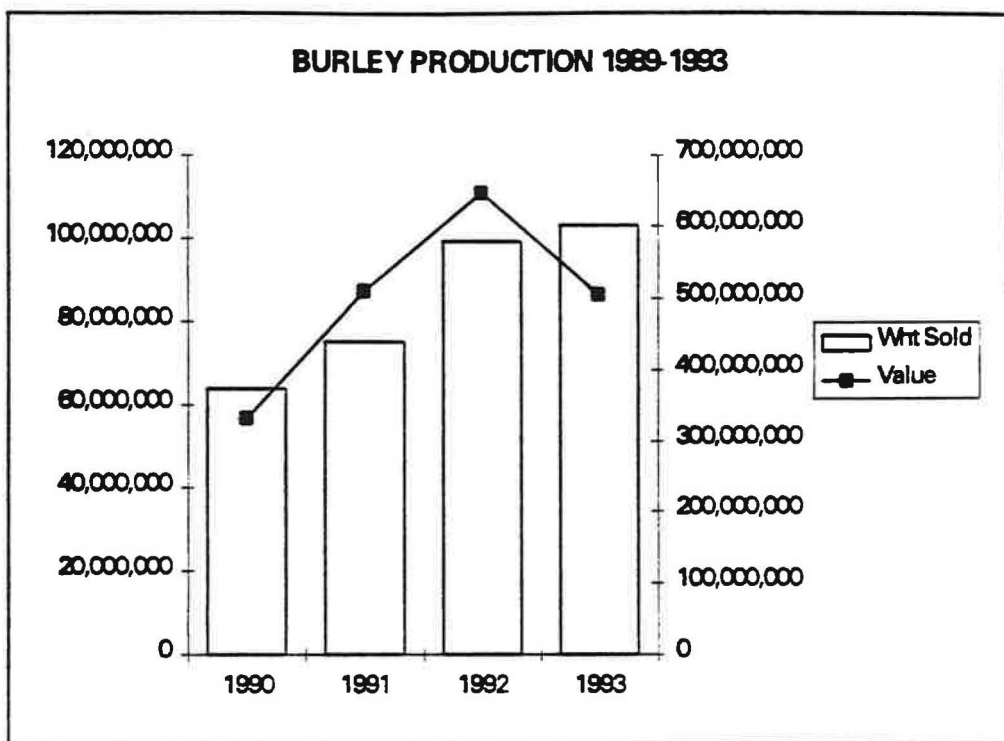
**Table 2: Values of Agricultural Export Commodities**

Domestic Export Commodity	Export Value (Mk '000)	Percent
Tobacco	938,012	68%
Tea	156,690	12%
Sugar	68,780	5%
Other	206,150	15%
Total Export 1993	1,369,632	100%

Source: Monthly Statistical Bulletin May 1994 Zomba

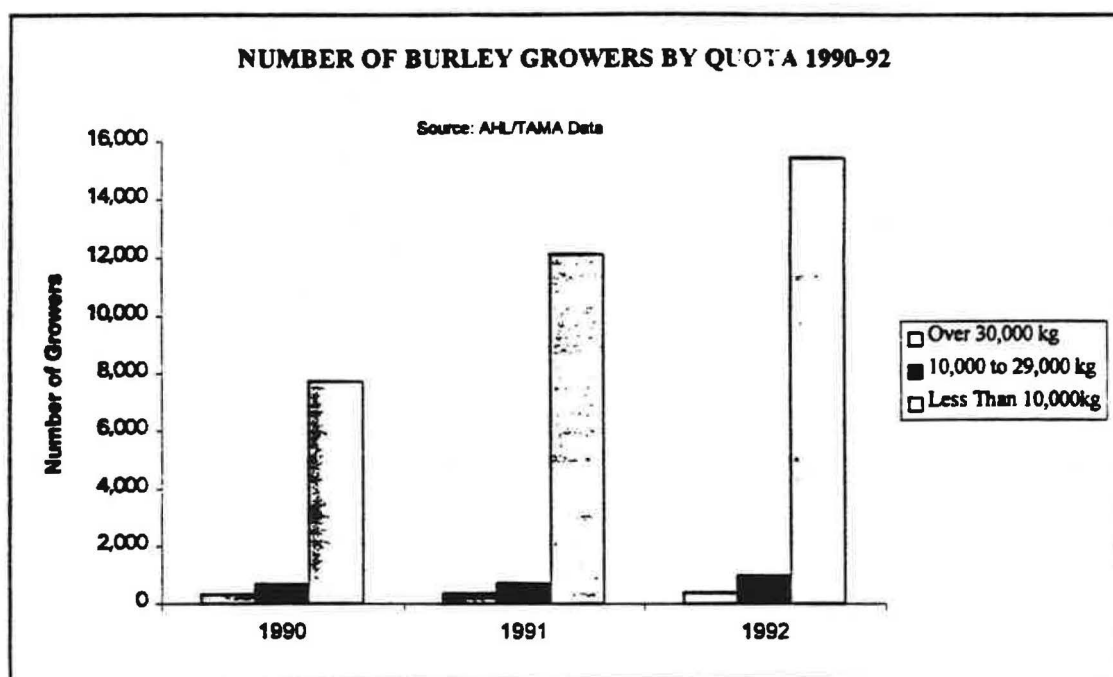
85. The main type of tobacco grown in Malawi is burley, an American strain air-cured by hanging it on racks in open-sided barns. More sophisticated estates produce flue-cured (Virginia) tobacco cured in closed barns heated by hot air conducted through metal pipes. Less important types of tobacco include oriental, fire-cured and sun-cured, mainly grown by smallholder farmers

86. Auction sales report a doubling in production over the last decade, with the greatest increase being in burley production. In a good year Malawi is now producing above the level which international buyers would like to see - in the order of 100,000 tonnes of burley - and this oversupply may have been a contributory factor in the drop in prices in 1993.



86. The entry of smallholders into the market via Burley Clubs since 1992 may have some dampening effect on the trend to register customary land as estates. It should, however, be remembered that these clubs enable a farmer to grow only 200-300 kg per annum (as opposed to a minimum quota of 3500 kg per estate) and interest in registration is still strong.

87. Some concern has been expressed as to the possibility of quality declining due to the entry of smallholders into the market, a threat to the viability of the industry as a whole. While a real risk exists in the medium-term once poor rotational practices take effect, this problem has yet to emerge. The performance of the smallholders will be measured not against the large, high input estates, but against the small estate growers producing less than 10,000 kgs who now account now for 55 % of the burley crop.



### Farming Systems

88. Under the auspices of the Estate Extension Service Trust (ARET) a farm recording scheme collected data over three years from 50 estates spread throughout Malawi. One of the features of the sector to emerge was the wide range of farming systems represented in even such a small sample. In that the owners of estates may come from a variety of backgrounds it is perhaps not surprising that they farm in different ways and have widely varying farming objectives.

89. One end of the scale is represented by large farming companies controlling a number of estates, backed by corporate capital, and with very commercial objectives. At the other end are found the very much greater number of estates run by an "emergent smallholder" type of farmer with few non-land assets and little concept of business practices. This last factor is important since a smallholder, on becoming an estate owner (more correctly the tenant of leasehold land), finds him or herself thrust into the world of commercial banking and finance without preparation. Instead of being able to rely on credit groups and the like, the newly commercial farmer must tackle the banks with their requirements for collateral, business plans and credit ratings.

90. In between these extremes lies a range of farm businesses; some owned for a considerable time by a civil servant or teacher, others belonging to shop keepers and small rural businessmen. A special type is found to be owned and

managed by an entire village made up of an extended family with each branch cultivating part of the whole in a co-operative venture.

**Table 3: A Few Non-plantation Estate Typologies**

Category	Owner	Area	Crops	Livestock	Labour	Draft power	Main Objective
Emergent	Ex-tenant	12ha	Burley, maize, beans, groundnuts, cassava	A few goats, free range chickens	Family, tenants	Hand hoe	Subsistence, plus cash in good years
Small Commercial Estate	Businessman -absentee	40ha	Burley, maize	nil	Tenants, ganyu	Hand hoe	Cash income
Small Family Farm	Retired policeman	40ha	Burley, maize, soyabean	Goats, a couple of cows, oxen, chickens, pigeons	tenants, ganyu, relatives	Hand hoe, some oxen	Way-of-life, cash if possible
Large Family Estate	Ex-patriate permanent resident	500ha	Burley, flue, maize, soya, coffee, spices etc.	Beef or dairy herd	tenants, permanent labour	Tractor, oxen,	Sufficiently profitable to sustain way of life
Large Commercial Estate	Corporation	1000 ha +	Burley , flue, maize, specialist export crops.	Beef or dairy herds	Permanent and casual labour	Tractors	Return on Capital

Ganyu labour is local casual labour, sometimes paid in kind.

91. It should be noted that a range of crops are grown by the estates, the general rule being the smaller the estate the larger the range in order to provide household subsistence.

### **The Tenant System**

92. Although any farmer occupying leasehold land is strictly a tenant; in Malawi the term is reserved for a person who brings his family onto an existing estate and grows a crop utilising land , inputs, and food provided by the owner of that estate. The resultant crop is sold to the estate at the end of the year. The proceeds of this sale are first used to repay the estate owner for the inputs and food supplied and the tenant then leaves with the cash balance. The usual crop

to be grown under this widely adopted system is burley tobacco, but on the more progressive estates tenants may also sell other crops such as maize, maize stover, and legumes. (By regulation flue-cured tobacco cannot be grown by tenants, although this does happen on the smaller farms). On some estates the role of the owner or manager can be reduced to the basics of supplying and supervising tenants then buying and marketing the tobacco.

93. Features of the tenant system are as follows:

- (a) tenant pays no cash rent (but estate may collect high economic rents);
- (b) tenant may leave after one year, although some of the better commercial estates have kept the same families for more than one generation;
- (c) tenants usually come from areas with high population pressures;
- (d) tenants seeking land on small estates are primarily concerned with food supply for the dry season;
- (e) tenants on well-managed estates will earn significantly more this way than working as labourers;
- (f) tenant has little control over production, and therefore income, since the inputs and management provided by the estate may or may not be adequate; and
- (g) the tenant system enables a small farmer to start growing tobacco on a very small budget, since he does not have to pay for labour and the cost of fertilisers and chemicals (if used) is repaid by the tenant.

#### General Constraints on Agricultural Development in Malawi

94. The title to this section is kept deliberately broad, since the constraints discussed here affect the traditional crops just as much as potential new crops. The means of removing these constraints have been much discussed within the private sector and the views of experienced innovators have been repeatedly put forward to government. Apparently without

effect. In a move to bring all the players together the World Bank encouraged the formation of an Agricultural Diversification Committee (ADC) in June 1994. For a variety of reasons this committee has not met since. A restructured body has been proposed to the Ministry of Agriculture and Livestock Development with a target inauguration date of 14th July 1995 (Steele, ref 5).

95. The private sector -as represented by the Chamber of Commerce, Press Corporation, or the Tea Association- argue that incentives are not required, merely the removal of disincentives. This implies that change will be cost-free but ignores the loss in government revenue that would result if many of their suggestions were adopted. They do, however, have a strong argument when they contend that government intervention, rather than encouraging development, may be holding investors back. Government, on the other hand, seems unwilling to relinquish control (especially in technical matters) against the promise of long-term benefits.

96. Four aspects of an enabling environment for diversification were identified by the World Bank for the attention of the ADC; these form a convenient framework for discussion:

- (a) Marketing and Export Incentives
- (b) Finance
- (c) Inputs and Technology (Production and Post-harvest)
- (d) Transport and Infrastructure

#### **Marketing and Export Incentives**

97. **Market Information:** Sitting-in on discussions with traders and processors it became very apparent that the majority of farmers in the estate sector have no idea of the opportunities in the local and export markets.

98. A number of the projects discussed would only interest a few farmers, but all should have at least been made aware of the prospects and allowed to decide for themselves.

99. Information to farmers might be improved in the near future with the establishment of the Agri-business Advisory Unit within the Malawi Investment Promotion Agency; provided

that the AAU recruits a good marketing specialist and the services of the Agricultural Research and Extension Trust (ARET) are made use of to pass on the material.

100. Although the above network will be able to provide "general awareness" information, the individual will be unable to access detailed, confidential, information on specialist markets. This data will be in the hands of relatively few traders/processors who will thus have the means to control the local market. To counteract this more businesses should be encouraged to be active in the market and AAU/ARET can assist by publishing world prices and market reviews.

101. **Export Tax:** In what is promised to be a short-term move GOM has imposed a 10% tax on crop exports, presumably in order to gather immediate revenue from this year's tobacco crop. Apart from taxing production this measure results in additional financing charges since the tax is collected at point of sale to the intermediate buyer and not when the value-added crop is actually exported. (This system actually reduces potential revenue, but simplifies collection and gives the government early cash flow).

102. The danger with this tax is that it may be seen to be an easy tax to collect and widened to all export crops in addition to tobacco, coffee, tea, and sugar.

103. **Training and Exposure:** Despite election pledges it seems that the government will not in the foreseeable future permit Asians to trade outside of the four major towns. It follows that if an active brokers market is to develop in the rural areas this will be based on Malawian-owned businesses. Establishing successful enterprises requires training and exposure to world trade and quite how this will be accomplished is unclear. It may be worth considering a studentship scheme administered by the Chambers of Commerce to award study tours to deserving entrepreneurs who have been able to muster a persuasive case and programme. These awards could be categorised to enable farmers to take advantage of them as well.

## **Finance**

104. Finance depends on a suitable investment climate. Speaking to potential investors it seems that the signals are mixed. Despite the incentives set out in the 1995 MIPA Investors Guide (ref 3) , which include some tax breaks, it remains that Malawi charges a higher rate of tax for outside

investors, levies a turnover tax, and makes it difficult to employ non-Malawian senior staff.

105. Investment in agriculture by large companies is unlikely at this time with concern growing over encroachment and the future of leasehold properties in general. Hopefully the Land Utilisation Study will provide a sound basis for a progressive land policy.

106. The internal commercial banks are still wary of making loans for diversification since the tobacco crop offers a form of security in a business they know well. This situation may soon change, however, as it is becoming more and more easy for growers to evade stop-orders on their crop by selling to intermediate buyers.

107. A new bank has just opening its doors (First Merchant Bank) in Malawi and it will be interesting to note the newcomer's policy towards agricultural loans.

### **Inputs and Technology**

108. On the inputs side the main bone of contention is the import duties and surtax charged on inputs.

### **Customs Tariffs- Malawi as at May 1995**

#### **Agricultural Inputs**

**Table 4:**

Percentage on CIF value

Item	Duty	Surtax	Excise Duty
Seeds and Animal feeds	20	1	20
Fertilisers	Free	Free	Free
Agric. Chemicals	20	6	20
Veterinary Medicines and Supplies	Free	Free	Free
Tractors and equipment	30	6	10
Hand tools	20	1	20
Irrigation pumps (hand and powered)	40	2	20
Aluminium pipes and fittings	20	1	20
Plastic pipes	20	6	10

Source: Customs and Excise Tariffs Order 1994

Note total duty is greater than the sum of the percentages since each calculation is incremental, for example:

	Kwacha
Seed landed value including transport	100
Duty at 20%	20
Sub-total	120
Surtax at 1%	1.20
Subtotal	121.20
Excise at 20%	24.24
Total	145.48
Duties and tax	45.48
Duties and tax as percentage of CIF value	45.58%, not 41% (20+1+20)

109. The rationale for these rates is probably historical since until the 1990's the customers for imported inputs were mainly the estates, whom it was thought could carry the cost. (Note that seed for smallholder crops was either home-grown or produced locally by National Seed)

110. The situation has changed in that there are now far more small businesses using these inputs and growing pressure on government to reduce duties. One of the first tasks of the new Agricultural Diversification Committee should be to commission a proper analysis of the economic cost/benefits of lifting tariffs.

111. Major technical barriers to technology transfer are the present shortage of seed for alternative crops, particularly oilseeds, and the time taken to release new varieties. It is to be hoped that the moves being made to establish a regional market by not requiring in-country CSU testing will be successful.

### **Transport and Infrastructure**

112. Transport costs for export produce from, and inputs to, Malawi are high. The Tea Association quotes £0.13 per kg for tea from Limbe to coast versus £0.04p from Nairobi to coast., The prospects however seem brighter now that the Nacala railway is being improved and Malawi now operates an "open skies" policy on air-freight. Lingadzi Rose Farm organised the weekly charter of a freighter this year and this is working well.

113. The road network is much improved in some areas, deteriorating in others, particularly in the North. This situation could possibly assist Malawi Railways (presently being restructured) to take over more freight traffic in competition with the well-organised road hauliers.

114. Several observers comment on the lack of irrigation in Malawi, citing the lake as a source. The situation is not that simple since the lake has its disadvantages and the cost of electricity is a severe hindrance to the development of irrigation. Electricity charges for commercial use are based on a Maximum Demand Tariff calculated on the period of highest demand during a twelve-month period. Thus the farmer or factory owner pays for power during low demand periods whether or not it is used. This system, while maximising ESCOM revenue, encourages wasteful use of power in slack periods (since you have to pay for it anyway, why save?) and makes energy costs prohibitive for anything but the most valuable crops.

115. A number of potential investors have raised the matter of electricity costs, but this is not a good time for ESCOM to think of encouraging increase in demand. The existing turbines on the Shire are silted up and will not be fully operational for two years; a planned new dam has yet to be built, and the lake level continues to drop.

#### Prospective Role of Organisations

116. The leading role of the estate sector in agricultural diversification is recognised by government (ref 4) in that the larger estates are better placed, by virtue of their financial and managerial resources, to accept risk and invest in agro-processing facilities. The strategy of encouraging the large estates in their initiatives and thus to obtain a "trickle-down" effect to the small estates and smallholders is also supported by donors such as the World Bank and USAID.

117. In that they are very similar managers, it is reasonable to postulate that a technology which is adopted by the small estates will also be suitable for smallholders. If this holds true then a chain should develop with the large estates bringing in the technology and developing outgrower schemes amongst the small estates which would quickly spread and bring benefits to the neighbouring smallholder farms.

## Large Estates

118. Despite the worries over employment permits, land tenure, and taxation, the major farming companies in Malawi retain a positive attitude and are looking for new opportunities. Their strengths and weaknesses as potential innovators may be tabulated:

Strengths	Weaknesses
<p>Substantial investment already in place.</p> <p>Knowledge of farming conditions.</p> <p>Able to bring in capital to finance processing equipment.</p> <p>Good overseas contacts.</p> <p>Actively looking for sources of supplementary income in case of decline in tobacco quota or demand.</p> <p>Some political influence.</p> <p>Presence in rural areas and knowledge of potential outgrowers.</p> <p>Wish to improve public relations and be seen as benefactors of the small farmer, therefore not likely to be exploitative.</p> <p>Capacity to overcome logistical difficulties when importing new inputs.</p>	<p>Concerns over employment permits for skilled staff.</p> <p>Land tenure system under review.</p> <p>Will have to change farming system in order to diversify and thus possibly also change management staff.</p> <p>Have to convince Directors of parent company that project is viable.</p>

119. The nucleus estate system is not new and, given a suitable product, should work well in Malawi with small estates and smallholders feeding a central processing facility based within a farming company.

