

PART 4 – AROMA CHEMICALS DERIVED FROM ESSENTIAL OILS

6 Economic and Commercial issue

6.1 General comments

Over time, various South African organizations have gathered data with regards to the actual cost of production of essential oils in the South African. These include organizations such as Biosys Plant Extracts (Pty) Limited, CSIR, SAEOPA and BioAfrica⁵⁹. Much of this information was and is being gathered on the basis of trial and error activities and the results are considered to be confidential. Furthermore, farmers are notorious for cross-subsidizing crops within their farming unit and thus detailed costs of production are often difficult to determine. The best source of information may be the community-based projects where the rigors of project management should produce more accurate data.

From international literature and local experience it is possible to determine the general parameters concerning yield and returns. For example, CSIR has provided the following figures for Geranium -*Pelargonium Graveolens* (Conventionally grown)⁶⁰:

Table 24: Sample economic summary prepared by CSIR

Plant material (kg/ha/annum)	40 000
Oil yield (%)	0.13
Oil yield (kg/ha)	45
Farm gate price (\$/kg)	60
Annual income (R/ha)*	28460

* Assuming R/\$ of R9.80 (2001 figures)

Naturally, the parameters need to be adapted to reflect the current exchange rate and the current market price. So for example, the US\$ price has since gone up to about \$90/kg, and the Rand has strengthened against the US Dollar. However, at a R/\$ exchange rate of R7 to the US\$, the annual income per hectare is still approximately R28,000.00. The estimated cost of cultivation per hectare is about R10, 000.00/hectare. This yields a profit per hectare of R18,000.00 per annum, which for a stand of 20 hectares translates into a gross profit of R182,400 per annum. This analysis does not take into consideration the operational costs and the initial start-up costs.

⁵⁹ See example of SAEOPA information sheet on Lemon grass – Appendix A

⁶⁰ Additional figures provided in Appendix "B"

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In order to perform a sensible economic analysis one needs to generate a financial model literally from the “ground” up. One begins with the analysis of the available farming area and what crops it can produce. This requires detailed consideration of the agricultural aspects of essential oil production, which are beyond the scope of this Study. Accordingly, this Study does not include a detailed economic analysis of the product of the various oils.

However, although each farm and each crop has its own particular economic parameters, the general economic considerations are quite generic. To this end the Consultant has compiled a check list of issues to be considered when constructing a business plan for an essential oil crop. (See Appendix “C”).

Furthermore, the rest of this section of the report highlights some of the generic economic considerations affecting essential oil production.

6.2 Economic decisions

Although the decision to farm essential oils must be an economic one, there are several varied reasons for producers undertaking essential oil production. Agricultural is a risky undertaking and therefore market-risk management and crop diversification play a particular role. Some of the considerations prompting a producer to enter into the essential oils industry include:

- A diversification of agricultural production;
- Relatively small area under crops (20 to 50 hectares);
- The produce, if stored under the right conditions, can be held for extended periods of time;
- Since the crops are not edible they are not subject to theft;
- It is a higher value crop, though prices fluctuate;
- Crops can be versatile (e.g. lavender can be sold fresh, dry or as an essential oil);
- Interest in distillation process and the end products (products can be sold directly into niche markets like aromatherapy); and
- The market is a specialty market and buyers tend to be more loyal to producers.

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From a community development perspective one can also add:

- There is good potential for job creation (particularly if organically certified oils are to be produced); and
- There is potential for the creation of better skilled and paid jobs.

6.3 The start-up cost

One of the key barriers to entry into the essential oil industry is the start-up costs. Besides the considerations set out in the checklist, there are several “rules of thumb” that have been determined:

- The basic economic unit of production is 20 to 25 hectares (ensuring sufficient material through the distillation unit);
- The land should be irrigated; and
- The optimal still size should be approximately one ton.

The extent of the outlay is dependent on what infrastructure is already available. The key costs here are:

- the cost of irrigation, which may cost up to R10,000/hectare to establish;
- the cost of a distillation unit, which may cost up to R500,000; and
- the cost of establishing the crop, costing approximately R9,000/hectare (most are perennial).

With regards to the still, there are several technology options available but the consensus is that stills should be manufactured from stainless steel and steam distillation process should be used. This is not the cheapest option but is the most economical in the long-run. Furthermore, short cuts on the distillation unit could render the oils unmarketable. The estimated cost of a one ton still (together with boiler, condenser, Florentine flask and mechanical hoist) is R500.000.00. The cost of the distillation unit is one of the key barriers to entry for most farmers. However this can be mitigated where farmers share facilities on a toll basis. The potential prohibitive cost of a distillation unit is one of the impetuses for the need to develop a suitable mobile distilling unit that can be “leased” to a farmer or community until they are persuaded of the viability of the crop.