## **Small Estates**

120. The small estates represent a valuable resource. The managers of these businesses have taken the first step along the road to true commercial farming. They no longer see themselves as smallholders relying on government services, but wish to become businessmen. The fact that many of them do not really understand what this means, and to date have been cushioned to a great extent by the profitability of the burley crop, is of secondary importance to their initiative in making the change.

121. These growers are ready for new ideas and seem to be receptive to the idea of forming outgrower groups. From the nucleus estate's point of view, as a group they understand basic commercial opportunities and would welcome training in new technologies. Adherence to contracts would initially be a problem except for those crops where the main estate was the only or major buyer (by virtue of owning the processing equipment). Otherwise a equitable arrangement would be required with facilities for arbitration.

## **Agricultural Research and Extension Trust (ARET)**

122. ARET is in position and now needs encouragement. The research facilities are good and there is spare capacity for new trials, which should have a strong on-farm bias. The Director of ARET is listed as a possible member of the Agricultural Diversification Committee and this should be confirmed to keep him exposed to new, non-tobacco enterprises. His support is being sought in preparing a ARET capability statement for diversification.

123. Initial practical training for farmers could be organised through ARET acting as a co-ordinating institution for other bodies such as Bunda College, Natural Resources College, MEDI, and the Department of Agricultural Research.

## **Agricultural Diversification Committee**

124. The Agricultural Diversification Committee was convened in Blantyre on the 28th June 1994. This meeting was chaired by the Secretary for Agriculture and Livestock Development with a agenda for the committee to draw up its own terms of reference and to establish working groups/sub-committees for the study of specific diversification issues.

125. The terms of reference for the committee were agreed to be:

- (a) To guide the formation and preparation of a National Agricultural Diversification Strategy consistent with the Government's development and economic diversification objectives;
- (b) recommend to Government for necessary action (s) policy decisions to facilitate and support a private sector led investment programme to diversify the agricultural sector;
- (c) to guide a diversification Secretariat and the Working Groups in undertaking the required activities; and
- (d) to monitor implementation of the diversification programme, and help resolve issues which are especially Cross Sector/Ministry Agency in nature.

126. Four working groups were appointed to immediately start work on the preparation of submissions on specific issues in diversification. These four groups were:

- (a) **Marketing and Export Incentives Sub-Committee** (Chair Mr A Schwarz, Tea Association of Malawi).
- (b) **Finance Sub-Committee** ( Chair Dr J Jana, Malawi Chamber of Commerce and Industry).
- (c) **Inputs and Technology Sub-Committee** (Chair Mr J Carter, Press Corporation).
- (d) **Transport and Infrastructure Sub-Committee** ( Chair Mr B Zingano, Secretary for Works).

127. These sub-committees typically had 7 members drawn from the main committee each and were to meet under the guidance of the steering committee secretariat led by the Chief Planning Officer, MOALD. Only one of the sub-committees has met since inauguration.

128. Given the lack of progress since June 1994 the question arises as to whether or not such a body is seen to be useful and important by stakeholders in the agricultural diversification process.

129. When this point was put to individuals actively involved all agreed that, despite the past poor showing, some form of co-ordinating and lobbying body would help to remove the much-

discussed obstacles to investment and the development of new technologies in Malawi.

However, the consensus was that the opportunity should be taken to redesign the committee in such a way that its activities might be better focused and of real assistance to Government.

130. To quote the Chief Executive of Press Corporation in a letter to the World Bank advising Mr Hiwa that the inputs group would be suspending its work; "...this whole initiative appears to have slowed down and perhaps needs a complete re-think".

131. In its 1995 strategy document (ref 4) MOALD pays particular attention to agricultural diversification and proposes a package of measures which will cover, *inter alia*:

- (a) product development and technology transfer;
- (b) improved efficiency in agro-processing and marketing;
- (c) improvement in infrastructural and support services;
- (d) trade liberalisation;
- (e) trade facilitation;
- (f) institutional development;
- (g) improvement of export competitiveness;
- (h) credit availability; and
- (i) incentives

132. One of the actions prescribed to implement these changes is to "Strengthen the Agricultural Diversification Steering Committee as the interface between the private sector and GoM to develop diversification and export promotion strategies." (Annex A page 13). This statement provides evidence of the ministry's support for the steering committee, and so it would appear that both the private sector and government wish the committee to be re-activated.

133. If one major lesson is to be learned from the experiences of the past year, it is that using working groups, often working in isolation, to examine various aspects of the diversification problem is certainly slow and may not in the end provide the best advice.

134. This is because:

- (a) Of necessity, the work of the groups overlaps, with the result that some aspects may be researched more than once while others are neglected on the assumption that another group is looking into them.
- (b) Group members are appointed for their expertise in certain aspects of the programme, but as the issues broaden into other areas this knowledge has its limits and, as was recognised by the WB mission (ref. 5), it may have to be reinforced with specialist consultancy.
- (c) The members of the groups are drawn from the membership of the main committee. By virtue of their eligibility for membership it can be assumed that these persons hold responsible positions in their respective organisations. As a consequence they cannot be expected to invest a disproportionate amount of time in voluntary group work. To cover time-consuming data collection and analysis consultancy assistance is once again necessary.
- (d) As a result the working group system requires two stages to get to the answers rather than one. That is, the steering committee poses a question to a working group, the working group then poses the same question in a more detailed (and possibly distorted) form to a consultant.
- (e) The consultant's response, being some way removed from the originator of the query, may have to be revised by the working group before being presented to the main committee. This process does allow the working group to have an input, but if the members of this group also belong to the main committee they are given the opportunity to comment in any case.

- (f) Co-ordinating the work of four groups working on linked programmes requires considerable input from the secretariat, whose job extends well beyond merely pulling together four separate, complete, reports.

135. It is important that the issues presented for investigation be manageable. That is, possess objectives which may be attained within a reasonable time frame. Not "recommend a policy for import tariffs and duty on agricultural inputs", but rather "what would be the likely revenue costs and production benefits of exempting duty on small agricultural implements requiring less than 10 kW engines".

136. If the secretariat is to function effectively as the main clearing house of information for the committee, it will be necessary for the Ministry to assign one professional desk officer able to devote at least 75% of his or her time to the task. This is because the job would entail desk studies of existing data, accessing national and international information sources, planning consultancy proposals, assessing tenders, awarding and monitoring contracts, and preparing briefs.

137. In fulfilling its terms of reference the steering committee must be able to set priorities and take evidence on diversification issues and initiatives; quickly providing Government with sound recommendations based on the best available advice. In addition the committee should go one step further and be prepared to follow-up its recommendations and be consulted should its advice not be acted upon.

138. To equip itself for the task the committee should:

- (a) be composed of persons in government and industry able to influence high-level decision making and with access to detailed knowledge of their subject;
- (b) be kept small to facilitate concise discussion and positive action;
- (c) be perceived to be of sufficient national importance as to command commitment from its members and the persons they advise. To this end it should be chaired by a member of the Cabinet able to

represent its ideas directly to his or her colleagues in Government;

- (d) be equipped with a small secretariat mandated to co-opt and fund expert assistance as required.

139. Based on the opinions of those who have been involved with the ADC and who are tackling the problems of diversification on the ground, it is recommended that :

the steering committee be reconstituted as a single committee limited to twelve members in addition to the chairman. The committee should remain in the Ministry of Agriculture and Livestock Development under chairmanship of the Minister backed by a small secretariat provided by the Planning Division of MOALD

140. In support of this recommendation it is suggested that:

- (a) The committee should be composed of the representatives of four government and eight private sector bodies. A tentative membership list is provided overleaf.
- (b) The main committee should be empowered to co-opt members for short-term attachment as required. Some bodies who might be called upon in this capacity would be Customs and Excise, Reserve Bank of Malawi, the commercial banks, Ministry of Energy and Mining, Ministry of Lands etc.
- (c) The use of alternates to this committee should be discouraged but, where unavoidable, the alternate should attend equipped with a comprehensive brief on the agenda and able speak on behalf of his/her organisation. Members unable to regularly commit time to the committee should ask to be replaced.
- (d) The committee's task is to decide on action which may be recommended to government without delay. In order to achieve this the committee should meet at least quarterly, at which meetings it will set a research/data collection programme for the secretariat to complete and report on at the next meeting.

### **Suggested Agricultural Diversification Committee Membership**

<b>Status</b>	<b>Organisation</b>	<b>Suggested Individual</b>
Chairman	Ministry of Agriculture and Livestock Development	Minister
Member	Ministry of Agriculture and Livestock Development	Secretary of Agriculture and Livestock Development
Member	Ministry of Finance	Secretary to the Treasury
Member	Ministry of Works	Secretary of Works
Member	Ministry of Commerce and Industry	Principal Secretary
Member	Press Corporation	Chief Executive
Member	Agricultural Development and Marketing Corporation	General Manager
Member	Agricultural Research and Extension Trust	Director
Member	Private	Mr A Schwarz
Member	Private	Mr A Barron
Member	Tobacco Association of Malawi	Chairman
Member	Malawi Investment Promotion Agency	Chairman
Member	Malawi Export Promotion Council	Chairman

- (e) The secretariat's main task will be to provide sufficient information on the questions and issues posed as to enable the committee to make sound recommendations for action without the need for further research or prolonged debate.
- (f) A budget will be required to cover necessary travel and accommodation expenses for members and the day-to-day operating expenses of the secretariat. A further fund is necessary to enable the secretariat to engage consultants and fund investigations in order to research the questions posed by the committee.

141. This fund might be provided under a special facility and/or by redirecting some of the \$147,000 Budget for Consultancy Studies/Surveys detailed in Annex 4 of the World Bank report on agricultural diversification. All the working group activities proposed for funding under this heading could now be taken over by the secretariat and its use by this revised committee seems appropriate.

## DIVERSIFICATION AND THE FOCAL COMMODITIES

### Attitudes and Experiences

#### **Smallholder Sector**

142. By comparison with the smallholder/communal sector in South Africa, Zimbabwe and Zambia, the smallholder sector in Malawi has shown itself quite responsive to the introduction of new cash crops or to increasing demand for traditional products. (Guar seed and Birdseye chillies provide good examples of each type of case).

143. The problems that have been encountered with such developments in the past are the inadequacy of the rural marketing system and the absence of extension support.

#### **Small Estates**

144. This growing sector displays keen interest in new crop production. On the evidence of the November 1994 Fora, that part comprised of teachers, civil servants, etc possesses a rosy-tinted glasses view, buoyant optimism and a great lack of experience of most aspects of commercial production and trading.

#### **Large Estates**

145. This group has proved rather conservative in the past and those which experimented rarely pursued the new crops, largely owing to other management pressures. A new interest is emerging, however, but approaches are not uniform:

- (a) The tea estates are under land pressure and appear interested mainly in perennial crops.
- (b) The estates with tenants display a rather more open approach to crop options but there remains a tendency to go for 'safe', better known types such as soya and groundnuts. However, interest was expressed during interviews on perennial crops which could be employed on estate borders as means of preventing squatting, plus crops which could utilize installed infrastructure (steam boilers for essential oil production or solvent extraction equipment).

146. Paprika is the single (and very recent) new crop which appears to have generated major interest in the estate/tenant sector. In spite of the 1994 marketing mishap, field performance by tenants was considered good and returns were attractive (at least on paper).

147. With regard to production of speciality items for import substitution (eg citronella oil for Levers), there are clearly some problems. Although this subject could not be fully examined during the mission, the import tax structure may play a role here. Lever Bros. stated that importing products via Zimbabwe could prove cheaper than domestic production (including its own large production of soap). This arises from the fact that Zimbabwe refunds import tax on re-export and the real 'parity import price' in such cases is comparatively low.

#### **Market Knowledge and Awareness**

148. As noted earlier, market knowledge and awareness of opportunities with the focal commodities is extremely poor in all sections of the agricultural community and it appears not high for non-traditional crops amongst long established exporters. The principal cause is remoteness from markets and lack of contacts, whether this is the smallholder in the countryside or the large estate and exporter. This single fact is the primary constraint to diversification and development, all other factors are secondary by comparison.

149. Traders' knowledge of the South African market is very limited.

#### **Marketing Infrastructure**

150. While no longer holding a monopoly position on the purchase of crops, Admarc - through its role as the sole purchaser in relatively remote areas - appears in the recent past to have inhibited development. This has arisen through paying inflated, uneconomic prices for produce, then swinging the other way and, thereby, dampening farmer interest. In social terms, even some of its rivals in the private sector acknowledge the need for a buyer-of-last-resort within Malawi at its present stage of development but fail to understand why low, unattractive prices are paid by Admarc for items in considerable demand (eg guar).

151. More geographically favoured smallholders have the option of selling to specialist, private traders based in the towns

but this is an option open to a relatively small proportion in this group.

152. Accessing of information on the international markets by exporters is not an easy or efficient process for exporters. This is due to the number of bodies which has been established (with the support of donors), each being under-resourced and acting independently without any real commitment to collaboration.

### **Investment Strategy**

153. Private sector interviewees made harsh criticisms of the emphasis being laid by Government on investment from overseas and on the blunderbuss approach. This was considered a wasteful diversion of limited resources away from the many serious, prospective domestic investors in agri-business who would be the real dynamos of development.

154. It should be noted that neither Government nor the private sector appear at present to appreciate the full potential of investment from South African agri-business.

155. In the case of Pinechem of Durban, which has made a positive decision to invest in naval stores in Malawi with a parastatal, the process has been painfully slow. This is attributed to the many layered bureaucracy and the apparent absence of a final decision-maker.

### **Malawi's Comparative Advantage with the Focal Commodities**

156. On a global market basis, Malawi possesses a mix of advantages and disadvantages, depending upon the particular commodity. Transport distances and costs are clearly a major difficulty with all but the higher unit-value products. Set against this, inefficient use appears to be made of the opportunity for back-loading lorries which deliver goods from South Africa and return empty.

157. Malawi possesses a clear comparative advantage over South Africa for the production of a wide range of agricultural products in demand on that country's domestic market and with some commodities for the international market. A promising example in the category is paprika. Malawi enjoys better soils, climate and higher rainfall; it has a cheaper labour force; and, in the smallholder sector, there is a much greater dedication to cash crop production. Additionally, the tenant

system on estates provides a means through its management structure for extension and training with newly introduced crops. These combinations of positive attribute are likely to attract investment in Malawi from South African agri-business.

158. The main regional competitor is likely to be **Zimbabwe**. In this case, Malawi has a comparative advantage in rainfall and much superior production capability in the smallholder sector. Set against this, Zimbabwe has a very strong, professionally managed commercial farming sector, increasing irrigation facilities and a superior- if not perfect - agricultural produce marketing system.

## **POTENTIAL AND NEEDS FOR FOCAL COMMODITY DEVELOPMENT**

### **Needs**

#### **Market Knowledge Development**

159. This needs to be tackled at two levels:

- (a) Improvement of awareness of regional and international market opportunities amongst exporters and the medium - to the large - estate sector. A rationalisation of the presently fragmented and apparently competing trade advisory and information service bodies under one coordinated umbrella should enhance effectiveness. Additionally, sponsored familiarisation/promotion visits of representative members of the private sector should be undertaken, with South Africa as the primary target. Face-to-face contact with buyers and observation of wholesale/retail markets would pay dividends.
- (b) A greatly improved means of transmitting information on market demand/opportunities is essential for the smallholder sector.

#### **Marketing Infrastructure**

160. In order to achieve any meaningful improvement to smallholder market awareness and sales opportunities, the ban imposed on trading by the Asian community in rural area *must be revoked*.

161. Until such time as bulk production is developed for many of the focal commodities and because of the peculiar market

characteristics of some, exporting will need to be done via specialist traders or directly by major producers in Malawi. At some stage, however, the establishment of formalised marketing systems, such as Zimace in Zimbabwe, would be advantageous. For some of the focal commodities (eg turmeric, ginger, garlic and onions) marketing to South Africa could be readily accommodated with a vegetable produce market, for which there is a desperate need in view of the demand in South Africa's winter and the surplus of high quality produce in Malawi.

#### **Trade Barriers with South Africa**

162. Any remaining major barriers for trade in the focal commodities with South Africa should be identified in SACU negotiations.

#### **Investment**

163. Development of many of the focal commodities, particularly those involving equipment for further processing, will be constrained until affordable credit is available to Malawian investors.

164. Inward investment promotion should focus on South Africa in the immediate future since it offers the greatest potential.

#### **Technology and Extension**

165. The most effective body to develop and disseminate agricultural technology in Malawi is ARET. Press Agriculture has indicated a willingness in principle to actively collaborate with ARET and to part-fund activities (provision of land, infrastructure, staff) involving trial and demonstration plots. This concept should be pursued by ARET with other large estates.

166. Technology transfer/extension inputs by buyers - as in the case of paprika - is another valuable mechanism. In the processing area, technology transfer could be achieved through external co-investors as in the case with the naval stores development between Vipcor and Pinechem.

#### **Germplasm**

167. For all of the focal commodities, product quality is of great importance in marketing and this is highly dependent

upon the intrinsic properties of the germplasm grown. This must be appreciated from the outset of a new development, particularly those involving perennials. Acquisition of elite germplasm, combining good field characteristics with final product quality must receive appropriate attention. Any selection work needed could possibly be undertaken by ARET in collaboration with other institutions.

### **Candidate Crops for Development**

168. A tentative list of crops for priority attention is given in Table 5 and these individual commodities are sub-classified according to the target market and their suitability for differing farming groups.

### **The Smallholder Selection**

169. The commodities proposed for smallholders are those which are relatively undemanding in technical skill, require little investment and are compatible with mixed cropping systems.

170. Castor and annatto are of particular value as perennials which require little attention, other than at harvest time and can be cultivated on an extensive basis.

171. Guar has the largest volume potential and its best adaptation areas have been defined already.

172. Turmeric and ginger would benefit from cultivation in the higher rainfall areas.

173. In addition to coriander, other spice seeds should be promoted with priority assigned amongst these to cumin in view of the demand potential.

### **The Estate Tenant and Outgrower Sector**

174. Outgrowers are included with estate tenants since this is an option to which some estates are giving serious thought. These two groups offer the potential for production of a wider range and a rather more demanding set of commodities (or of raw materials for further processing on the estate itself) since supervision/training can be provided through the estate management.

175. Paprika offers the greatest potential in product volume terms in this scenario.

**Table 5: Candidate Commodities for Development in Malawi**

Commodity	Target market		Producer		
	Domestic/ regional	International	Smallholder	Tenant/ outgrower on an estate	Large Commercial Estate
Paprika		✓		✓	✓
Turmeric	✓				
Ginger	✓		✓		
Coriander	✓		✓		
Cumin and other spice seeds	✓		✓		
Dried onion, garlic	✓			✓	
Guar	✓		✓		
Castor	✓				
Annatto		✓	✓	✓	
Essential Oils:					
citronella	✓			✓*	✓
Lemongrass	✓			✓*	✓
Geranium		✓		✓*	✓
Vetiver		✓		✓*	
Piper (sassafrass)		✓		✓*	✓
Lime		✓		✓*	✓
Eucalyptus#		✓		✓*	✓
Naval Stores	✓		Company, dedicated		

# E. citriodora  
or medicinal eucalyptus sp.

\* raw material production  
only; processing by  
estate

176. Onion and garlic offers considerable scope for the South African market in their own right as fresh vegetables but are likely to be more profitable if flaked and dehydrated at an estate processing unit.

177. Raw material for essential oil distillation could be produced by tenants/outgrowers, provided that access road infrastructure and distances from the estate distillery were suitable. All herbaceous essential oil crops are of lowish bulk density and transport costs are an important consideration.