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On average it is estimated that it costs some R20,000 per hectare to establish an essential oil crop (irrigation, soil preparation and seed/seedlings). However, the cost varies depending on the original cost of crop material. It usually takes two to three years to begin commercial production and another two to reach full-scale production. This period requires funding. Commercial farmers carry the cost of rolling-out an essential oil business by subsidizing it from their existing operations. As an indication of how much it costs over a period of some 3 to 5 years to establish an essential oil growing business, it has been estimated that a community-based project requires an investment of between R3 million and R4 million over five years in order to become established⁶¹.

However, one of the benefits of essential oil production is that one can scale-up production in phases, thereby mitigating risks and allowing for adaptation. The process for the establishment of an essential oils production facility is generally done in phases. For example, Biosys works on three phases:

- Phase one - Pilot sites of approximately 0.2 hectare trial blocks per crop (a selection of 3 or 4 crops).
- Phase two - Production of 25 ha
- Phase three - Production of 50 ha

A similar process is being followed in the Eastern Cape, in a community based project, where the process is:

- Pilot – for training and plant propagation
- Phase one – larger scale production (60 ha and four crops)
- Phase Two – transition to “organic” production (60ha)

6.4 General comments on Financing

To date the development of essential oil production has been financed in one of two ways:

- In the case of existing commercial farmers, this has been financed by revenue from existing operations or by borrowing from existing financiers (e.g. overdraft).

⁶¹ Based on the budgets of a couple of community-based projects reviewed.

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Commercial farmers are well known for cross-subsidizing their operations and treating their farm as a single economic unit.

- In the case of emerging farmers (of which there are very few examples) the funding has been by way of assistance from local or provincial development agencies (e.g. the project at the Oliver Tambo Municipality in the Eastern Cape or Buchu projects in the Western Cape) or national government in conjunction with state institutions like the Department of Science and Technology (DST) and CSIR (e.g. the project at Giyani in the Limpopo Province).

There is a third type of financial support that is emerging. This is where buyers of the oils are either jointly investing in distillation equipment or lending distillation equipment to the producer, thereby sharing in the establishment costs and sharing the risks.

There are several state organizations or schemes that may be of relevance to a person wishing to initiate an essential oils business. However, the Consultant is not aware of any instances to date where commercial farmers have raised finance from any of the state funding institutions (e.g. The Enterprise Organisation (TEO), Industrial Development Corporation (IDC) or Land Bank).

In theory, the Land Bank is best positioned for lending to a farmer wishing to establish an essential oil production capacity. However, the experience of SAEOPA members is that the Land Bank expects the farmer to put up 50% of the financing up-front and that this has prohibited accelerated start-up. Farmers therefore slowly scale-up using their own resources over time. This has been found to be slow and onerous since there is a need to get to the minimum operating level of 20 to 25 hectares as soon as possible. There are two main start-up costs that tend to be significant hurdles for farmers, the equivalent of which the Land Bank is known to finance in other ventures (e.g. fruit growing). The first is the establishment of the crops. The second is the upfront investment in distillation equipment. It appears to be the perceived risk of the essential oil industry that makes the Land Bank wary. This may be mitigated by other types of government or parastatal support to the industry.

6.5 General comments on Government Support

Consideration has been given to the possible introduction of special producer focused incentives for the essential oil industry; however, internationally these have not proven to be effective. In fact incentives create perverse incentives enticing players into an industry for

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the wrong reasons. In Australia, producer incentives to encourage entry into the tea tree oil industry resulted in a temporary increase in production that was unsustainable and later resulted in several liquidations, negatively impacting on the industry. The emerging international consensus, which is supported by strategy consultants such as Michael Porter⁶², is that Government's most effective role is in factor creation. This involves creating and enabling environment and factors for the development of an industry. The specific areas of application in the essential oils industry are publicly funded research and development and the improvement of education and skills development delivery systems. These are the recommended focus areas of Government support.

The essential oil industry has significant technical (agronomic) and financial barriers to entry. The two phenomena are of course related. The industry requires some initial support (both technical, commercial and financial) in order to break out of its current constraints. Once some success has been achieved, players will find it easier to enter the industry. For example, if the Government Departments (e.g. Agriculture) and Research Councils (e.g. ARC and CSIR) were to put more public technical support behind essential oil crops this could provide the information and assurances required by financiers, like the Land Bank, to enable them to adopt a less risk averse stance.

The essential oil industry has benefited and would continue to benefit from export incentives and assistance supplied through DTI (TISA). SAEOPA has been on several trade missions with varying degrees of success. However, the main constraints are still producing adequate volumes and the need to have standards and testing to consistently meet quality standards. The formation of an essential oil Export Council could be useful in that it would allow an organization like SAEOPA to leverage its own funding and promote industry co-operation for exports. However, SAEOPA has been advised that there was a moratorium on the formation of new Export Councils. The position is that due to a proliferation of Export Councils, and the budgetary effects this had had, DTI is now insisting that industry groupings first form Joint Action Groups, as a precursor to applying for recognition as an Export Council. A Joint Action Group may be formed where companies within a sector agree to co-operate with regards to a industry related matters (for example, research on export markets) and who then approach TISA for the purpose of gaining assistance for that particular initiative. As has been pointed out, in terms of the value chain, profile in the international market is crucial. South Africa requires an overall strategy for developing the face of the South African essential oils industry. DTI and other affected governmental agencies need to engage the industry on a uniform approach to this matter.

⁶² "The Competitive Advantage of Nations", Porter, M. Macmillan (London) 1990

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Another area where government support may be required is in the case of developing communal land. With regards to communal farmers and rural development, one of the unique features that need to be addressed is the clarification of the land rights. Any uncertainty as to land ownership and land usage rights has a negative impact on commercial development and particularly access to finance. The few communal projects involving essential oils (e.g. Oliver Tambo Municipality) have first had to settle the land rights issues prior to commencement. This is both a legal and political (local government and tribal authorities) exercise.

6.6 General comments on the potential relevance of Co-operatives in the Essential Oil industry.

Historically, Co-operatives have been successfully utilised in the creation of the South African agricultural sector. Co-operatives have historically been managed by the National Department of Agriculture. This is about to change. The introduction of the new Co-operatives Bill could herald a new generation of co-operatives in South Africa. In terms of the proposed Bill, the DTI will take over responsibility for co-operative structures and these will be administered by CIPRO (Company and Intellectual Property Rights Office).

Informal, contractual, co-operative structures have been successfully used for a number of “new style” agricultural ventures (for example, flower growing and fish farming). Co-operatives are useful for the following reasons:

- They help integrate various stages of the supply chain for mutual benefit;
- They mitigate risks for small producers;
- They mitigate risks for potential financiers;
- They mitigate risks for end-buyers.

With many agricultural ventures there can be a significant premium earned by those intermediaries that sell produce into the international or local market. This benefit may not always be shared with the primary producers. Accordingly, there is a mismatch between risk and reward and new industries may never get off the ground unless the benefits of the final sales are in some manner shared with the primary producers. This dilemma has already been felt in the local essential oil industry. Growers feel aggrieved at the difference in price received at the farm gate when compared with the export prices. Exporters on the other hand are concerned that growers do not appreciate the time and effort required to match oils

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to buyers. These poor perceptions are being remedied as the industry grows. Already greater degrees of co-operation are emerging between growers and marketers (e.g. co-investment in distillation units).

Many agricultural endeavours have significant ancillary requirements that can benefit from “bulk” purchases. This may include seed (or seedlings), fertiliser and equipment. Furthermore, there may be specialised equipment which is more affordable and economic when acquired and operated co-operatively. The payment for the acquisition and operation of such facilities is better managed on a broader co-operative basis and risks are shared.

The collective responsibility of a co-operative towards repaying financiers reduces the risk. The potential of a crop failure and therefore cashflow problems is mitigated when the risk is spread across several independent, but co-operating, producers. Co-operative structures could greatly increase the likelihood of funding.

Buyers when selecting suppliers take cognisance of the supplier’s ability to deliver the required quantity and quality of product. Local essential oils producers have experienced the difficulty of obtaining a buyer without a guaranteed minimum supply of product. There is therefore a need to “bulk-up” supply in order to attract a buyer. If the bulking up process is independent of the individual growers the advantages of increased prices is lost to them.

The above objectives can be achieved by using company or contractual mechanisms. However, the proposed Co-operatives Bill provides formal mechanisms for the establishment of co-operative structures. These structures will have common statutorily prescribed features which will aid with their establishment, ensure transparency and good governance. The Bill provides for different levels of Co-operatives ranging from a Primary Co-operative to Secondary, Federal and then culminating in a “co-operative apex organisation”. Co-operatives can be organised on geographical or sector specific bases. These features allow for flexibility and growth of a co-operative structure.