178. Vetiver differs from all of the other essential oil crops in that its roots (the distillation raw material) can be stored for up to a year. This allows greater flexibility in utilization of the distillery and matching capacity to raw material flow. (It is worth noting also that planting stock availability is not as immediate constraint. ARET is multiplying vetiver for erosion control problems. However, erosion control and oil production are not compatible; the plant is dug up after 18 months for its roots).

179. Annatto, West Indian lime and eucalyptus (for coppice management) as perennial trees would be valuable in defining estate borders and deterring encroachment.

#### **Large Commercial Estates**

180. Paprika again is a prime candidate for large commercial estates, particularly if the aim is premium quality, niche markets.

181. Essential oil production could draw on extant boiler facilities on some estates, provided that crop distillation does not conflict with tobacco curing. If in the longer term interest lies in mechanical harvesting, then citronella, lemongrass and *Piper* (sassafras) would be appropriate. The perennials, lime and eucalyptus could serve also on large estates to define boundaries.

182. The economic merits of plantations of annatto on large estates cannot be assessed at this stage. However, processing to the nor-bixin extract would be within the competence of some estates, using either its own or bought in seed.

## **Exclusions and Cautions**

183. Expansion of **Birdseye chillies** is not recommended in view of the growth of production elsewhere and the small size of the market.

184. For similar reasons, production of **Tagete oil** and **marigold extract** should be approached with caution.

185. Production of '**organic oils**' for the small overseas aromatherapy market is not recommended as a principal objective after investment in a distillation plant. If this market proves unpunctured at a later date, then production of the small marketable volumes could be a 'bolt-on' to mainstream production.

186. **Dried herb** production for the international market is almost certainly uneconomic owing to their low bulk density and relatively high costs of transport. The profitability of transport to the South African market requires closer examination.

187. **Karaya gum** is placed in the 'cautionary' bracket since a significant investment on R&D and extension may prove necessary to develop commercial scale production. The requirements and returns from such an investment should be examined by a karaya consultant.

## **Speciality Items**

188. **Mulange cedarwood oil** is the exception to the general recommendation on the aromatherapy/'green oil' market. In this case, the distillation raw material is available as a waste from the timber industry. A small, purpose-built distillation unit could be set up at Mount Mulange to produce this oil for a niche market which pays high prices for small volumes.

189. **Ninde oil** is also a candidate for small volume production and niche marketing to aromatherapists. However, this would incur costs in the production of the raw material. It might be suitable as a 'bolt-on' to a larger essential production venture, in which ninde is employed to utilize any existing, under used processing capacity.

190. **Naval stores** development has been discussed earlier (paragraphs 50-56) and all that remains is a decision on

whether or not to proceed and, if yes, on the appropriate scale with respect to the available tree resource.

**ORGANISATIONS VISITED AND PEOPLE MET IN MALAWI**

**Private Sector**

Lever Bros. (Malawi) Ltd. POB 5151 Limbe	Manufacturers of soaps, detergents and related products.
Tel: 641-100 Fax: 645-720	Mr Philippe Colas Commercial Director
Royale Chemicals Ltd. POB Limbe	Manufacturer of soap (small volumes) and misc. related products
Tel: 641-299	Mr Barsala
Transglobe Produce Exports POB 51064 Limbe	Processors and exporters of guar (plus sunflower, pulses and soya)
Tel: 643-967/642-761 Fax: 643-620/642-440	Mr Salim A Tayub Director
Group Commodity Brokers Ltd. Kidney Crescent POB 5200 Limbe	Exporters of chillies paprika, Colombo root, annatto and other produce
Tel: 671-934/671000 Fax: 671/151	Mr Arthur Schwarz, Chairman
Nali Ltd. Nali House Partridge Avenue POB 5767 Limbe	Manufacturer/exporter: chillies, chilli sauce and other food products (vinegar, tinned food, tomato sauce)
Tel: 644-444/645-234 Fax: 643-520	Mr Nali-Lo Khoromana Managing Director
Bharat Trading Co. Churchill Road POB 5163 Limbe	Traders in spices, processor/exporter of pulses

Tel: 640-296/642-163  
Fax: 640-024

Mr N D Patel, Manager  
Mr A K Patel, Marketing  
Manager

Cheetah Ltd.  
Private Bag 9  
Lilongwe

Paprika exporter

Tel: 722-266, x 217  
Fax: 720-668

Mr Sander Donker  
Managing Director

Press Agriculture Ltd.  
POB 30238  
Lilongwe 3

Estate operation; incl.  
growing of paprika and  
pyrethrum

Tel: 784-411  
Fax: 780-523

Mr Nigel Christie  
Managing Director

Malawi Chamber of Commerce  
POB 258  
Blantyre

Tel: 671-988  
Fax: 671-147

Dr J A Jana  
Executive Director

Agricultural Research  
Extension Trust (ARET)  
Mchinji Road  
Private Bag 9  
Lilongwe

Tel: 722-266  
Fax: 265 782 657

#### **Public Sector**

Agricultural Development  
and Marketing Corp.  
(Admarc)  
POB 5052  
Limbe

Buyers/exporters of  
smallholder chillies, guar  
and general produce

Tel: 640-044/500  
Fax: 640-486/642-381

Mr F Kantonga and  
Mr A Chipunga, Senior  
Sales Officers

Viphya Pulp and Paper  
Corporation Ltd.  
(VIPCOR)  
Development House  
Victoria Avenue  
POB 1252  
Blantyre

Tel: 620-600  
Fax: 633-097

Forestry Department  
POB 30048  
Lilongwe

Fax: 784 268

Malawi Investment Promotion  
Agency (MIPA)  
Aquarius House  
Private Bag 302  
Lilongwe 3

Tel: 780-800  
Fax: 781-781

#### **Others**

Mr Dan Fullerton  
Agricultural Economist  
The World Bank  
Washington

Body responsible for  
development of the Viphya  
forest

Mr C Makunganya  
Project Engineer and  
Mr Chitosi

Mr Trevor Abell  
Senior Forester (on  
secondment from NRI)

Mr Phiri, Executive Director  
Mr C Kaferapanjira, Investor  
Service Officer

**SOME OTHER USEFUL NAMES AND ADDRESSES IN MALAWI**

Commonwealth Development Corp.  
CBM Building  
POB 30397  
Capital City  
Lilongwe

Tel: 732-033

Central Africa Co  
Limbe

Lonrho subsidiary  
(Mr Nick Wilkinson)

Valmore Paints Ltd.  
POB 555  
Blantyre

Consumers of castor oil  
  
(Mr J Wouters, M/D)

International Commodities Ltd  
POB 956  
Capital City  
Lilongwe

Prospective investor in  
naval stores production  
  
(Mr S Hussein, M/D)

Malawi Development Corporation  
MDC House  
POB 566  
Blantyre

Tel: 620-100  
Fax: 620-584

AGO Bhambini  
POB 5231  
Limbe

Traders in spices and  
general produce

Tabwera Investments  
POB 30333  
Chichiri  
Blantyre 3

Exporter of chillies,  
Colombo root, pulses

Tel: 671-988  
Fax: 671-147

Mr Frank Mbendera  
Director (Also, Chairman  
of Herbs and Spices  
Association Malawi)

Down and Clapperton Ltd	}	
Gomani Road	}	
POB 1682	}	
Blantrye	}	
Tel: 670-877/601	}	
Fax: 670-442	}	
	}	
Precision Tools Engineering	}	
POB 388	}	
Blantrye	}	
	}	
Tel: 671-609	}	Manufacturers/suppliers
	}	of equipment and
Petroleum Services	}	materials (eg potential
(Malawi) Ltd.	}	with essential oil
POB 1800	}	distilleries)
Blantrye	}	
	}	
Tel: 670-699	}	
Fax: 671-228	}	
	}	
Steel Supplies Ltd	}	
POB 388	}	
Blantrye	}	
	}	
Tel: 670-577/876	}	
Fax: 671-014	}	

**ZAMBIA: DETAILED COUNTRY REPORT**

**COUNTRY POPULATION PROFILE**

**Population:** 8.5 million

- 99 per cent black ethnic group, predominantly low income and some 55 per cent rural dwellers
- < 1 per cent European/Asian ethnic group, involved mainly in business and commercial farming
- 700 commercial farmers

**SPICES AND HERBS SECTOR**

**Market Characteristics**

**Market Structure**

1. Brand-name retail packs of spices and herbs are found within supermarkets while curry mixes and some other spices are sold by shops owned by members of the Asian community. Informal sales of a limited range of loose spices are made in street markets.

**Market Demand and Trends**

2. Quantification of the size of the market for spices, herbs and extracts proved impossible during the brief period of the visit. Moreover, inspection of published import statistics for the early 1990s posed a question mark over their accuracy; for example, recorded import volumes reported for saffron and vanilla were disproportionately high by comparison with the more commonly consumed spices.

3. Demand levels, however, may confidently be assumed as low and with consumption largely restricted to the very small European and Asian populations and the hotel/restaurant sector. The majority black population do not have a tradition of consuming spicy food.

4. Future growth in consumption of spices and herbs is unlikely unless there occurs a significant development in institutional food programmes.

#### **Sourcing of Materials**

5. The vast bulk of spices and herbs are imported and retail spice packs in supermarkets are mainly of South African origin (with Robertsons as the apparent market leader). With the exception of Malawi's Nali Sauce, all other sauces and pickles in supermarkets were South African.

#### **Domestic Production and Exports**

6. Prior to the 1990s, Zambia had no significant or sustained production of spices and herbs. Various introductions were made during the Colonial period of a range of spices and herbs but this was more the personal and short-lived enthusiasm of individual expatriates than a serious attempt at commercial development. When this sector was last reviewed by NRI in 1988 (ref. 15), production was limited to a narrow range of herbs by smallholders and one commercial firm (Wakefield, near Kabwe), supply was insufficient for demand and prices on the domestic market were greater than those on the international market.

7. In the subsequent period, chillie development was unsuccessfully attempted and paprika has been introduced.

#### **Chillies**

8. A number of commercial farmers cultivated Birdseye chillies for export during the late 1980s and early 1990s. However, these ventures collapsed owing to high freight costs and lack of knowledge of the market. It was reported during the visit that commercial chilli production now is restricted to one farmer and this material is sold fresh.

#### **Paprika and its Oleoresin**

9. Paprika is the only non-traditional crop, other than cut flowers, which has been developed in Zambia in recent years. Production by commercial farmers commenced around 1990 and was stimulated by visiting South African buyers. Interest was further boosted by the creation of domestic trading firm, PIPO, by Dutch expatriates.

10. The development of this new crop, however, has been chequered. Productivity and quality difficulties were encountered in the early phase owing to lack of technical knowledge (and many of these problems require further attention). Also, many farmers were over-optimistic about returns and others experienced problems with some South African traders. These difficulties were compounded towards the end of 1994 by the collapse of PIPO and planting for the 1995 season fell. (Output levels during 1995 were poor also owing to the drought).

11. **Production** in 1994 was over 500 tonnes but the expectation for 1995 is only 150 tonnes.

12. Two developments have occurred during 1995 which should foster greater confidence in the crop. Firstly, one of the partners in the former PIPO company has formed a new paprika pod exporting operation, Cheetah Zambia Ltd, and an oleoresin extraction plant has been constructed near Lusaka by another company (Enviro Oils and Colourants Ltd). These two companies estimate, respectively, that Zambian paprika production in 1996 will be 450 to 2000 tonnes.

13. **Cheetah Zambia Ltd** is operating on similar lines to its sister company in Malawi (see Appendix 4A, paragraph 25). Seed and some extension support are given to contract commercial farmers and an initial payment of US\$1/kg is received on delivery of dried, deseeded pods to the warehouse in Lusaka; the balance of the payment is paid 6 to 8 weeks later, following analysis within Cheetah's laboratory of the colour value of the material. An initiative has been taken also with smallholder farmers in the north of the country in which individual families have been issued with sufficient seed for 0.25ha (which is considered as the maximum size for good management by smallholders). For the immediate future, Cheetah will export its dried pods to Spain but aims in the longer-term to produce high quality ground paprika and its target volume is 2,000 tonnes annually. (The company also is promoting flower seed production in a similar manner to its paprika operation).

14. By comparison with Zimbabwe, costs of transporting export consignments of paprika pods from Zambia are high (US\$200/tonne to Europe; US\$65-90/tonne to Johannesburg). For this reason, the other domestic venture, **Enviro Oils and Colourants Ltd**, has invested in **paprika oleoresin** manufacture. The company is jointly owned by Mr P Connelly and Mrs Mwanamwambna, who have experience of rose production and

exports. The factory is located near Lusaka airport and was manufactured by De Smet of Belgium. The unit is a continuous extraction type with two sets of vessels and the investment cost probably was US\$2 to 3 million. Its paprika feedstock throughput capacity is around 20 tonnes/day of paprika or some 4,500 tonnes/year if operated mainly for this crop; on this basis annual production of oleoresin would be 280 tonnes or greater. The factory was due to be commissioned at the end of July 1995 but no significant quantity of paprika is expected to be available until the 1996 season. Owing to the predicted slow recovery in paprika production, combined with the competition from buyers, operation of the factory at full capacity will not be possible before 1997 at the earliest. No alternative material is currently available for extraction in Zambia, other than marigold for which a processing trial is to be carried out under contract in August 1995 (see paragraph 48).

#### **Other Current Developments**

15. At the suggestion of the University of Zimbabwe, a Herbs and Spices Association was formed in Zambia at the end of 1994. The Membership is almost exclusively composed of women and their aim is to engage in export. The current focus is on dried herbs and cultivation has been initiated with lemongrass, peppermint, sage, rosemary, basil and oregano. The output in 1996 will be very small since only five individuals are growing, each with a maximum of 3ha of mixed herbs. Apart from preliminary contact with a prospective South African buyer of organic herbs, the producers have no knowledge of markets or marketing.

#### **Research and Extension**

16. No significant research appears to have been carried out on spices or herbs the Ministry of Agriculture since the 1970s, when a limited screening operation was carried out on chillies. There is no extension capability in this area.

17. Producers and traders, therefore, must fall back on their own resources for research and development.

## **ESSENTIAL OILS SECTOR**

### **Market Characteristics**

#### **Usage**

18. Essential oils are consumed in Zambia as ingredients of soaps/detergents, 'personal care products', pharmaceuticals and beverages.

#### **Market Size and Trends**

19. Quantification of the scale of demand for natural essential oils was not possible during this brief study and the published import statistics are of questionable accuracy.

20. It can be safely assumed, however, that consumption patterns are similar to those of Malawi and Zimbabwe with soap/detergent products being the largest outlet. Since the mass market is for inexpensive laundry soap, the main oil employed would be citronella. By comparison of population sizes with Malawi, **citronella oil consumption** in domestically produced and imported soaps probably is the range of 30-50 tonnes annually.

21. Multinationals withdrew from manufacturing soaps and detergents in Zambia some years ago but their products (either from their South African or Zimbabwe factories) dominate supermarket shelves. There are three significant domestic soap and detergent manufacturers which target the lower-end of the market. ROP Ltd (formerly owned by Lever Bros.) claimed 50 per cent of the market share of domestic producers and sales of 500 tonnes of soap a month in the Lusaka area alone. It was reported that Lever Bros now are repurchasing certain Government-owned soap/detergent companies.

22. Zambia is likely to follow the trend of essential oil usage of Sub-Saharan Africa as a whole, i.e. any major growth will be with fragrance rather than flavour oils.

#### **Sourcing of Materials**

23. All essential oils consumed in Zambia are presently imported mostly in pre-compounded (ready-to-use) forms or as ingredients of finished, retail products.

## **Production**

24. A small citrus fruit industry (orange and a little West Indian lime) exists in Zambia and there are several juicing plants. However, no information could be gained during the visit on whether or not the juicing plants co-extracted oil.

25. No significant or sustained production of non-citrus oils has occurred in the history of Zambia or its Colonial forebear, Northern Rhodesia.

## **Earlier Initiatives**

26. While there has been no previous successful commercial development, essential oils have sporadically attracted local interest over the years. Independent research was pioneered in the 1930s by Gore-Brown (see ref 41) and by Miss Marion Gamwell, the discoverer of ninde (see refs 42-44). The records of NRI's predecessors also reveal the receipt for analysis from Government bodies and private farmers of samples of the oils of geranium, ninde and linaloe up until the mid-1960s.

27. No Government research on essential oils appears to have been undertaken in Zambia since 1970.

## **Current Interest and Initiatives**

28. Interest by the private sector has reawakened in essential oils over recent years and two commercial farmers are currently investing in modest-scale production; largely from the wish to diversify into added-value products rather on a thorough market appraisal.

29. Mr R Stucki, Lusaka has been carrying out cultivation trials for a few years with lemongrass, geranium, lavender, rosemary, basil and dill. Two distillation vessels, each capable of holding about 1 tonne of herbaceous material, are currently being manufactured for nuclear-scale processing and further evaluation of the crops.

30. Mr G Alison, Chizemba, has planted perfumed roses (Damacena, Gallica, Bourbon and Rugosa types) and *Melissa*. Consideration is being given to purchasing the innovative, Wilde extraction system with the view to producing relatively small volumes of 'true-to-nature' oils for the European aromatherapy market.

31. Other commercial farmers and women members of the Herbs and Spices Association also expressed great interest in essential oils but admitted an absence of knowledge of both production and markets. The little information available to members of the Herbs and Spices Association appears to have originated from the University of Zimbabwe. None of those interviewed were aware of the international market and techno-economic profiles which have been published periodically by NRI and some other overseas specialist organisations.

## **NAVAL STORES**

32. This subject area was examined in detail by Coppen in early 1995 (ref 62) and the following provides a summary of his findings.

### **Market Demand**

#### **Rosin**

33. Import statistics record a rising trend over 1991 to 1993 for rosin and its derivatives from 51 tonnes to 170 tonnes (the latter valued at Kw 36.4 million).

34. A substantial proportion of the rosin is used by Zambezi Paper Mills Ltd for sizing purposes and their current consumption is 30-40 tonnes annually. However, their requirement will rise sharply to around 600 tonnes per annum when their new pulp mill comes on-stream in 1996.

#### **Turpentine**

35. Current demand for turpentine is comparatively weak with under 10 tonnes per annum being recorded in import statistics for 1991-93.

36. The major competitor of turpentine as an industrial solvent is mineral turpentine/white spirit and consumption of the latter by the Zambian paint industry totals around 650 tonnes annually. Each of the major paint manufacturers indicated a willingness to substitute imported white spirit by domestically produced turpentine, subject to quality and import price parity for white spirit (ca. US\$1,150/tonne in late 1994).

## **Pine Oil**

37. Imports of pine oil fluctuated between 5,000 and 14,000 litres annually over 1991-93.

## **Sourcing of Materials**

38. All naval stores products are imported into Zambia and in the recent period South Africa has become a supplier of rosin.

## **Prospects for Gum Naval Stores Production**

### **Resource Potential Assessments**

39. The largest resource of pine trees is found in the Copperbelt Province and all those of significance are owned by ZAFFICO, the Zambia Forestry and Forestry Industries Corporation. The current total area of pines in the ZAFFICO plantations of the Copperbelt is 40,000 ha with *Pinus kesiya* accounting for 70 per cent, *P. oocarpa* for 24 per cent and the balance a mix of *P. michoacana* and *P. merkusii*. The replanting schedule is expected to keep pace with increased demand for wood when the new pulp mill comes on stream in 1996.

40. Tapping yield trials were carried out with the various species in 1978-79 by the Forest Products Research Division in Kitwe. In 1991-92 Zambezi Paper Mills in collaboration with ZAFFICO and Simba Chemical Industries Ltd undertook new tapping trials and obtained qualitatively similar results to the earlier study. The results were sufficiently encouraging to prompt Zambezi Paper Mills to enter into discussions with a large Portuguese naval stores producer for technical and marketing assistance on establishing an industry. Lack of finance has thus far prevented progress but Zambezi Paper Mills remain interested in the project.

41. Coppen (1995) has reassessed the available data on the resource and on the gum yield and quality characteristics of the species. He concluded that *P. kesiya*, although the poorest gum yielder, must be regarded as the core resource for any future naval stores operation and that new and thorough tapping trials must be carried out with this species. Should new trials confirm that gum yields from tapping of this species would be economically viable, then some 7.3 million trees of suitable age and size potentially could be employed. This figure would be large enough to support many different options in terms of annual production target and tapping regime. Assuming a minimum gum yield of 2kg per tree, tapping

the entire 7.3 million *P. kesiya* trees would provide 14,600 tonnes of gum oleoresin per annum.

42. Zambia's medium-term requirements for gum rosin (excluding rosin derivatives) and for part-substitution of white spirit could be met by processing of 1,000 tonnes of gum resin per annum, which equates to the size of a minimum-sized factory. Options for an expansion of the tapping scale could possibly include supplying gum resin to Zimbabwe Phosphates in Zimbabwe which is experiencing a progressive decline in the supply of domestically produced raw material. Future assessment of the Copperbelt's pine resource potential, therefore, should be considered within a wider regional strategy for achieving self-sufficiency in naval stores.

## **WATER SOLUBLE NATURAL GUMS**

### **Market Demand**

43. No information could be gained during this study on the demand within Zambia for water-soluble gums.

44. The obvious candidate for substantial consumption (possibly one thousand tonnes or greater) is **guar** by the copper mining industry.

### **Production**

45. There is no recorded commercial production of any water-soluble gums in Zambia.

46. **Guar** production was the subject of a pre-feasibility study by Shell Zambia in the mid-1980s but no commercial development ensued. During the present study, discussions were held with the Tobacco Association which admitted that the crop and its uses were previously unknown to its staff who are looking for diversification opportunities.

## **NATURAL COLOURANTS**

### **Market Demand**

47. No reliable information was obtained during the field study on demand for natural colourants and import statistics fail to disclose sufficiently detailed information.

## **Production**

### **Marigold**

48. Production of marigold meal for export in the pelletised form commenced in recent years by Mastock, a subsidiary of a Government-owned company. The operation is based at Chiawa in the Zambesi valley and the target is export of 2,000 tonnes annually. Sales are currently being made to the Unilever subsidiary, Biocon - rather than to Spain which is the major European market - and at price (US cents 12.5/kg) half that of the Mexican product. A trial processing of the extract has been contracted to Enviro Oils and Colourants Ltd. for mid-1995 (see para 14).

### **Other Colourants**

49. There is no other colourant production in Zambia, although annatto - which was first introduced as an ornamental - has naturalised.

50. The only company with any awareness of a market for annatto and turmeric oleoresin appears to be Cheetah. Neither product were known to Enviro Oils and Colourants Co or to the Tobacco Association.

### **CASTOR SEED AND OIL**

## **Market Demand**

51. The Tobacco Association reported that demand for castor oil in Zambia was in excess of 500 tonnes annually with the major usage being in paints and a smaller consumption in particle board manufacture. The brief duration of the field study prevented direct study of this market.

52. Users of castor oil source their requirements mainly through imports.

## **Production**

53. Production of castor seed was reported by the Tobacco Association as substantial during the 1950s but subsequently declined. The plant now has established itself in the wild state in many areas.

54. The same source reported that there is a processor of oil in the northern region who secured equipment under a USAID

project. The quality of the oil was said to be poor and unfiltered.

55. Members of the Herbs and Spices Association are keenly interested in castor and have established contact with a Zimbabwean buyer, the Trinidad Co. However, knowledge of the crop and markets are poor; the Association appears to believe that it is the source of an essential oil. Planting has been established by several members and a crop of around 50 tonnes of beans is expected within the Association in 1996.

56. The Tobacco Association also is very interested in promoting castor within its crop diversification programme. It is purchasing seed with the aim of farmers planting 1,000 ha over 1995/96 and plans to install a mill during 1996. The aim is to achieve import substitution and to export overseas. This organisation is presently unaware of the scale of demand for the oil in South Africa and Zimbabwe.

## **AN OVERVIEW OF TRENDS IN ZAMBIAN AGRICULTURE**

### **General Observations**

57. Agriculture in Zambia embraces a very large number of smallholders, a middle group of medium-sized farms and a relatively small number of large commercial farming operations.

58. Recent years have seen some radical changes in agriculture. A significant number of commercial farmers who took out loans for developments in the early 1990s have become technically bankrupt through a combination of drought and a hike in bank rates to over 50 per cent. In addition, there has been deregulation of the markets for some of the main traditional crops and a move towards privatisation of Government-owned estates and agri-businesses. This has created both uncertainty and a new stimulus for crop diversification in the commercial farming sector which parallels in some respects the situation in Zimbabwe.

59. Drought problems have been encountered in recent years, as elsewhere in the region, and this has been most acute in the South of Zambia. By comparison with Zimbabwe, however, relatively little investment appears to have been made in irrigation facilities.

## Attitudes to and Constraints on Diversification

60. Pre- and post-Independence Zambia has gone through several phases of debate over crop diversification. In all of these phases, fears over the future of tobacco has played a central role. By the latter half of the 1980s, additional factors came into play: concern over the international competition for cut flowers and vegetables in the European market and the need to earn foreign exchange for import of agricultural equipment and other inputs. Recent market deregulation measures has added an extra ingredient.

61. Interviews with commercial farmers and organisations such as the Tobacco Association revealed varying degrees of interest in and real commitment to pursue crop diversification. However, the single common factor was the lack of market knowledge, not only for non-traditional crops but also for some more familiar crops with respect to trade potential within the region. For most farmers, the 'export market' means the international scene - especially Europe - and little awareness, let alone real knowledge exists on the neighbouring, large market of South Africa.

62. While there are signs that some individuals - particularly amongst the smaller commercial farmers - are tempted to produce a new product on the basis of the flimsiest market information and then attempt to sell, lack of market knowledge is the single largest constraint on diversification and development in the farming community.

63. Additionally, the indebtedness occurring with many farmers who diversified in the early 1990s has placed a major cautionary brake on many others. Unless new crops/products can be developed with existing financial resources, i.e. without securing loans, many farmers presently are inclined to avoid risk-taking.

64. In theory, the availability of investment funds from loaning institutions does not present a major problem. In practice, however, securing credit for working capital from Zambian commercial banks is difficult. With the exception of Barclays, only short-term loans are available and these are at very high interest rates. Moreover, loans are restricted largely to a limited range of better-known, i.e. 'safe' crops.

65. The absence of a vertical marketing system was cited also as key constraint on development.

## **Diversification and the Focal Crops**

### **Extant Experiences**

66. Experience with the focal commodities within the farming community is effectively restricted to Birdseye chillies some years ago and paprika in the recent period. The first failed and the latter has experienced a faltering in producer confidence.

### **Market Awareness and Technical Knowledge**

67. Knowledge of markets and marketing systems for the focal commodities is considerably weaker than for many other prospective diversification crops within the farming community, financial institutions and the Export Board. The last named body fulfils a useful role but clearly has much to learn not only on the focal commodities but also on the South African market at large. X

68. Technical knowledge on the focal commodities was found equally weak amongst interested parties met and variously ranged from lack of appreciation of the importance of quality, minimum commercial size of export shipments and requirements for processing.

### **Institutional R&D Support Facilities**

69. No significant capability or experience exists within Government institutions for the focal commodities, nor is it likely to be acquired in the foreseeable future.

### **Comparative Advantage with the Focal Commodities**

70. With regard to other producers worldwide, Zambia possesses a mixed set of comparative advantages/ disadvantages with individual commodities. Management expertise of large commercial farms is probably the most important attribute. Costs of transport to the overseas market for all but the highest unit-value products is the obvious disadvantage.

71. However, Zambia clearly has a number of comparative advantages over agriculture in South Africa with respect to capturing a share of that country's market. Zambia's climate and rainfall is much superior and, moreover, its water resource availability - if presently under-utilised - does not present a constraint. Additionally, labour in Zambia is abundantly available and there are much less restrictions and

prescriptions; for labour-intensive agro-industries Zambia has a clear comparative advantage over South Africa.

72. **Zimbabwe** presents the greatest competition in relation to supplying lower unit-value commodities to both the South African and international markets owing to the difference in transport costs. However, rainfall in northern Zambia is superior and may be an economic compensating factor in some cases.

#### **THE POTENTIAL AND NEEDS FOR FOCAL COMMODITY DEVELOPMENT**

73. Opportunities and requirements are broadly similar to those discussed for Zimbabwe and Malawi in the two preceding Appendices.

#### **Needs**

##### **Market Knowledge Development**

74. Improvement of market awareness is of critical importance amongst all sectors involved with decisions on diversification and development in Zambia. A very high priority must be assigned to the South African market and this would be facilitated by a forum/seminar attended by South African agri-business and representatives of the Zambian farming and trading community plus lending institutions. Sponsored familiarisation visits to South Africa by representatives of Zambian farmers and traders would be a valuable follow up.

##### **Marketing Infrastructure**

75. Marketing infrastructure must be created for certain of the bulk volume commodities discussed later in the candidate crop list.

##### **Investment Finance**

76. Zambian banks must review their policies and provide affordable credit if development is to occur. Moreover, all lending institutions should be prepared to loosen the restrictions on commodity types for which loans are eligible; project viability should be the main criterion.

77. An alternative approach is via joint-ventures with South African agri-business. The potential for this with particular commodity groups requires exploration.

## **Technology Acquisition**

78. In most instances, technology will have to be acquired/developed independently by the farming community either independently or through a committed trader (as in the case of paprika).

79. For some commodities, technology transfer through co-ventures will be possible.

## **Germplasm**

80. Where a new development involves introduction of new crop, great attention must be given to acquisition of elite germplasm which not only provides good yields but also has intrinsically good final product characteristics. Any domestically available germplasm should be fully evaluated for field performance and end-product quality prior to large-scale bulking and issue to farmers.

## **Candidate Crops for Development**

81. A tentative list of crops for priority attention is given in the following table. This indicates target markets, their suitability in terms of management skills for different farming groups and for climatic zones. Particular comments on some individual proposed crops and on exclusions/cautions are given below.

## **Paprika**

82. A potential for substantial growth appears likely here with the expected decline in South African production. However, the scale and rate of expansion of production should be geared to knowledge of the international and regional supply positions, including trends in Zimbabwe and Malawi.

## **Turmeric and Ginger**

83. While the turmeric and ginger oleoresin markets are competitive on both price and quality, production in the Enviro Oils and Colourants plant merits consideration when an adequate supply of raw material, primarily grown for spice export, becomes available. This move would assist towards full utilisation of the factory's installed capacity and its product portfolio.

## **Dried Herbs**

84. Production of conventional dried herbs for the overseas market will not be economic owing to transport costs and the costs of freight to South Africa need to be thoroughly appraised.

#### **Castor**

85. The profitability of plantation cultivation on commercial farms needs thorough assessment. Production elsewhere in the world is based on harvesting wild plants or semi-informal smallholder cultivation.

86. Oil extraction is not suitable for very small scale operations.

#### **Essential Oils**

87. Bulk volume oils for the mainstream market are recommended and this will involve a commitment by farmers on investment in equipment, land and additional labour over the year.

88. Production of smaller volume, higher unit value oils could be developed at a later stage as a 'bolt-on' to existing operations in which equipment utilisation is optimised. Risks of market saturation exist with 'organic oils' for the aromatherapy market. However, ninde may be an exception owing to its uniqueness.

89. Most of the herbaceous and spice seed oils proposed can be distilled on the same equipment. Lime oil requires specially designed equipment for liquid charges.

90. None of the *Eucalyptus* species presently grown in Zambia are suitable for oil production and introduction of selected species will be necessary.

#### **Naval Stores**

91. As discussed earlier in paragraph 41, thorough tapping trials on *P.kesiya* must be repeated to confirm yields before a decision is taken for investment in a naval stores industry.

92. Also, the potential and profitability of sale of crude gum oleoresin to Zimbabwe Phosphates should be considered as a possible component of a tapping operation.

# CANDIDATE COMMODITIES FOR DEVELOPMENT IN ZAMBIA

Commodity	Target market		Producer			Region
	Domestic/ regional	Inter- national	Smallholder	Estate outgrower	Estate or large commercial farmer	
Paprika	✓ (a)	✓		✓	✓	Central, Northern
Turmeric	✓		✓			Central, Northern
Ginger	✓		✓			Central, Northern
Coriander	✓		✓			Central
Cumin and other spice seeds	✓		✓			Central
Dried onion and garlic	✓		✓	✓	✓	Central
Castor	✓		✓			Central, Northern
Guar	✓		✓			Southern
Annatto		✓	✓	✓		Central, Southern
Citronella Oil	✓			✓ (b)	✓	Central, Northern
Lemongrass oil	✓			✓ (b)	✓	Central, Northern
Geranium		✓		✓ (b)	✓	Central, Northern
Vetiver		✓		✓ (b)	✓	Central, Northern
Piper (sassafrass)		✓		✓ (b)	✓	Central, Northern
Lime		✓		✓ (b)	✓	Central
Eucalyptus		✓		✓ (b)	✓	Central, Northern

(a) domestic oleoresin producer (b) processed by estate

**ORGANISATIONS VISITED AND PEOPLE MET IN ZAMBIA  
(\*met subsequently in the UK)**

Cheetah Zambia Ltd  
POB 36666  
Lusaka

Paprika and flower seed  
trader

tel: 1 287 660  
fax: 1 286 665

Mr Mark Terken  
Director

Bimzi Ltd  
POB 50514  
Lusaka

Co-owner of paprika oleoresin  
factory; rose grower and  
exporter

tel: 247353  
fax: 245558

Mrs C Mwanamwambwa,  
Managing Director

Enviro Oils and Colourants  
Ltd  
POB 36960  
Lusaka

Oleoresin factory

tel/fax: 230634

Mr Keith Peacock, Technical  
Manager

Tobacco Association of Zambia  
POB 32617  
Lusaka

tel: 1-286636  
fax: 1-286635

Mr A van der Vinne  
Managing Director

Mr R Stucki and  
Mr Andre Stucki\*  
Quien Sabe  
POB 30215  
Lusaka

Farmer; prospective essential  
oil producers

Dr P Aagaard\*

Prospective rose oil producer

Mrs Katongo Mulenga-Maine  
POB 33805  
Lusaka

tel/fax: 286290/230548  
Zambia National Farmers Union  
POB 30395  
Lusaka

tel: 223222  
fax: 222736

Flora Consultancy Services  
c/o Lendor Ltd  
Mulambo Road  
2601 Lusaka

tel: 243732  
fax: 244163

Mr Laurens Nel  
POB 30282  
Lusaka

tel: 230196

Ubizane Ltd  
Private Bag 186  
Woodlands  
Lusaka

tel: 290098

Export Board of Zambia  
POB 30064  
Lusaka

tel: 1-228 106 7  
fax: 1-222 509

ROP Ltd  
Chandwe Mubndu road  
Lusaka

tel: 1-225658

Prospective herb and  
essential oil producer;  
Chairperson of the Herbs,  
Spices, Essential Oils  
Association of Zambia

Dr George Gray, Executive  
Director

Mr Peter Cottan  
Managing Director

Farmer

Rose exports and other  
diverse operations

Mrs G van der Merwe

Mr M J Musonda  
Executive Director

Soap manufacturer

Mr Tembo

Commonwealth Development  
Corporation  
POB 3200  
Lusaka

tel: 253657  
fax: 250122

Mr Ernest Mtamboh  
Executive, Zambia

World Bank Office  
Zambia Redcross Building  
Redcross Lane  
POB 35410  
Lusaka

tel: 252 811/ 253223  
fax: 254 283

Ms Gertrude Banda  
Visiting Mission's Secretary

Dr S Jaffee  
World Bank  
Washington

**NAMES ACQUIRED OF OTHER USEFUL CONTACTS IN ZAMBIA**

Mr Paul Connelly	Co-owner of paprika oleoresin factory - Enviro Oils and Colourants Ltd
Mr George Alison Chizemba	Rose grower Prospective essential oil producer
Mr Robert Dean Ellensdale Farm Lusaka	Citrus grower
Ingaweri Products Ltd Lusaka	Citrus juice manufacturers Mr Simpson
Zamhort	Parastatal; former juice producer
Wintergreen Farms	Fresh chilli producer Mr George Nada
Trencham Trading Ltd Lusaka	Interests in spices Mr David Brass
Mastock Ltd Chiawa	Marigold producer
Cheseborough Ponds Ltd Lusaka	Toiletries manufacturers  Mr E H Mazhawidza General Manager
fax: 1 288443	
Unified Chemicals Lusaka	Soap manufacturers
tel: 1 249387	
ROP Ltd Ndola	Soap/detergent manufacturers
tel: 650549 fax: 650142/162	Mr P Daka, Purchasing Manager

Zambia Paint Manufacturers  
Ltd  
POB 31223  
Lusaka

Mr R Sauter,  
Managing Director

VitreteX Paints Ltd  
POB 70207  
Ndola

Mr H A Gatchell  
Managing Director

Zambezi Paper Mills Ltd  
POB 71400  
Ndola

Dr K Sharma  
Executive Director

Zambia Forestry and Forest  
Industries Corporation  
(ZAFFICO)  
POB 71566  
Ndola

Mr D L W Chitundo  
Director of Operations

## SWAZILAND: A NOTE ON PRODUCTION OF THE FOCAL COMMODITIES

Population - ca 0.9 million; predominantly black ethnic group and largely rural; small European expatriate community, engaged in management of estates and agri-business

## SPICES

1. Smallholders have traditionally grown chillies and turmeric; mainly for home consumption but with a little entering the informal market.

2. Samples of the turmeric have been examined periodically at NRI (ref. 20) at the request of the Ministry of Agriculture and NGO's which wished to ascertain the market potential. The quality of this Swazi spice was found consistently to be mediocre and unacceptable for the international market. The pigment content is intermediate between the Indian Madras and Alleppey types and the volatile oil content is high, which is common for turmeric produced throughout Southern, eastern and central Africa. These quality deficiencies are attributed to the cultivar(s) grown.

## ESSENTIAL OILS

3. Swaziland has been a producer and exporter of citrus and eucalyptus oils for twenty years or more:

## Annual exports (tonnes):

	1980-92	1994
lime oil	3-4	NA
medicinal eucalyptus oil	75-100 (= 30% of Africa's production and 5% of international trade)	20
industrial eucalyptus oil	10-20 (= 10% of world production and trade)	10

Source: NRI estimates  
NA: data not yet available

### Eucalyptus Oils

4. Production has been undertaken by the Shiselweni Forestry Co, a subsidiary of the Commonwealth Development Corporation (near Nhalangano) and by the Mankaiana Estate. The latter is close to the border with Transvaal and 50km north of Piet Relief where the South African owner, Mr A Martin has his office.