Recommendation:

In the event that the Bill is enacted, there will be a need to investigate the detailed application of Co-operatives for use in the essential oils industry. In general, these co-operatives would probably be regionally based (as opposed to crop based) and have the following components:

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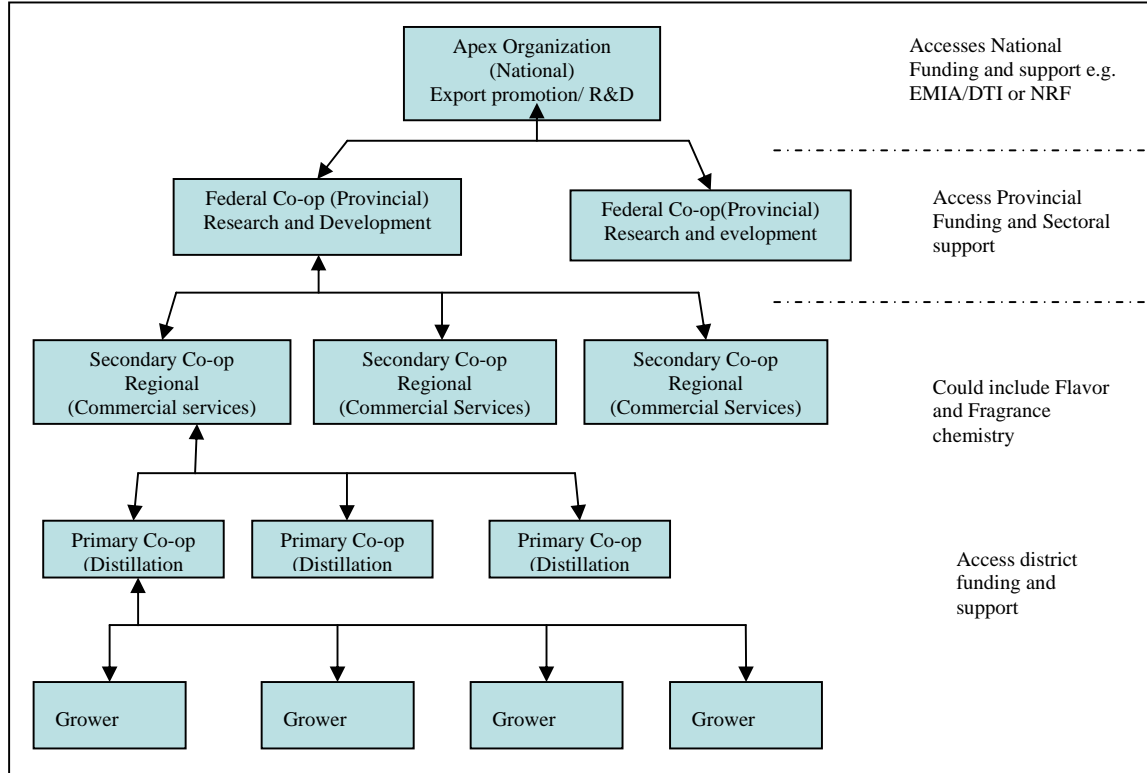
- Grower members (perhaps separate growers for young plant material and others for oil distillation, depending on crop selection)
- Distillation facilities and oil storage facilities
- Testing and R&D management facilities
- Buyers for inputs such as fertilisers and plant materials
- Centralised marketing arm.

It may be that, in the initial stages, the co-operative makes use of the Primary and Secondary Co-operative Structures proposed by the Bill. That would mean that a smaller geographically located group of growers, with a distillation facility, could form a Primary Co-operative, which in turn could be a member of a Secondary Co-operative which owns the bulk storage, testing and marketing facilities. The Secondary Co-operative could service the “higher needs” of a number of participating Primary Co-operatives. It is foreseeable that, if, for example, certain Secondary Co-ops are known for different oils types, Secondary Co-ops could form a Federal Co-op to better promote those particular oils at a national and international level (alternatively Secondary Co-ops could form a Federal Co-op at Provincial level to coincide with Provincial assistance programs). In turn Federal Co-ops could form a national co-operative apex organisation to promote South African essential oils nationally and internationally.

The following diagram illustrates the potential application of the Co-operative structure to an essential oil industry in South Africa:

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Figure 8: Illustrative Co-operative Structure for Essential Oils Industry



The structures proposed by the Bill are flexible and lend themselves to commercial innovation. As co-operatives grow in size the functionality may change. For example, there may be potential for value addition such as producing isolates. This could occur at the Secondary Co-op or Federal Co-op level. Co-operatives could be structured to coincide with support structures provided by national and provincial government agencies.