### **Medicinal Oil**

5. Shiselweni's operation was based on a 16 month interval coppicing regime of 700ha *Eucalyptus smithii* and the oil output ranged between 50-80 tonnes annually. A detailed description and financial analysis of this operation is given by Coppen and Hone (1992; ref55). CDC closed the operation in 1994 owing to a progressive decline in oil yield, some of the trees having been coppiced continuously for 20 years, and focused its eucalyptus oil production on its younger plantations at Tanwat (Tanganyika Wattle Co) in Tanzania.

6. The Mankaiana Estate's medicinal oil production is based also on *E. smithii* but differed from Shiselweni's (and all other African producers) in recovering leaf on felling trees for timber on an 8-10 year rotation. It is the only current producer of medicinal oil in South Africa - Swaziland at present (see also Appendix 7).

7. Both producers exported the bulk of their crude oil to Australia where, after rectification it appeared on the world market as Australian oil. Smaller quantities were exported to Portugal and Spain. Mankaiana's oil exports were handled by Eucatrade Ltd. in Piet Marisburg.

### **Industrial Oil**

8. Mankaiana also produces an 'industrial oil' (piperitone type) from *E.dives*. Management is based on an 8-10 year timber rotation with recovery of 'waste leaf' for distillation. Exports are made exclusively to Australia where the oil is employed as the raw material for the manufacture of menthol.

### Citrus Oils

9. Several estates produce citrus fruit in Swaziland. The bulk of production is destined for the fruit export market but there is some processing. No information is available

on the scale of production, if any, of orange oil. However, United Plantations at Pigg's Peak has produced distilled West Indian lime oil, along with lime juice for many years. Some of the lime oil is sold to South Africa but the bulk is exported, probably to Coca Cola in the USA (which has a bottling factory in Swaziland).

10. This Swazi operation, together with that of Mazoe Citrus in Zimbabwe appear to be the only current producers of lime oil in Southern and eastern Africa. The lime oil factories on Zanzibar and at Mtwara on mainland Tanzania ceased production over 20 years ago.

#### **GUM NAVAL STORES POTENTIAL**

11. Extensive plantations of pines exist in the High Veld. However, the prospects for gum naval stores production probably are constrained to the Shiselweni plantations. Elsewhere the combination of climate and dominant species (*P.patula*) are less suitable.

12. Shiselweni has 3,000ha of pine, mainly *P.elliottii* which is destined for saw-timber at 25 years of age. Most of the stock is now 15-20 years old and reaching the stage when tapping could commence. A tapping trial is necessary before the viability of naval stores production can be assessed.

#### **GUAR**

13. Trials with guar seed were conducted by the Ministry of Agriculture during the mid-1980s in the Low Veld. It is understood that field performance was found good but it is not known whether successful commercial production subsequently developed.

#### **RESEARCH ON THE FOCAL COMMODITIES**

14. The only substantial research known to have been carried out on the focal commodities in the past decade appears restricted to Shiselweni - NRI collaborative studies on eucalyptus oil. This work involved identification through screening of elite provenances and individual trees of *E.radiata* and *E.smithii*, plus study of the influence of management regimes on oil productivity with the latter species.

15. The Swazi Ministry of Agriculture focused on food crops for smallholders up until the mid-1980s, when attention was

rekindled in cash crops. However, the only contact with NRI in recent years on the focal commodities involved turmeric (see para 2 above).

16. An appraisal of the prospects for establishing production of wattle bark in Swaziland was made recently by NRI for the Centre for Development of Industry (Brussels) and the Swaziland Industrial Development Co. This concluded that the venture was very high risk and that attention would be better focused on improving sales of bark and timber to South Africa (Coppen and Thomson, 1995; ref. 76).

**SOME USEFUL CONTACTS IN SWAZILAND**

Commonwealth Development  
Corporation  
POB 133  
Mbabane

Tel: 42051/4  
Fax: 45185

Shiselweni Forestry Co  
PO Box 98  
Nhalangano

Tel: 78411, 78588  
Fax: 78713

Swaziland Citrus Board  
POB 343  
Mbabane

Tel: 44263/266

United Plantations  
Ngonini Estate  
Piggs Peak

Mankaiana Estate  
(Close to border with  
Transvaal 50km north of Piet  
Relief)  
Office: 19 Alfa Building  
Piet Relief  
Transvaal

Tel: 01343-3601  
Fax: 01343-2113

Misc. plantation interests

CDC subsidiary; former  
eucalyptus oil producer;  
prospective naval stores  
producer.

Lime oil and juice producers

Eucalyptus oil producers

Mr Albert Martin, owner

**EUCALYPTUS OIL PRODUCTION IN SOUTHERN AFRICA:  
DEVELOPMENT HISTORY AND FUTURE PROSPECTS**

*Southern Africa (effectively South Africa and Swaziland) emerged as a significant world source of eucalyptus oils over the period 1970-90. Dominance was achieved in supply to the world market of 'industrial eucalyptus oil', a piperitone source, and exports have averaged 150-180 tonnes annually in the more recent period. Exports of medicinal eucalyptus oil during the 1980s ranged between 200-250 tonnes annually or 13 per cent of recorded international trade. However, a decline in world prices for medicinal oil over 1992-94 led to major cutbacks in Southern African production and the mothballing of some operations. This note examines the causes of the problem with medicinal oil, the prospects for resuscitation of the industry in South Africa and for the entrance of new suppliers in the region. The potential for 'perfumery oil' production from *E.citriodora*, are discussed as an alternative to citronella oil as a fragrance in the regional soap industry. Discussion of industrial oils is not made as the market appears reasonably secure and with little scope for a new entrant.*

**Medicinal Oil****Definition and Uses**

1. The term 'medicinal eucalyptus oil' derives from the original use in medicine of the cineole-rich essential oils derived from certain *Eucalyptus* species. Pharmacopoeia specifications call for a minimum cineole content of 70 per cent. The oil is employed in medicine as an inhalant/decongestant in various forms, perhaps best known as 'Vick's Chest Rub', but also it has other applications as a flavour (eg menthol-eucalyptus lozenge confectionery).

**International Demand**

2. Recorded international annual trade was assessed in 1992 by Coppen and Hone (ref 55) as around 2,000 tonnes. The oil is used globally but the biggest individual import markets are the European Community and North America. Demand is stable in these major markets but a growth in usage in developing country markets may be expected in the long-term.

3. Actual world consumption is much greater than trade since there is significant domestic usage in certain producer countries (eg India) and, most notably, in China which is the current major world producer. Even allowing for large stocks, demand within China possibly approaches 1,000 tonnes annually (Green, 1995; ref. 57).

### **Production**

4. This oil provides a classical example with essential oils of the periodic geographical relocation of major supply areas. In this case, however, special additional factors apply beyond the usual causes of production cost/price competitiveness and socio-economic changes.

5. Eucalypts are native to Australia and the oil producing industry commenced there. Today, Australia has a 5 per cent share of the world market. During this century some countries in the tropics deliberately introduced medicinal oil species of eucalyptus to establish oil production. However, the major world sources in the middle of the century, Portugal and Spain, established their position without prior design; *Eucalyptus globulus* was planted for polewood/pulpwood production and oil processing developed later by use of the 'waste leaf' which became available on tree felling.

6. Portugal and Spain were progressively displaced as the major suppliers from around 1970 by an identical process following the introduction of *E.globulos* to China as a timber source. The major producing area in China is the remote province of Yunnan where the tree is invariably found along the roadside and distillation is carried out by farmers on simple, inexpensive stills. Average annual production in Yunnan province is 3,000 tonnes and outputs as high as 5,000 tonnes occurred in the early years of economic liberalisation. The main essential oil compounding factory in Yunnan has the capacity to rectify 2,000 tonnes of crude oil annually to Pharmacopoeia grade.

7. China's success in capturing the dominant supplier role on the market arose not simply from its production volume but also through an aggressive export pricing policy.

8. World production and export estimates for 1991/92 are shown below:

# World production and export estimates for 1991/92

(tonnes)

	Production	Exports
World total	3,800-4,130	ca. 2,000
of which:		
PR China	3,000	1,500
Portugal	150-200	150
India	150-200	ne
Australia	120-150	100
South Africa	150-180	120
Swaziland	80-100	80
Zimbabwe	10	10
Chile	80-100	80
Spain	50-100	50
Others	100	ne

Source: Coppen and Hone (1992) and revised by Green (1995)  
ne: not estimated, small

## Prices

9. World prices are set by China and are most commonly listed for Chinese, 80 per cent (cineole) oil. Movements in price for this Chinese grade, delivered Europe are shown below. The sequence for 1987-91 are for the end of year prices.

	87	88	89	90	91	92	94	94	95	95
						(Jan)	(Feb)	(Jul)	(Jan)	(Jul)
US\$/kg	7.7	9.5	5.8	5.7	5.1	4.6	2.2	2.75	6.0	4.85

10. The price fall experienced from 1989 to 1992 arose from a combination of factors: US\$ weakness, a reduction in buyers' stocks as a result of world recession and high interest rates, plus China's pricing policy which was aimed primarily at earning US\$ on a weak market. Prices plummeted to a historical low until mid-1994 and this must be attributed at least in part to the economic liberalisation in China, which resulted in the creation of many new and inexperienced exporting companies and a 'free-for-all' approach. The Chinese Government applied a brake in mid-1994 and stopped shipments to bolster prices. Subsequently, no shipments have been made from China on contracts made at US\$3/kg. (This situation is not unique to eucalyptus, but

applies also to several other Chinese oils.) European market spot prices reached US\$6/kg in early 1995 and have only recently eased with supplies arriving from other sources.

### **Southern African Production and the Impact of Prices**

11. Production of medicinal eucalyptus oil in **South Africa and Swaziland** is located principally on the Transvaal/Swazi border. It originated as a secondary development to the planting of *E.smithii* for timber. Later, all but one of the oil producers turned to cultivating *E.smithii* specifically for leaf distillation on a coppicing regime of 12 to 18 months intervals. The exception, Mankaiana Estate just inside Swaziland grows for timber on an 8-10 year rotation and distils 'waste leaf' on felling.

12. The oil produced from *E.smithii* has a 70-75 per cent cineole content and is regarded as a 'crude oil' owing to the presence of minor natural components unacceptable in Pharmacopoeia specifications. It must, therefore, be rectified and in the process the cineole content is enhanced. Since rectification facilities have become available only in recent years in South Africa, all producers initially exported their crude to Australia, which then re-exported rectified material as Australian oil. All exports remain of crude oil today but a proportion of shipments now go to Portugal and Spain.

13. Oil yields from young coppiced *E.smithii* are of the order of 200kg/ha, commence to fall after ten years, but still can exceed 130kg after 15 years. With these yields and prices prevailing prior to 1991, ie US\$5/kg, cif or more, the operation gave good returns.

14. The perceived attractiveness of production prompted the establishment of medicinal eucalyptus production in **Zimbabwe** in the late 1980s (see Appendix 3A, para 47). This was a classic risk-taking exercise with an investment decision being made on the basis of limited and second-hand information on both technology and markets in which mistakes were made, including the initial selection of species. However, lessons were learnt in production and, save for initial difficulties in identifying buyers, profitability indicators were good until prices commenced to dip in 1992 (see Coppen and Hone, ref 55). Even with low prices, returns compared to tobacco were fair and the operation provided an additional bonus in furnishing its own boiler fuel, plus surplus polewood for fencing on-farm or for sales

to neighbours. The production scale was eventually reduced, not so much through low market prices or difficulty in sales as from the development of more remunerative and less-labour intensive essential oil crops (which better matched an already highly diversified farming operation).

15. *E.smithii* cannot be mechanically harvested and branches must be cut and stripped of leaves manually. This cost element, combined with low prices took its toll on the South African industry and all the coppice system producers dropped out by the end of 1994; some withdrawing from the industry and others mothballed their distilleries. This decision has been influenced also by rising demand for timber on the South African market. Production of medicinal oil in 1995 is now carried out only by Mankaiana Estate in Swaziland which uses the short rotation for timber production with waste-leaf recovery.

16. The largest of the Swazi producers, a Commonwealth Development Corporation subsidiary (Shiselweni Forestry Co). has ceased production also, but for a variety of reasons. The plantations were old, some trees being 20 years of age, the distillery equipment needed refurbishing and a new plantation had been established over the previous years in Tanzania. CDC, therefore, has not withdrawn from production but undertook a considered strategic relocation of the site of operations.

17. Eucatrade Ltd hold the view that distillery gate prices for crude oil must rise to Rand 20/kg (US\$5.54/kg) before coppice systems producers will resume production in South Africa. Good profitability could be achieved, however, from the short-rotation timber/waste-leaf recovery system if distillery gate prices for oil were Rand 17/kg (US\$4.71), which is almost 50 per cent higher than the June 1995 price. Stocks of *E.smithii* in the environs of the Transvaal distilleries are of the order of 20,000 ha, sufficient to provide around 120 tonnes of oil annually on a 6-8 year rotation regime.

#### **Future Prospects for Southern Africa Producers**

18. The sheer size of China's output of medicinal oil will ensure that it dominates the world market for the foreseeable future and it is difficult to predict at what level its export prices will settle. Continuation of the economic liberation measures could still lead to phases of very low prices; particularly as there is a fair profitability margin in the main source, Yunnan where the

raw material resource is abundant, labour costs are amongst the lowest in China and rapid major socio-economic changes - as seen in the 'Economic Development Zones' of the sea-boards - are highly unlikely.

19. It is possible, therefore, that South African medicinal oil production might never recover to its former levels. Current price expectations seem highish and the trend in labour costs in South Africa is upwards.

20. However, production in neighbouring countries in the region could prove profitable if prices stabilise at a reasonable level.

21. The quality of medicinal eucalyptus oil is governed by the germplasm rather than by the skill of the distiller or the sophistication of the equipment; the latter more influences oil yields. It would be conceivable, therefore, to duplicate the Chinese production system with a large number of smallholder producers and bulking for export of many lots of oil. However, this seems unlikely to be adopted in Zimbabwe or Zambia owing to cultural attitudes/land constraints and even the price of a small distillation unit could be a constraint in Malawi.

22. Production by commercial farmers or estates, therefore, appears the way forward. A coppicing system could be viable in a number of situations. If, however, labour costs for harvesting are a significant factor, then two approaches could be considered:

- (a) adoption of the short-rotation timber/fuelwood production systems with collection of 'waste-leaf'; this may match the needs of tea estates or even tobacco farmers who grow their own eucalyptus wood-fuel; or
- (b) where possible, cultivate a eucalypt which can be mechanically harvested.

23. There is only one such mechanically harvestable species, *E.polybrachtea*. This is in fact the raw material of the present Australian industry, in which cleaned-up wild stands of the species are harvested by machine. *E.polybrachtea* also has certain other advantages: oil yields are good, the cineole content is higher than *E.smithii* and rectification of the oil is unnecessary and, also, it is a drought tolerant species. However, the adaptation limits of *E.polybrachtea* within differing eco-climatic zones of

Zimbabwe, Zambia and Malawi have not been thoroughly examined.

## **Research**

24. Comparatively little systematic and sustained research has been undertaken worldwide on oil-bearing eucalypts and that which has been done is fairly recent and on a narrow range of species (Coppen and Dyer, 1993; ref 56).

25. In Southern Africa, work on the eucalypts has been carried out collaboratively by CDC and NRI, mainly on *E.smithii* selection and management, but this cannot be regarded as substantial in relation to needs. Mr V Davidson, Director of Eucatrade Ltd, has done some work on *E.radiatta* selection. Essen Oils Ltd in Zimbabwe undertook short-duration trials, mainly on adaptation and initial growth rates with a range of species (including *E.polybrachtea*) but these were dropped when *E.smithii* displayed early promise.

## **Perfumery Oil (*E.citriodora*)**

26. Large scale production of *E.citriodora* is carried out in China and Brazil and annual world trade is around 500 tonnes.

27. *E.citriodora* is usually managed on a coppice system to furnish an oil which is interchangeable in many applications with citronella oil (eg in cheap soaps).

28. Setting aside consideration of the world market, this species is worth considering as an alternative source for supplying the regional soap industry with 'citronella' fragrance. It possesses a number of advantages over citronella in that repeated annual harvesting is not necessary, it is a long-lived perennial and, also, should provide its own boiler fuel.

29. It has been planted as an ornamental and has adapted well in many areas in the region but no systematic coppicing and yield trials have been recorded in the literature.

30. It would seem to fit a niche identified in Malawi for tea estates which wish to establish tree crops and for other estates which require perennials to define borders.

31. Like most eucalypts, *E.citriodora* must be manually harvested. Production on a large scale might, therefore,

not fit in well with tobacco farms operations. However, a small-scale operation might be manageable on many tobacco farms. The scale of the planting could be limited to the power of the existing steam boiler (thereby minimising investment costs) and with annual harvesting of plots at lull periods in the tobacco schedule. In this scenario, several farmers would need to bulk their output to make up a commercial size export consignment.

**BIRDSEYE CHILLIES: PRODUCTION  
AND TRENDS IN SOUTHERN AFRICA**

*Birdseye (or 'mombasa') chillies are small-fruited and highly pungent African types which were originally sourced from Central Africa and exported through the Kenyan port of Mombasa. The main geographical source of production has relocated several times since the 1970s, and there have been changes in the market. This brief note examines the pattern of development in Central and Southern Africa and future prospects.*

**Definition and Uses**

1. Birdseye chillies are obtained from *Capsicum frutescens* varieties. By tradition the highest grade dried Birdseye chillies are 2-3 cm in length and bright red in colour. The pungency or 'hotness' is the highest within the dried chillies which are traded internationally in significant volumes; this corresponds to a 0.9-1.0 per cent content of capsaicinoids, the pungent constituents.

2. Three market outlets have developed for Birdseye chillies:

- (a) retail sales, particularly in Europe, of whole, high visual quality material;
- (b) in the industrial extraction of 'African chillie oleoresin'; and
- (c) on a more limited scale for blending with other types of chillies and standardising the pungency of ground chilli powders and curry powders.

**International Demand**

3. Accurate quantification of the scale of international demand for Birdseye chillies is virtually impossible owing to the lack of differentiation of this type from other dried capsicums in published trade statistics. The estimate made by NRI for the late 1970s was around 1,000 tonnes (Purseglove et al, 1981, ref. 30; Smith, 1982, ref. 31).

4. In the subsequent period, the market has contracted as a result of changes in both supply levels and of the production sites for 'African chillie oleoresin'. Shortages

in the 1970s forced oleoresin extractors in Europe and North America to part-substitute Birdseye with lower pungency but cheaper Chinese Fukien chillies. At about the same time, India established an oleoresin extraction industry and for 'African chillie oleoresin' production drew on domestic, less pungent chillies. That country's subsequent success in capturing the lion's share of the world spice oleoresin market resulted in lower consumption of Birdseye chillies by the extraction industry in Europe and North America.

5. The current international trade in Birdseye chillies is possibly around 600 tonnes annually. Demand by oleoresin extractors might be eroded further if a significant commercial development occurs with the Nepalese Akarbare chillie, which has a greater pungency (around 1.2 per cent capsaicin), provides much higher crop yields and demands less labour in harvesting (Green and Mullard, 1990; ref 32).

### **Production**

#### **Pre-1982**

6. Up until the Idi Amin era in Uganda, that country was the principal source of Birdseye chillies. Exports were supplemented also by material originating in neighbouring Central African countries.

7. Supplies were disrupted, drying up at some stages during the Amin regime and a programme was initiated to develop the crop in Papua New Guinea with ODA funding and NRI technical support. This proved successful and exports of 200-300 tonnes annually were achieved. After some years, the industry collapsed. Production was based on smallholders who made sales through the Marketing Board which predicted low prices in one year and did not buy any of the crop. As it turned out that year coincided with a shortfall in exports of Chinese Fukien chillies and market prices reached a historic high. However, smallholders in Papua New Guinea lost all confidence in the crop and while attempts have been made subsequently to resuscitate production current exports are small.

#### **Post 1982**

8. The commercial farming sector in Malawi recognised the supply-side opportunity and plantation production commenced around 1982, being led by Nhamingomba Tea Estate and Nali Farms. By 1988, Malawi had established itself as the major world source of Birdseye chillies with annual exports of

250-300 tonnes but by this stage estate production had ceased and supplies were derived almost exclusively from smallholders.

9. **Zimbabwe** entered the scene in the late 1980s with production by commercial (tobacco) farmers and exports were 260 tonnes in 1994. Penetration of the market has been at Malawi's expense for reasons discussed below.

10. In the recent period, production in Uganda has resumed and some other countries in the region (e.g. Mozambique) also have commenced to export.

11. Malawian traders fear that their market will be further eroded by these developments. However, the concerns of traders are not appreciated at the farm level in Malawi, where production has developed spontaneously in non-traditional growing areas in the past few years. This reflects the determination of Malawian farmers to generate a cash income and their very poor market awareness.

12. A period of intense competition is likely to arise in the near future with periodic oversupplies and low prices. Zimbabwe is aiming at control of production levels at around 200 tonnes annually in order to maintain price stability and its lead role on the market.

#### Comparative Development Modes and Experiences: Malawi vs Zimbabwe

##### **Production**

13. In **Malawi**, smallholder took up the crop with alacrity and estate growers, such as Nhamingomba, soon withdrew as their production costs were considered uncompetitive.

14. A completely opposite situation has pertained in **Zimbabwe**. Early attempts at stimulating smallholder/communal farmer production failed, even with the provision of seedlings and some extension support from the main buyer. This is attributed to cultural attitudes: smallholders have little experience of cash crop production, fear drought and since land is limited place a priority on subsistence food crops.

15. Production in Zimbabwe has been developed by a group of commercial tobacco farmers (usually numbering 16) who are coordinated and served by what is effectively a marketing cooperative, Lomag Exports Ltd. Average plantings are 5-10

ha and the crop is treated fairly intensively if not to the same degree as paprika. Yields range from 2-5 tonnes/ha, averaging 2.5 tonnes, and this is much superior to smallholder yields by a factor of at least two. Returns are considered better than tobacco and investment is lower; crop drying is undertaken in the extant tobacco curing barns. For every Z\$1 invested in Birdseye chillies, the return is Z\$4-5.

### **Purchasing, Quality Control and Exporting Systems**

16. Farmers have the option in **Malawi** of selling to Blantyre-based traders or to Admarc. In practice, the low prices offered by Admarc result only in acquisition of the lowest quality material (poor colour and broken fruit). The traders only purchase and export top (visual) quality material. Admarc effectively allows farmers to dispose of material which is otherwise unsaleable on the domestic market. No attempts appear to have been made by Admarc to export this material to oleoresin extractors.

17. Malawian traders employ collectors, equipped with bicycles who tour farms and make purchases of small lots (around 1kg). The trade is now dominated by a group within the black community and at one stage it is understood that they (unsuccessfully) attempted to act as a cartel.

18. In **Zimbabwe**, Lomag purchases all fruits at Z\$13/kg (US\$1.56/kg), undertakes manual grading and exports all of the grades. One hundred and thirty women are employed in the grading operation. Qualities exported are:

- A - premium appearance fruits (to Europe);
- B - mixed grades (to grinders);
- C - oleoresin extraction grade (mainly destined to Mexico and the USA).

20. Zimbabwe has a **comparative advantage** over Malawi through not only this complete utilisation of the crop but also from the fact that the season commences 3 to 4 months earlier in Zimbabwe. It can capture, therefore, the lion's share of the premium grade market simply by having stocks available when those of buyers are depleted.

21. Where possible, sales are made direct by Lomag to end-users; relatively small quantities pass through a UK based dealer. Lomag works in close association with South Africa's major paprika trader and this has recently led to the opening up of the Mexican market for premium grade material.

## PAPRIKA IN SOUTHERN AFRICA:

## DEVELOPMENT EXPERIENCE AND FUTURE PROSPECTS

*Since 1980, Southern Africa has emerged as a major world supplier of paprika. The history of its development has been marked by various mishaps during the learning-curve with production and marketing and, also, the full potential for added-value processing has not yet been attained. This note described the experiences of the developments within South Africa, Zimbabwe, Zambia and Malawi, examines trends and discusses future prospects within the context of the global market.*

## DEFINITION AND USES

Description

1. Paprika is defined in international commerce as the powdered, dried pods (plus an allowable proportion of seeds) of varieties of *Capsicum annuum* var. *annuum* which possesses a high red pigment content. The latter is a major criterion for quality assessment and minimum levels are specified in buyers' and international standard specifications.
2. The fruits from which paprika is produced are large and more fleshy than the traditional African capsicums (or chillies). Paprika cultivars are the selected, richly red forms of the 'vegetable peppers' found in some African markets.
3. Paprika differs also from chillies in that the pungent taste ('hotness') is either absent or very low. The major world demand is for so-called 'sweet paprika' which is devoid of pungency.

Uses

4. Paprika's traditional and remaining major application is as a food additive, providing a deep red colouration and a distinctive flavour.
5. Very substantial retail sales are made of paprika and in discerning markets in Europe the flavour character is as important as the colour to consumers.

6. The industrial food market for paprika is of great importance worldwide and here paprika is mainly employed in the form of its solvent extracted 'oleoresin'; a highly concentrated form of the colour and other extractives. The principal quality criterion for paprika oleoresin is the colour strength.

7. Recently paprika oleoresin has developed a market as an additive to poultry feed in Japan and some countries in Western Europe. The purpose is to enhance to yellow colour of egg yolks and in this application it competes with marigold meal and synthetically produced beta-carotene.

## **WORLD DEMAND AND SUPPLY TRENDS**

### **Demand**

#### **Markets**

8. Paprika is a spice with very specific major markets, namely Eastern and Western Europe, countries bordering the Mediterranean, North America, Argentina and Chile. Elsewhere in the world, demand is for the pungent or 'hot' types of capsicums (i.e. chillies).

#### **Consumption Levels**

9. Accurate assessment of world demand for both paprika and its oleoresin is plagued by problems of classification systems used in published trade statistics.

10. The scale of trade in paprika in the late 1970s was estimated as somewhat in excess of 30,000 tonnes annually (Smith, 1982; ref 30). Western Europe accounted for 50 per cent of world inputs while the USA took 5,000 tonnes (which was much less than its domestic production). Additionally, world paprika oleoresin demand was estimated as some 500 tonnes.

11. In the subsequent period, there has been global growth in consumption of paprika, outstripping all other spices. Western Europe remains the largest import market with a demand for paprika of some 20,000 tonnes annually around 1990. The USA imported only some 4,000 tonnes but its total consumption of paprika is probably larger than Western Europe's since there is a very substantial domestic production. Japan has in this period emerged as a significant market.

12. The United States is a major producer of the oleoresin for its domestic market but also imports 300-400 tonnes annually. Western European consumption is difficult to quantify but also is very substantial. Current global trade in oleoresin is possibly around 2,000 tonnes annually.

### **Supply**

13. The traditional major supply sources for paprika have been Spain and Hungary with Bulgaria, Yugoslavia and Morocco in the second rank. Spain, Hungary and the USA accounted for the bulk of world production of the oleoresin in the 1970s.

14. The past decade has seen major changes to the pattern of production and supply. Spain has declined in importance as a grower but still dominates the trading of paprika and export oriented production of oleoresin. New suppliers to the market have emerged and these include Southern Africa, Mexico, Chile, Argentina, Peru, Ethiopia, Israel and, most recently, India and China. A large proportion of the paprika produced by some of these countries is shipped as unground, dried pods to Spain where re-export occurs after further processing to the ground material or to oleoresin.

### **Prices**

15. Paprika prices displayed a growth trend during the 1970s. Spanish material on the New York market moved from US\$0.8/kg to US\$1.8/kg (cif) and then stabilised for a number of years. The more recent, post 1992 period, has seen greater price swings with a decline over 1992-94 when an oversupply situation occurred; New York prices (cif) for imported paprika declined from US\$2.0/kg to US\$1.45/kg. Short crops in California, Latin America, Morocco and Spain in 1994-95 have firmed prices.

## **PAPRIKA DEVELOPMENT IN SOUTHERN AFRICA**

### **History**

16. Paprika is a relatively new crop to Southern Africa with commercial production commencing around 1980 in South Africa, expanding to Zimbabwe around 1990, then to Zambia and reaching Malawi in 1994. It has shown probably the fastest growth rate of any non-traditional cash crop in the region, which is now a major world supplier and its annual output (see Table 1) strongly influences international market prices. However, development has not been easy or

painless as a consequence of a largely haphazard, individualist approach by the majority of farmers and traders and by some processors who lacked knowledge of both technology and markets.

## **South Africa**

17. Trial production of paprika commenced during the 1970s in South Africa. About five years were required to develop the cultivation technology, which was previously unknown, and to select suitable cultivars. The first introductions were of the main commercial Spanish cultivars but these failed to perform adequately under South African conditions, especially with respect to final product quality. Subsequently, two cultivars from the United States, Peto Seeds' 'Papriking' and 'Papriqueen', were adopted and these are now the most widely grown (not only in South Africa but also by its neighbours).

18. Cultivation was initiated around Johannesburg but has subsequently spread to several other areas. All significant production arises from commercial farmers. Attempts to stimulate smallholder/communal farmer cultivation have failed owing to poor adaptation to crop management requirements or from lack of interest.

19. Annual production has averaged 10,00 tonnes in the past five years.

20. The bulk of production is aimed at the overseas (effectively Spanish) oleoresin extraction market and shipments are made of compressed dried pods.

21. There is only one domestic paprika grinder, Agro-Trading International Ltd, which has close connections with the Spanish and Chilean industries. It now focuses on production and export of high flavour quality material (as opposed to high colour value) for niche markets in Europe. It has developed new cultivars for this purpose and only buys from farmers who have contracted to grow the special seed and to sell back the entire crop (including seeds).

22. Three paprika oleoresin factories exist, although one of the smaller units is understood to have recently closed and plans to relocate to South America. The largest operation, Colour-X Ltd, is a subsidiary of the state-owned tea company, SAPECO and its processing capacity has recently been expanded. This and the other processing factory can produce jointly about 70 tonnes of oleoresin annually (see

Table 2). All of the oleoresin processors experienced initial problems in meeting the quality requirements of overseas buyers. This arose as much from raw material quality deficiencies as to mastering processing technology and penetrating an unfamiliar, competitive market.

23. Quality deficiencies have similarly caused problems to traders in paprika (purchasing from within South Africa and from neighbouring countries) and it has been a contributing element to bankruptcies in this sector in the recent period.

24. Production of paprika has been adversely affected by drought and the availability of water for irrigation in the past two years. Labour availability at the end of the harvesting season has caused problems also while the costs of labour are expected to rise in the near future as the result of legislation. This situation has prompted the paprika grinder to contract production in Zimbabwe and, more recently, to consider Malawi and Zambia as new supply sources. Other South African traders have been actively promoting production in Zimbabwe and Zambia for several years for similar reasons.

#### **Zimbabwe**

25. Interest in paprika in Zimbabwe was first stimulated around 1988 by a number of South African traders. The response of commercial farmers varied considerably; some holding back from caution over a completely unknown cash crop while others ventured into cultivation without any knowledge of production or quality requirements or markets. Crop yields and quality were initially poor and return expectations were not achieved by many farmers. Additionally, a number of South African traders unscrupulously exploited producers and this has left a residual prejudice against paprika amongst a large number of commercial farmers, compounding also the inherent distrust of any crop which requires a middleman.

26. However, production progressively increased and this has undoubtedly been assisted by the creation of two specialist exporting companies, Hy Veld Seeds Ltd and Lomag Exports Ltd, which provide selected seed and extension support to contract growers. Hy Veld Seeds is now the largest individual paprika pod exporter in Zimbabwe. Lomag Exports Ltd is in effect a farmers' marketing cooperative, which deals in several commodities (including Birdseye chillies), and specialises in a limited scale production of

high flavour quality paprika for Agro-Trade International of South Africa.

27. In 1993, an oleoresin extraction plant was commissioned by a subsidiary of Astra Engineering Ltd, Zimbabwe Paprika Ltd., and this has developed as the second largest individual paprika buyer in the country. This company also provides selected seed and extension support to its contracted buyers.

28. Annual production of paprika in Zimbabwe in recent years has been around 10,000 tonnes and cultivation is undertaken in a number of areas in the region around Harare. Paprika is almost exclusively a commercial farming crop. Attempts by the three principal domestic buyers to promote production by smallholder/communal farmers failed, even with provision of seedlings and extension support.

29. The bulk of production is destined for export as compressed pods for the Spanish market. The oleoresin plant has a requirement for 1,500 tonnes per annum.

30. The three principal domestic buyers have a policy for a cautious growth in production and devote effort to selecting new cultivars for improved product quality and to devising more effective crop management technologies.

31. While Zimbabwe is now a very important bulk producer of paprika, it is apparent that knowledge of markets, including domestic marketing facilities, is presently compartmentalised within the commercial farming community. This reflects the largely independent, if not insular attitudes of many farmers and the currently poor information dissemination mechanisms for non-traditional crops. Attitudes to adopting paprika are likely also to be strongly influenced by the need to irrigate for attainment of high yields. A substantial investment is being made in irrigation and some farmers consider that the return per megalitre of water from paprika is less attractive than for some other alternative crops.

## **Zambia**

32. Production of paprika by commercial farmers in Zambia followed on the heels of Zimbabwe in the early 1990s and was similarly promoted by South African traders. Problems of poor yields and quality were encountered through lack of knowledge of the crop and of exploitation by some South African traders.

33. Provision of selected seed and a degree of extension support to growers did not arise until the creation of domestic company, PIPO Ltd. Unfortunately, the company collapsed in late 1994 and this led to a crisis of confidence in the crop. Production of paprika in 1995 is expected to be only some 150 tonnes, as against 500-700 tonnes in 1994.

34. This reduction in paprika cultivation coincided with the construction of the largest paprika oleoresin plant in Africa by a company, Enviro Oils and Colourants Ltd, jointly owned by two rose growers. The plant which is due to be commissioned in mid-1995 has a capacity to produce around 280 tonnes of paprika oleoresin annually and requires over 4,000 tonnes of paprika feedstock. Even with a rapid restoration of confidence in the crop, the availability of paprika - in a competitive buyers' market - for full utilisation of the factory's capacity is unlikely to be attained before 1997 at the earliest.

35. Some degree of renewed faith in the crop has resulted from the formation of a new company, Cheetah Zambia Ltd, in early 1995 by one for the former partners in PIPO. Cheetah offers seed and extension support to contract growers and, also, has initiated trial production with smallholders in the north of the country.

#### **Malawi**

36. Paprika was introduced to Malawi by PIPO Ltd of Zambia in 1994 and some 150 tonnes were produced by estates and large commercial farmers. As a result of the collapse of PIPO at the end of that year, producers were left with unsold stocks and no market outlet. Sales were eventually made to Zimbabwean buyers and to Spain.

37. Despite this early set-back, the crop has proven sufficiently promising to persuade some growers to expand production in 1995. Some smallholders are contracting to the successor of PIPO, Cheetah Malawi Ltd - the sister company to Cheetah Zambia Ltd, and some large estates plan to export directly to Spain. Production in 1995 is predicted as 1,000 tonnes and the expectations for 1996 are 2,000 tonnes.

38. One of the notable features of the Malawi experience is that tenant farmers on large estates performed well with this previously unknown crop.

### Common Experiences with Paprika Development

39. Paprika is a more demanding crop, akin in its management needs to other horticultural crops, than to the traditional extensive crops grown by commercial farmers in the region. Each farmer must pass through a learning curve in order to achieve both good yields and high quality. This has been best achieved when advice and extension support has been forthcoming from specialist, committed buyers.

40. In South Africa and Zimbabwe, smallholders and communal farmers have not proven successful growers. This appears to have arisen from a combination of factors: an inability to master the demanding needs of the crop; the absence of adequate extension support; lack of familiarity with cash crops; land availability constraints and drought risks which instil an aversion to risk-taking and favour traditional subsistence crop production.

41. Commercial farmers who have persisted with the crop have found that returns are comparable to tobacco and cultivation fits in well with the tobacco schedule.

42. Nevertheless, a strong element of caution exists over the crop within parts of the commercial farming communities in Zimbabwe and Zambia; largely from the folklore of early mishaps and from lack of knowledge of international markets and existing domestic marketing facilities.

43. All of the oleoresin producers invested without prior experience of processing and marketing and a lack of appreciation of the degree of competition on the international market. The surviving South African and Zimbabwean operations have undergone a long and difficult learning curve. Additionally, none of the oleoresin factories appear to have fully recognised at the time of investment the likely degree of competition for the crop from paprika pod exporters.

44. Success, both for oleoresin processors and for paprika traders, in a competitive international market has hinged to a large extent upon the quality of product grown by farmers.

45. Production in all countries is presently geared predominantly to supplying material of a high colour content (measured by reference to an internationally recognised scale, ASTA colour units). However, the colour quality

attainable by a farmer is somewhat unpredictable even with intensive management.

### **Trends**

46. A decline in paprika production in South Africa is likely to occur through the combination of water availability constraints and rising labour costs.

47. Production in Zimbabwe, Zambia and Malawi is likely to increase.

48. South African buyers are looking increasingly to the northern countries as a supply source to maintain their position in trade. Moreover, the major South African buyer (and grinder) wishes to contract more production in the north.

49. All specialist, committed trading/processing companies in the region are:

- (a) seeking to diversify sales away from dependence on Spain;
- (b) placing greater emphasis on improving product quality and are devoting resources to this end; and
- (c) moving to contract only those farmers who can attain high crop yields which, in those countries prone to drought, means farmers with irrigation facilities.

50. Farmers with irrigation will increasingly devote more attention to comparing the returns from paprika with those of other irrigable crops.

51. Also, many farmers are likely to display a preference for growing high flavour quality paprika, under a contract of payment at a fixed price by weight rather than growing high colour quality material for which returns are less predictable.

### **Comparative Advantage**

52. All three northern countries possess a comparative advantage with paprika over South Africa through combinations of superior rainfall and/or availability of water for irrigation, labour availability and costs.

53. **Zimbabwe** has a comparative advantage over Zambia and Malawi in lower transport costs for export of its produce and greater installed irrigation facilities.

54. **Zambia and Malawi** benefit from higher rainfall in their northern regions and also from a larger and cheaper labour force than Zimbabwe.

55. **Malawi** displays the greatest potential for comparatively low cost production - while attaining good product yields and quality - through the tenant/outgrower system linked to estates (which can provide supervision / extension within a well-established structure).

### **Prospects and Needs for Further Development**

#### **Prospects**

56. Competition between suppliers of paprika and its oleoresin on the international market is likely to increase rather than decrease in future unless Hungary's production undergoes a decline.

57. Success for Southern Africa producers will be highly dependent upon competitive pricing and meeting high quality specifications. The scope for significant production by smallholders and communal farmers in some countries is probably limited owing to their difficulty in producing high quality paprika.

58. Expansion beyond the recent regional production total for paprika of some 25,000 tonnes per annum should be approached with caution in the medium term.

59. There is no immediate scope for expanding oleoresin processing capacity in the region owing to the competitive world market.

60. Subject to the development of a significant scale of production of high quality paprika, good prospects exist for establishing additional factories in the region for the manufacture of ground paprika for the overseas retail market.

#### **Needs**

61. There remains a substantial need for development of agricultural technology (cultivar selection and crop management) and extension support for farmers.

62. Additionally, expertise must be acquired on overseas marketing and processing technology if the region is to maximise its potential.

63. While marketing and technical knowledge could be developed independently, if slowly, success would be more assured through attracting co-ventures with experienced companies from South Africa, Spain and, possibly, elsewhere.

**TABLE 1: ESTIMATES FOR PAPRIKA (DRIED POD) PRODUCTION IN SOUTHERN AFRICA**  
(Tonnes)

	1992 and 1993	1994	1995	1996	1997	Comments
South Africa	av.10,000	8,000*	6,000*	10,000	Decline(?)	Increased labour costs and shortage of water for irrigation likely to have significant adverse effects.
Zimbabwe	av.10,000	8,000*	8,000*	10,000(+)	Growth	Increasing confidence in the crop and yields improving.
Zambia	av. 500	700	150	500(+)	2,000(?)	Assumes a restoration of confidence in the crop.
Malawi	nil	150	1,000	2,000	Growth	Crop first introduced in 1994
Total (rounded)	av.20,000	18,000	15,000	23,000		

Source: Interviews with traders

\*Drought reduced crop

**TABLE 2: PAPRIKA OLEORESIN PRODUCTION CAPACITY IN SOUTHERN AFRICA**

	No of factories	Oleoresin production capacity (tonnes/annum)	Annual requirement for paprika (tonnes)	Comments
South Africa	2	70	1,200	Previously 3 producers. Now one major and one minor.
Zimbabwe	1	75	1,500	Short crop due to drought in 1995 and full output in factory may not be possible.
Zambia	1	280 (min)	4,500 (min)	Utilisation of full capacity not possible before 1997 at very earliest owing to low domestic crop.
	Total	425 (min)	7,200	Very substantial total capacity compared to world demand.
International trade in paprika oleoresin		2,000 (est)		India recently entered market, which will become more competitive.

Source: Interviews with producers

**TABLE 3: PAPRIKA CROP YIELDS (for the main current cultivars, Papriking and Papriqueen)**

	Dried Pods (tonnes/ha)			Comments
	Rainfed	Irrigation		
		av	max	
South Africa	1.2-1.8	2.3	3.0	Further improvement unlikely
Zimbabwe	1.5-2.5	3.25	6.0	Progressive improvements shown and likely to continue
Zambia				Data not available. Potentially equal to Zimbabwe and superior for rainfed crop.
Malawi	1-1.6*	2.5*		*Data for first ever crop in 1994. Improvement highly likely and rainfed yields should be higher than Zimbabwe.

Source: Interviews with traders

**TABLE 4: COLOUR QUALITY OF ZIMBABWE CROP IN 1994**

ASTA colour units*	% of crop
Best: 290-380	50
250-280	40
<240	10

Source: Paprika Zimbabwe Ltd

\*American Spice Trade Association (ASTA) method for assay for colour content.

**TABLE 5: ESTIMATED INPUT COSTS AND RETURNS TO ZIMBABWEAN FARMERS ON SELLING TO ZIMBABWE PAPRIKA LTD IN 1995/1996**

(Figures: Courtesy of Zimbabwe Paprika Ltd)

Input costs (Z\$/ha)	11,200	13,000	15,000	17,500	19,000	20,500	21,500	22,500
Yield achieved (kg/ha)	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500
	Rainfed		Irrigated					

ASTA Units		Pod Price/kg (Z\$) *
Whole Pod	Pod Only	
195	230	7.45
229	270	9.83
254	300	11.58
288	340	13.43
305	360	14.52

Returns (Z\$/ha)

14,900	18,625	22,350	26,075	29,800	33,525	37,750	40,795
19,660	24,575	24,490	34,405	39,320	44,235	49,150	54,065
23,160	28,950	34,740	40,530	46,320	52,110	57,900	63,690
26,860	33,575	40,290	47,005	53,720	60,435	67,150	73,865
29,040	36,300	43,560	50,820	58,080	65,340	72,600	79,860

\*Price/kg = (pod ASTA x pod price/ASTA x 72%) + (seed price [Z\$1.25/kg] x 28%)

US\$ conversion at Z\$8.34 = US\$1	Pod Price		Return/ha		Average return/ha (irrigation at 3.5 tonnes and 300 ASTA)
	Lowest	Highest	Lowest	Highest	4,859
	0.89	1.74	1,786	9,575	

## NAVAL STORES IN SOUTHERN AFRICA: DEVELOPMENT EXPERIENCE AND FUTURE PROSPECTS

*Demand for naval stores (turpentine and rosin from pine trees) in Southern Africa exceeds production, although there exists a substantial, as yet underexploited pine tree resource. A survey of the market and the resource base for the Southern African region (plus Tanzania, Kenya and Uganda) has been undertaken by Coppen (1995; ref. 62) and additional information was gathered in the present study. Existing or mooted naval stores ventures in the region have mostly been formulated in terms for national import substitution. This note examines prospects for a pan-regional development for attainment of total import substitution, involving cross-border trade in processed and crude material, and for overseas exports.*

### PRODUCT DEFINITION AND USES

#### Definitions and Description

1. **Naval stores** is a collective term used to embrace turpentine and rosin, obtained by various processes from pine trees, plus their further processed derivatives.
2. **Turpentine** is a volatile liquid and is the essential oil component present in the **gum oleoresin** which exudes from pine tree trunks. The other component of gum oleoresin is **rosin**, which on refining is a hard, transparent yellow substance.
3. **Gum turpentine and gum rosin** are obtained by first tapping the gum oleoresin from the trunks of living pine trees and then separating the two components of the gum oleoresin by a steam distillation process; processing yields are 70 per cent for rosin and 15 per cent for turpentine. The tapping operation is undertaken on mature pine trees for a period of usually four years prior to their felling. This generates additional revenue from the forestry operation and creates employment for those engaged in tapping, collecting and processing the gum oleoresin (Coppen and Hone, 1995; ref. 60). The two primary products are collectively termed **gum naval stores**.

4. During the chemical ('Kraft' or 'sulphate') process of pulping pine timber to paper, it is possible to recover so-called 'sulphate turpentine' and 'tall oil rosin (or TOR)'. These products are collectively known as 'sulphate naval stores'.

#### Uses of Naval Stores

5. Turpentine has traditionally been employed as a solvent for paints, varnishes, etc. In these applications, however, it has been largely displaced by the less expensive 'mineral turpentine' or 'white spirit', derived from petroleum. The major user of turpentine today is the world chemical industry which isolates the various pinene components and these are then transformed into a range of derivatives (fragrance and flavour compounds, vitamins and resins). A substantial quantity of turpentine is also treated directly to produce 'pine oil', an industrial disinfectant/cleaning agent with a characteristic pine odour.

6. Rosin is employed, usually after chemical modification, in a wide range of applications. These include sizing of paper, the manufacture of adhesives and paints, and as a substitute for tallow or palm oils in soap production.

#### **WORLD SUPPLY AND DEMAND**

##### Demand

7. World production and demand for rosin is around 1.2 million tonnes and that for turpentine is 0.3 million tonnes. Much of this material is consumed within the major producing countries and does not enter international trade.

8. The traditional major importers of naval stores are the European Community, Japan and North America but demand is static in these countries.

9. By contrast, a progressive growth in consumption is displayed by developing countries. Major importers in this group include India and Korea. However, most others import naval stores on a comparatively small scale but on aggregate the figure is substantial. Rosin, rather than turpentine, is the item in greatest demand and this is mainly employed for paper sizing and adhesive manufacture. Another, often substantial application, is in soap production.

## **Supply**

10. Sulphate naval stores account for the supply on a world basis of about 40 per cent of all rosin and 60 per cent of all turpentine. Production is largely accounted for by North America, Europe and New Zealand and output is static owing to a trend away from chemical to mechanical pulping of wood for paper.

11. The balance of production arises from gum naval stores and the major suppliers to the world market in order of importance are China, Indonesia, Portugal and Brazil. Annual world trade in gum rosin and gum turpentine are respectively about 0.38 million and 0.025 million tonnes

12. The adequacy of future supplies to the market are very dependent upon production and consumption trends in China.

## **Prices**

13. Price hikes were experienced in early 1995 as a result of floods disrupting production in China and from drought in Brazil and Indonesia. In the prior period, however, prices for both rosin and turpentine were reasonably stable at around US\$650/tonne (cif).

## **NAVAL STORES IN SOUTHERN AFRICA**

14. Substantial pine forests have been planted for timber in all of the countries covered in this study. However, naval stores production currently occurs only in South Africa and Zimbabwe but as yet neither has an output adequate for their domestic demand. On a regional basis, there is major imbalance of demand as against production and the shortfall is met by imports.

## **Demand and Production Deficits**

### **Rosin**

15. The total current regional demand for rosin and its derivatives is of the order of 6,000 tonnes per annum (expressed as rosin) and the regional production deficit is 1,600 tonnes (see Table 1). This shortfall is overcome by imports which are indicatively valued at around US\$1 million (calculated from the average annual landed price for rosin in the early 1990s). The actual value is somewhat greater

since higher priced rosin derivatives compose a large element of imports.

16. The projected demand in the year 2,000 for rosin is estimated as around 10,000 tonnes. This assumes a growth rate in demand of 10 per cent in South Africa, the major market, and the commissioning of new paper factories in Zambia and Malawi.

17. The Zimbabwean naval stores industry is in decline (discussed later, paragraph 27) and assuming only a modest increase in South Africa output and no new production elsewhere, the production deficit for the region in the year 2000 could be of the order of 5,600 tonnes of rosin, valued at US\$3.6 million (see Table 1).

18. Should regional production of rosin develop to exceed the demand levels indicated above, additional sales could be made to soap manufacturers. For example, Lever Bros. in Malawi could utilise 500 tonnes of rosin annually as a partial substitute (5 per cent level) for its imported Malaysian palmsterine. If this were taken up by the soap industry throughout the region, an additional demand of 1,000 -2,000 tonnes would be created for rosin.

#### **Turpentine**

19. Current demand for turpentine as a solvent in the region is weak at less than 200 tonnes annually (see Table 2), owing to the competition from inexpensive, imported white spirit. A production surplus exists at present and South Africa exports over 900 tonnes of its turpentine annually to the world chemical industries.

20. In 1996, a South African company plans to produce pine oil for the domestic market and this will substantially erode the turpentine production surplus and the level of turpentine exports.

21. In Malawi and Zambia, paint manufacturers have indicated a willingness, subject to quality and price, to employ domestically produced turpentine. This could increase regional consumption for turpentine by another 700 tonnes.

22. Using the same assumptions on naval stores production trends described above (paragraph 17), a production surplus will remain in the year 2,000 at a level of 250-1,000 tonnes

of turpentine, depending on the level of usage by paint manufacturers.

#### **Pine Oil**

23. Figures on **current demand** for pine oil are available only for South Africa, which imports 600 tonnes annually.

24. South Africa's commissioning of a plant in 1996 for conversion of turpentine to pine oil will supply its needs and, possibly, allow manufacture of additional material for sale to other countries in the region.

#### **Production (Existing and Potential) in the Region**

##### **Zimbabwe (Existing Producer)**

25. Zimbabwe was the first country in Africa to establish a gum naval stores operation. This dates from the UDI period when naval stores could not be imported. The factory is owned by Zimbabwe Phosphates Ltd and is sited in Harare. The annual production capacity is some 850 tonnes of rosin and 200 tonnes of turpentine.

26. Although the country has extensive pine resources, only one area of the Eastern Highlands has trees with the requisite combination of gum yield and quality. It has been the single source of raw material in the factory's history. Supply of gum oleoresin has never exceeded 1,000 tonnes per year. Production of rosin was adequate for local demand until recently and has allowed periodic exports to South Africa. The domestic turpentine market has become weaker, following the importation of less expensive white spirit and unsold stocks were held in the recent period by the factory.

27. The owner of the pine resource, Border Timbers Ltd has decided to phase out gum tapping and to focus on the core business of timber production. Supplies of oleoresin to the factory in 1994 were 40 per cent of the requirement and the major buyer of rosin, the paper mill has switched to an alternative source. The factory is now operating part time and production will cease within a few years.

##### **South Africa (Existing Producer)**

28. Sulphate naval stores have been produced for many years by the paper industry but gum naval stores did not arrive on the scene until 1985. Production of rosin by each of the

operations is currently 2,000 tonnes per annum. This output of rosin is 1,000 tonnes less than the current market requirement. Turpentine demand is small and the bulk of the industry's production (900 tonnes) is exported overseas.

29. Gum oleoresin is obtained from pine plantations in northern Natal, owned mainly by the South African Forestry Department. Processing is undertaken in Durban by a single company, Pinechem Ltd which also converts some of the gum rosin to rosin derivatives.

30. Expansion of the gum naval stores operation has been slower than wished, largely as a result of foresters' aversion to any activity not concerned with timber growing. A modest expansion is currently underway and this will allow for complete export substitution of rosin by 1996.

31. Pinechem intend to produce pine oil from its own turpentine in 1996. It plans, also to expand its rosin derivative operation.

32. However, the installed capacity for gum naval stores processing will be only 60 per cent utilised in 1996.

33. Given permission to tap the bulk of the suitable standing trees, production of rosin and turpentine could increase, respectively, to 24,000 tonnes and 3,000 tonnes annually. This would greatly exceed the region's total demand for many years and permit a significant entry into the world market.

#### **Malawi (Likely new producer)**

34. Malawi has a large pine resource in the northern Viphya Forest and other smaller plantations in the Southern region. The first thorough appraisal of the potential for gum naval stores development was made by NRI (Coppen et al, 1983 and 1985; ref 63 and 64). This concluded that an economically viable minimum-sized factory (1,000 tonnes annual consumption of oleoresin) could be established, drawing on the Viphya forest and selling the products domestically. Like many other proposals for development of the Viphya during the Banda regime, this was not followed through.

35. Over the past few years, the potential of the Viphya has been re-examined by Pinechem of South Africa. This has led to a joint-venture proposal, involving VIPCOR (the parastatal with responsibility for Viphya development), two

local banks and Pinechem. The South African company would make a small equity investment and would contribute technology and marketing expertise. If the project is approved by Government, a 1,000 tonne annual throughput factory would be constructed in 1996. The rosin output of the factory (ca. 700 tonnes annually) will find a market either with Lever Bros. and the paint industry in Blantyre or with a newly mooted paper factory. Most of the turpentine produced (150 tonnes) probably would be consumed by the paint industry.

36. A separate development, involving a local company with Japanese backing, has been proposed. In this case, the factory would consume annually 2,000 tonnes of oleoresin drawn from both the Viphya and the Southern region forests.

37. If both developments proceed, the local market would become oversupplied in the medium-term but, more importantly, Coppen (ref. 62) is sceptical over the adequacy of the tree resource to keep two factories supplied with raw material.

#### **Zambia - Possible Producer**

38. The largest pine resource in Zambia is found in the Copperbelt and this has been assessed by local bodies for naval stores production on two occasions, in 1979 and in 1992.

39. The more recent study was prompted by Zambezi Paper Mills Ltd and involved the forest industries parastatal, ZAFFICO and Simba Chemical Industries Ltd. The results encouraged Zambezi Paper Mills to seek technical and marketing assistance for a development from the Portuguese naval stores industry. However, lack of finance has prevented further progress.

40. Coppen (ref. 62) has reassessed the available data on the resource and has made recommendations on the appropriate species for tapping. He stressed that thorough yield tapping trials must be conducted in order to confirm that economic yields are possible.

41. If such tapping trials confirm acceptable yields, a range of options are open for naval stores development. A minimum-scale, 1,000 tonnes factory would serve Zambia's demand for naval stores in the medium-term. However, the

annual gum oleoresin production potential could be as high as 14,600 tonnes.

#### **Swaziland**

42. The only suitable pine species and site for gum tapping in Swaziland are owned by the Shisehewi Forestry Co, a subsidiary of the Commonwealth Development Corporation (CDC). Some 3,000ha of pine are now approaching the appropriate age for tapping and a tapping yield trial is necessary to confirm economic viability.

43. Assuming a good yield performance and a low stocking density, some 1,000 tonnes of gum oleoresin per annum might be obtainable over a ten year period. This would be adequate for a small-scale processing plant but there is the alternative of selling the oleoresin to Pinechem in Durban.

#### **Theoretical Regional Production Potential**

44. If all the unexploited trees mentioned above were shown to yield gum economically and were made available, production in the year 2000 could be of the order of 37,000 tonnes for rosin and 5,500 tonnes for turpentine (see Table 5).

45. These volumes would be more than adequate for projected regional demand for naval stores and would permit exports on to the international market (valued at US\$18-20 million) which would equate to those of Portugal.

46. These surpluses also are of a sufficient scale for investment in added-value further processing (rosin derivatives, pine oil and pinene isolates) and might attract overseas investment.

#### **Constraints on Development**

47. Various constraints beyond the purely technical (suitable species; economic tapping yield) exist on achieving the full naval stores potential in the region. These include:

- (a) the widespread reluctance of foresters to release trees for tapping;
- (b) the absence of a fully considered and integrated felling/tapping strategy which would maximise returns from the resource and avoid conflict of purposes;

- (c) a lack of project finance in some countries;
- (d) a lack of technical and marketing expertise in some countries and a propensity to seek collaborative assistance from overseas rather than from neighbours with a track record of experience (and knowledge of Africa); and
- (e) a tendency for an insular approach rather than to examine the wider regional scene and the opportunities offered by co-operative interaction.

48. For developments outside South Africa, sales of turpentine might be problematic on the domestic market. Also, the option of direct overseas export would not be open for small consignments; the economics of shipment dictate volumes of several hundred tonnes. Therefore, instead of holding on to stocks for bulking and shipment irregularly, the best option would be for sale to the South African industry for further-processing or bulking with its own turpentine for export.

49. Rosin derivative manufacture might be viable in countries with a medium-scale annual production of rosin. However, further processing of turpentine to pine oil or isolation of its pinene components would not be an economic option for those with less than many hundreds of tonnes available.

50. For the immediate future South Africa is the only country which will have sufficient domestically produced turpentine to engage in added-value processing.

#### **Development Pathway Options**

51. Individual countries can choose to follow their own, narrow paths with naval stores development but this is likely to lead to self-imposed constraints rather than maximisation of opportunities offered by regional strategic collaboration.

52. Options open within a regional approach would include:

- (a) simply limiting operations to tapping and shipping crude gum oleoresin to a neighbour with underutilised processing capacity (Zimbabwe or South Africa), if either funds for immediate investment in a factory are

not forthcoming or a question exists over the longevity of the resource; and

- (b) in the case of Zambia, where the resource potential appears substantial, tap gum both for a domestic factory and for sale to Zimbabwe or South Africa.

53. A scheme illustrating possible interactions and products is shown in Table 6.

**TABLE 1: ESTIMATED ROSIN DEMAND IN THE REGION AND PRODUCTION  
DEFICIT WITH MARGINAL CHANGE IN TOTAL OUTPUT**

(tonnes)

	Current demand (1995)	Demand projection for year 2000	Major assumptions
Demand in region	6,100	10,600	10% annual growth in South Africa. New paper mills in Zambia and Malawi.
Production deficit in region (import cost of deficit, US\$1 million)	1,600  (1.04)	5,600  (3.64)	Zimbabwe industry ceases by year 2000. Modest increase in South African production.

**TABLE 2: ESTIMATED TURPENTINE DEMAND IN THE REGION AND  
PRODUCTION SURPLUS/DEFICIT WITH MARGINAL CHANGE IN OUTPUT**

(tonnes)

	1995	2,000	Notes
Demand in Region	170	1,400	600 tonnes converted to pine oil, and new paint use of up to 750 tonnes
Production - surplus - deficit	930 -	- 250	As in Table 1

**TABLE 3: ESTIMATED PINE OIL DEMAND AND SUPPLY IN THE REGION**

(tonnes)

	1995	2,000	Notes
Regional demand	600+	700+	Modest annual growth
Production deficit	600	nil	South African processing unit in 1996

**TABLE 4: CURRENT AND PROJECTED DEMAND AND DOMESTIC SUPPLY BY COUNTRY, ASSUMING NO SIGNIFICANT GROWTH IN PRODUCTION**

(tonnes)

Year	Regional Total		South Africa		Zimbabwe		Zambia		Malawi	
	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000
<b>Demand</b>										
Rosin	6,100	10,600	5,000	8,000	900	1,000	180	800 (b)	10	800 (d)
Turpentine	170	1,400 (a)	60	600 (a)	100	100	10	650 (c)	nil	100 (c)
Pine Oil	600+	700+	600	700	na	na	6		na	na
<b>Production</b>										
Rosin	4,480	5,000	4,000	5,000	480	nil (e)	nil	nil	nil	nil
Turpentine	1,100	1,200 (a)	1,000	1,200 (a)	100	nil (e)	nil	nil	nil	nil
Pine Oil	nil	600	nil	600	nil	nil (e)	nil	nil	nil	nil
<b>Production Deficit</b>										
Rosin	1,600	5,600	1,000	3,000	420	1,000	180	800	10	800
Turpentine	-930 (f)	200	-940 (f)	-600 (f)	nil	100	10	650 (c)	nil	100
Pine Oil	600+	100	600	nil	na	na	6		na	na

Notes: na.. not available

(a) 600 tonnes going to manufacture pine oil

(b) Consumption by new paper plant from 1996

(c) Assumes substitution potential for white spirit

(d) Assumes consumption by mooted paper mill

(e) Zimbabwe industry closes due to lack of raw material

(f) Surplus exported

**TABLE 5: THEORETICAL PRODUCTION IN YEAR 2000 - IF COMPLETE  
RESOURCE WERE ECONOMICAL FOR TAPPING**

(tonnes)

	Rosin	Turps	Requirement
South Africa	24,000	3,000	Forestry Department allows large scale tapping
Zimbabwe	nil	nil	Resource depleted/unavailable
Malawi	700	150	
Zambia	11,700	2,200	P.kesiya resource gives economic yields.
Swaziland	700	150	Tapping proves economic
Total	37,100	5,500	
Regional Demand in year 2000	10,600 (+2,000 in soaps)	700 (+700 in paints)	
Surplus to export on int.market or to further process for export	26,500 (24,500)	4,800* (4,100)	Comment: *..turpentine volume would be adequate to sustain fractionation operation.
[Nominal value of exportable surplus, US\$]	[17.2 million] [(15.9 million)]	[3.1 million] [(2.7 million)]	

**TABLE 6: ACTIVITY OPTIONS WITHIN A REGIONAL DEVELOPMENT FRAMEWORK**

Activity Options	Zam	Zim	Mal	Swazi	SA
Produce crude gum only and ship to neighbour for processing	✓		✓	✓	
Process imported crude gum		✓			✓
Process on scale sufficient only for domestic market; ship surplus turps to SA (plus rosin in the case of Swazi)	✓	✓	✓	✓	
Process for domestic market and also export crude gum to neighbour	✓		✓ (?)		
Process for domestic market plus extra for export	✓				✓
Domestic and regional turps bulked for <ul style="list-style-type: none"> <li>- export <i>per se</i></li> <li>- processing to pine oil for regional and overseas sales</li> <li>- isolation of pinenes for overseas sales</li> </ul>					✓

**REFERENCES CITED IN THE TEXT**

**Country Agriculture and Economy**

**Malawi**

1. AGRICULTURAL DIVERSIFICATION COMMITTEE. (1994) *Minutes of the first meeting of the Agricultural Diversification Committee, held at Associated Chambers of Commerce and Industry, 28 June 1994.*
2. ARET. (1995) *Farm Budgeting Handbook*. Lilongwe: Farm Management Section, Agricultural Research and Extension Trust; March 1995.
3. MIPA. (1995). *Investors Guide: Malawi Welcomes the Private Investor*. Lilongwe: Malawi Investment Promotion Agency; March 1995.
4. MOALD. (1995). *The Agriculture and Livestock Development Strategy and Action Plan*. Lilongwe: Ministry of Agriculture and Lands.
5. STEELE, R.J.G. (1995). *The Agricultural Diversification Committee: A Progress Report and Next Steps*. Lilongwe: ARET; March 1995.

**South Africa**

6. ABSA Bank. (1994). *The Structure of the South African Economy 1994/95*. Johannesburg: ABSA Bank.
7. AGRIFUTURA. (1994). *Agrifutura Bulletin*, 1 (2), December. Stellenbosch: Agrifutura.
8. BLIGNAUT, C.S. (1995). *Paper presented at the Farm Management Conference, Bloemfontein, 28 June 1995.*
9. B.M.I. FOODPACK (1992). *A Strategic View of the South African Food Industry in the 1990's*. B.M.I: confidential report.
10. BUREAU OF MARKET RESEARCH. (1990). *Income Elasticities of the Demand for Consumer Goods and Services*. Pretoria: UNISA, Bureau of Market Research Report No.175.

11. ECONOMIC ANALYSIS SYSTEMS. (1995). *Analysis of Trade Statistics*. Pretoria: Economic Analysis Systems.
12. ESTERHUYSEN et al. (1994). *South Africa in Sub-Equatorial Africa*. Pretoria: Economic Integration Institute.
13. TRUTER, K. (1995). *Considerations for a Common Market for South Africa*. Paper presented at Agrecona Outlook Conference, 2 March 1995.

## **FOCAL COMMODITY REFERENCES**

### **Recent Diversification Potential Overviews**

14. GREEN, C.L. (1982). *The Export Development Potential for Spices, Essential Oils and Gum Naval Stores in Malawi*. Geneva: International Trade Centre, (Restricted distribution).
15. GREEN, C.L. (1988). *A Study on Research, Commercial Production and Development Potential for Spices and Plant Extractives in Zambia, Zimbabwe, Swaziland and Malawi*. Natural Resources Institute Report (unnumbered; restricted distribution).

### **Spices**

#### **Recent International Trade Reviews**

16. ITC. (1992). *Report of the Third Meeting of the International Spice Group, Kingston, Jamaica, Nov. 1991*. Geneva, Switzerland: International Trade Centre.
17. AMERICAN SPICE TRADE ASSOCIATION. (1995). *Spice Consumption '93. Imports, US Production and Current Trends*. American Spice Trade Association (ASTA), POB 1267, Englewood Cliffs, NJ 07632, USA.
18. USDA. (1995) *Tropical Products - World Markets and Trade*. Washington D.C., USA: United States Dept of Agriculture, Foreign Agricultural Service Circular Series FTROP 1-95, April 1995.

## **South Africa**

19. WALLACE, W. (1995). The South African Market for Spices. Paper presented at the World Spice Congress held in Cochin, India, February 1995.

## **Swaziland**

20. TAYLOR, S.J. and Green, C.L. (In press). Turmeric: A profile of quality variation by geographical source. (Collated data of surveys by the Natural Resources Institute).

## **Zimbabwe**

### **Early initiatives:**

21. ANON. (1912). Cayenne pods from Rhodesia. *Bulletin of the Imperial Institute*, 10, 572.

22. ARNOLD, H.C. (1928). Report of the Agricultural Experimental Station, Salisbury for 1926-27. *Rhodesian Agric. J.*, 25, 396-7.

23. WALTERS, J.A.T. (1926). Southern Rhodesian chillies for England. *Rhod. Agric. J.*, 1926, 655-6.

24. ANON. (1927). Fennel and dill seed from Southern Rhodesia. *Bull. Imp. Inst.*, 25, 121-120.

25. ANON. (1932). Annual report of the Agricultural Experimental Station, Salisbury. *Rhod. Agric. J.*, 29, 615-619.

26. ANON. (1935) Annual report of the Agric. Expt. Station, Salisbury. *Rhod. Agric. J.*, 32, 769-70.

27. MARSHALL, G.W. (1940). Report of the Government Horticulturalist for 1939. *Rhod. Agric. J.*, 37, 362.

28. ANON. (1965). Report of the Secretary to the Ministry of Agriculture for December 1963 to September 1964. (Page 80). Salisbury: Government Printer.

29. ANON. (1966). Report of the Secretary to the Ministry of Agriculture for October 1964 to September 1965. (Page 48). Salisbury: Government Printer.

## **Chillies and Paprika**

30. PURSEGLOVE, J.W. et al (1981), *Spices*, vol. 1. London: Longman Group Ltd (Tropical Agriculture Series).

31. SMITH, A.E. (1982). *Selected markets for chillies and paprika*. Tropical products Institute Report G.155. (Obtainable from the Natural Resources Institute, Chatham, UK).

32. GREEN, C.L. and MULLARD, P. (1990). Review of the spice development project in the Solomon Islands. Natural Resources Institute report. No. R.1617 (restricted distribution).

(For paprika, see also ref.73 under 'Natural Colourants').

## **Essential Oils**

### **Recent International Trade Reviews**

See ref. 18 under 'Spices'.

### **Early Reviews of Regional Production and Trade.**

33. Islip, H.T. (1948). Essential oils of the British Colonies in relation to world supplies. *Bulletin of the Imperial Institute*, 36, 159-179.

34. ANON (1952-3). Exports of essential oils from the British Colonies for the years 1947-50. *Colonial Plant and Animal Products*, 28-32.

35. ANON. (1954). Exports of essential oils from the British Colonies for 1949-52. *Col. Plant. Anim. Products*, 4, 24-28.

36. ANON. (1955). Exports of essential oils from British Colonies and Commonwealth Countries for 1951-54. *Col. Plant Anim. Products*, 5, 211-216.

37. ANON. (1959). Exports of essential oils from the British Colonies for 1953-57. *Tropical Science*, 1, 12-18.

## **Malawi**

38. AMES, G.R. et al. (1970). The development of ninde oil, Part 2: Production in Malawi. *Tropical Sci.*, **12**, 22-28.
39. AMES, et al (1970). The development of ninde oil. Part 3: Cultivation and distillation procedures. *Trop. Sci.* **12**, 151-156.
40. GREEN, C.L. et al. (1988). A re-examination of Mulange cedarwood (*Wideringtonia whytei* Rendle). *Flavour and Fragrance J*, **3**, 105-108.

## **Swaziland and South Africa**

See ref. 55 for recent eucalyptus oil reviews.

## **Zambia**

### **Early Initiatives:**

41. GORE-BROWN, S. (1932). Notes on the production of essential oils with special reference to Rhodesia. *Rhod. Agric. J*, **29**, 352-359.
42. ANON. (1935). *Aeolanthus gamwelliae* oil from Northern Rhodesia. *Bull. Imp. Inst*, **33**, 499-451.
43. ANON. (1961). 'Ninde'. Report of the Dept. of Agric., Federation of Rhodesia and Nyasaland, June 1961.
44. AMES, G.R. and MATTHEWS, W.S.A. (1969). The development of ninde oil. Part 1. *Tropical Science*, **11**, 164-169.

## **Zimbabwe**

### **Early initiatives.**

45. ANON. (1916). Extract from the Rhodesian Agric. J. on eucalyptus oil. *Bulletin of the Imperial Institute*, **14**, 637.
46. ANON. (1918). Citrus fruits in Southern Rhodesia. *Bull. Imp. Inst.*, **16**, 565.
47. ANON. (1928). Citrus fruit in Southern Rhodesia. *Bull. Imp. Inst.*, **26**, 86.

48. ANON. (1929). New crops for the Colonies: Essential Oil plants. *Bull. Imp. Inst.*, 27, 307-322.

49. COOMBES, T.J. et al (1954). Oil of *Pentzia schistostephioides* from Southern Rhodesia. *Colonial Plants and Animal Products*, 4, 145-150.

50. SHOLTO DOUGLAS, J. (1961). Good incomes await the oil farmers. *Kenya Farmer*, 56, (Feb), 9.

51. ANON. (1966). Rhodesia: geranium oil success. *Manufacturing Chemist and Aerosol News*, 37 (March), 80.

52. ANON. (1967). Essential oil production from new African plantings. *Int. Perfumer*, 15 (b), 1 and 8.

53. SHOLTO DOUGLAS, J. (1967). The introduction of essential oil crops in new areas. *Perfumery and Essential Oil Record*, 58 (a), 630-637.

54. GUENTHER, E. (1958). Essential oils of two continents. *Chemist and Druggist*, 169 (Feb.), 211-212.

Recent Initiative:

See ref. 55 below on eucalyptus oil.

### **Eucalyptus**

55. COPPEN, J.J.W and HONE, G.A. (1992). *Eucalyptus Oils: A Review of Production and Markets*. Chatham, UK: Natural Resources Institute Bulletin No. 56.

56. COPPEN, J.J.W. and DYER, L.R. (1993) *Eucalyptus and its Leaf Oils: An Indexed Bibliography*. Chatham, UK: Natural Resources Institute publication FY2.

57. GREEN, C.L. (1995). Report of a visit to China. An advisory mission to the Yunnan Flavours and Fragrance Research and Development Centre. Natural Resources Institute report. No. R.2218 (selective distribution).

### **Sassafrass Oil from Piper Hispidinervium.**

58. GREEN, C.L. and HONE, G.A. (1992). Essential oil production in developing countries. *Proceedings of the 3rd International Meeting on Aromatic and Medicinal Plants, held*

at Nyons, France, December 1991. Nyons: CFPPA, French Ministry of Agriculture.

59. MAIA, J.G., GREEN, C.L. and MILCHARD, M.J. (1993). New sources of natural safrole. *Perfumer and Flavourist*, 18, 19-22.

### **Naval Stores**

#### **Recent World Market and Techno-economic Profiles.**

60. COPPEN, J.J.W. and HONE, G.A. (1995). *Gum Naval Stores: Turpentine and Rosin from Pine Resin*. Rome: FAO; Non-wood Forest Products Series No. 2.

61. GREENHALGH, P. (1982). *The Production, Marketing and Utilisation of Naval Stores*. Tropical Products Institute Report G170. (Obtainable from the Natural Resources Institute, Chatham, UK. This monograph covers gum naval stores, sulphate naval stores, wood naval stores and their down-stream derivatives).

#### **Regional Resource Reviews.**

62. COPPEN, J.J.W. (1995). *Prospects for New Gum Naval Stores Production in Sub-Saharan Africa. An Assessment of the Pine Resources in Malawi, Zambia, Tanzania and Uganda and their Potential for the Production of Turpentine and Rosin*. Accra, Ghana: FAO Regional Office for Africa (POB 1628, Accra).

#### **Malawi**

63. SMITH A.E. and COPPEN, J.J.W. (1983). *An Opportunity Study on the Production of Gum Naval Stores in Malawi*. Geneva: International Trade Centre, Doc. ITC/DIP/129.

64. COPPEN, J.J.W. and GREENHALGH, P. (1985). *An Evaluation of the Prospects for Production of Gum Naval Stores in Malawi*. Tropical Development and Research Institute, report No. R.1290(R).

#### **Zimbabwe**

65. COPPEN, J.J.W. (1982-86). *Zimbabwe pine oleoresin. Parts I-VIII. Analysis and evaluation of turpentine and resin from individual trees and provenances of P. elliottii, P. kesiya, P. leiophylla, P. montezuma, P. michocana,*

*P. pseudostrobus*, *P. oocarpa*, *P. merkusii* and three varieties of *P. caribaea*. Natural Resources Institute: in-house reports with distribution only to Zimbabwe collaborators (Forestry Dept. and Border Timbers Ltd).

66. COPPEN, J.J.W. (1986). Zimbabwe gum naval stores development. Evaluation of nine pine species of pine as possible supplementary sources of resin to the existing *Pinus elliottii*. Consideration of oleoresin quality and tapping yields. Natural Resources Institute: in-house report, distributed only to Zimbabwe Forestry Dept. and Border Timbers Ltd.

67. COPPEN, J.J.W. et al. (1988). Composition of xylem resin from five Mexican and Central American *Pinus* species growing in Zimbabwe. *Phytochemistry*, 27, 1731.

68. COPPEN, J.J.W. et al. (1993). Xylem resin composition and chemotaxonomy of three varieties of *Pinus caribaea*. *Phytochem*, 33, 1103-11.

#### Water-Soluble Gums

##### **Reviews of International Production and Trade.**

69. COPPEN, J.J.W. (1995). *Gums, Resins and Latexes of plant origin*. Rome: FAO. (Covers gum arabic, karaya, tragacanth, locust bean; various hard and soft resins; balsams and latexes).

70. ROBBINS, S.R.J. (1987). *A Review of Recent Trends in Selected markets for Water-soluble gums*. Overseas Development Natural Resources Institute, Bulletin No. 2. (Available from the Natural Resources Institute Chatham UK. Covers: gum arabic, guar, tragacanth, karaya and locust bean).

##### **South Africa - Guar**

71. Institute For Crops and Pastures [S.A.]. (1975). *Guar - a crop with a future in South Africa*. *Farming in South Africa* Leaflet No. 137; published by the RSA Dept. of Agricultural Technical Services, Pretoria.

72. CHEMSERVE STEINHALL. (1986). 'The Guar Story' and 'Guar in S.A.' Supplements to *Financial Mail*, Nov. 7, 1986; pp. 21-22 and p.25.

## **Natural Colourants and Dyestuffs**

73. GREEN, C.L. (1995). *Natural Colourants and Dyestuffs: A Review of Production, Markets and Developmental Potential*. Rome: Food and Agriculture Organisation (FAO).

74. BRUTSCH, M.O. and ZIMMERMANN, H.G. (1993). The prickly pear (*Opuntia ficus-indica*) in South Africa: utilization of the naturalised weed and the cultivated plants. *Econ. Bot.* 47 (2), 154-162.

## **Castor**

75. MARTER, A.D. (1981). *Castor: Markets, Utilization and Prospects*. Tropical Products Institute Report No. G152. (Available from Natural Resources Institute, Chatham, UK. Dated on production and markets but useful as an introduction to the crop, processing and market structures.)

## **Wattle**

### **Swaziland**

76. COPPEN, J.J.W. and THOMSON, M.R. (1995). *Black wattle. Prospects for the production wattle bark extract for export in Swaziland*. Brussels: Centre for Industrial Development.