



A report prepared for the project

Lessons Learnt on Sustainable Forest Management in Africa

DEVELOPMENT OF TRADE AND MARKETING OF NON-WOOD FOREST PRODUCTS FOR POVERTY ALLEVIATION IN AFRICA

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**Development of trade and marketing of non-
wood forest products for poverty alleviation in
Africa**

by

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1.0 BACKGROUND

1.1 General about the SFM project

This paper is one amongst several commissioned by the project “*Lessons Learnt on Sustainable Forest Management in Africa*”, or “SFM in Africa”, for short. The understanding that several forestry projects, programmes and initiatives have already been carried out in Africa, and that major lessons can be learnt from them, was the reason for setting up the project. It was believed that such lessons, whether they were positive or negative, if properly analysed could be of great importance in shaping the direction of future initiatives to achieve sustainable forest management (SFM). Replicating positive experiences and avoiding failures could lead to better utilisation of scarce financial and human resources. Moreover, this type of project has no precedent in Africa, in that most past project evaluations mainly dwelled on impact studies against stated objectives and did not go beyond this level. The studies commissioned by this project have undertaken in-depth assessments of notable successes and failures and have tried to identify the factors that might have contributed to such outcomes. Based on the foregoing understanding, the project has the following overall objectives:

- To analyse and establish what lessons have been learnt from positive and negative experiences of various initiatives, projects and programmes aiming at sustainable management, use and conservation of forests in sub-Saharan Africa;
- To analyse and establish what ecological, economic, social and other pre-requisites are necessary for extending positive lessons to wider use (to more people, larger areas, other countries, etc.); and
- Based on the outcome of the above analyses, to identify the most urgent issues and concerns for Africa to draw the attention of the various international processes.

1.2 This report

The basic business processes that relate to the economics of non-wood forest products (NWFP)¹ are production and marketing. While production deals with the provision of the products, marketing consists of the activities by which the products flow from the producer to the ultimate consumer. In this paper, processing is considered as an appendage of marketing because it converts the resource into marketable products. Processing and marketing together form the tools with which the raw materials are converted to appropriate products to meet market requirements. They create some of the uses of time, place and form: packaging, advertising, transportation, sorting and stockpiling. This paper basically deals with the processing and marketing of NWFPs in Africa because the production aspect is treated by another paper in this same project.

NWFPs play important roles in the daily life and well being of both rural and urban populations in Africa. Rural and poor people depend on NWFPs as major sources for food, medicines, fodder, gums, fibre, and construction materials. NWFPs may also form valuable traded commodities at local, national, regional and international levels, providing employment and income opportunities at each level.

The major issue at stake is that the commercialisation of most highly valued NWFPs has been identified to cause major impacts on the sustainability of raw material production. One reason suggests that the benefits of processing and marketing NWFPs are small at the level of local producers. This hinders the ability of local producers to financially support sustainable production. Moreover, such poor local revenue capture can neither lead to an improvement in their income and livelihoods nor to the accumulation of capital for investment in the development of such products. Therefore, much of the revenue is earned at the processing end, usually located outside the raw material production areas (*GAIA/GRAIN, 2000; Wynberg, 2000; CARPE, 2001*). On this note, although not fully documented, the hypothesis guiding this paper is that the development of local processing techniques and better marketing arrangements can lead to higher incomes and improved livelihoods for the producers of highly valued NWFPs in Africa. To achieve this, better institutional arrangements including the influence of national and international organisations are considered instrumental.

¹ NWFP consist of goods of biological origin other than wood, derived from forests, other wooded lands and trees outside forests (*FAO, 2001*).

It is against this background that this study has been initiated to provide a better picture of the situation of NWFP processing and marketing in Africa, specifically focusing on their impact on employment and income generation, and highlighting major constraints as well as ways forward. Such analyses and syntheses would address the following key questions:

- What is the current experience with regard to moving up the value chain as regards NWFPs in Africa? Is there a clear indication of significant shifts in the approach to processing and marketing of NWFPs?
- Are there any successful instances of value addition and trade of NWFPs that have helped to increase employment and income to rural communities?
- What are the technical, economic, policy and institutional issues that influence NWFP processing and marketing? How are some of the constraints being overcome and what has been the experience?
- Can poverty alleviation be realistically accomplished through improved NWFP processing and marketing? What stops forestry from getting more benefits to local peoples?

With the overall goal of improving the development of processing and marketing of NWFPs in Africa for improving income as well as creating incentives for sustainable use, this paper has the following as specific objectives:

- Collect, compile and synthesise information on experience of processing and marketing of NWFPs and provide a broader perspective of their significance to rural employment and income generation;
- Analyse the economic viability of NWFP processing and marketing and to what extent benefits accrue to the different players, and in particular those from low income groups;
- Assess the policy, legal and institutional aspects relating to processing and marketing of NWFPs and analyse their strengths and weaknesses as regards enabling improved processing, particularly focusing on their potential for enhancing income and employment;
- Undertake a detailed assessment of the emerging opportunities for enhancing trade of selected products (such as Devil's claw, Rattan, Gum Arabic, *Prunus africana*, and Marula oil) and analyse the strengths and weaknesses in fully benefiting from them; and,
- Make a synthesis of social, economic and institutional lessons learnt from the case studies and draw major conclusions and recommendations that can guide and inform future projects/initiatives.

The case studies for this paper were drawn from Cameroon, Namibia, Sudan and Zimbabwe, although some references were also made on interesting experiences across Africa. The paper is basically a desk review and synthesis of available literature. Due to time and financial constraints, short field visits that were supposed to be conducted to update information presented were left out. Discussions in this paper are mainly on the processing and marketing of consumer products from the forest to the final consumers and to that of raw materials to the processing industries. The importance and limitations of value-added products at the local level (either to final consumers or to further processing industries) is discussed to reflect opportunities and pitfalls in the development of processing and marketing of NWFPs in Africa.

1.3 Definition of some concepts

The key concepts used to guide this paper include: *development, producers, marketing and trade, and processing*. Some explanations are given to the concepts in order to simplify the understanding of the paper and its overall relevance to the development of processing and marketing of NWFPs in Africa.

Development: Some salient features of Joseph Alois Schumpeter's (1888-1950) concept of development are considered relevant in guiding this paper on the development of processing and marketing of NWFPs in Africa. Such features include:

- The introduction of new goods or new quality of goods with which consumers are not yet familiar;
- The introduction of new methods of production that are not yet tested by experience;
- The opening of new markets where a particular commodity has not yet entered;
- The conquest of a new source of supply of raw materials;

- The carrying out of a new organisation of any industry, like the creation of monopoly, breaking up of monopoly position (*Adeyoju, 1975*), creating cooperatives or village marketing groups; and,
- To the above points a sixth one may be added, *viz.* the recognition and enforcement of better benefit sharing mechanisms, with the rights of local producers fully integrated.

Producers of NWFPs include the gatherers who collect the products from the forests. They also comprise those primary-level processors who buy the basic raw materials from the gatherers and convert them into primary products. Producers are also those that convert the semi-processed primary products to value-added, semi-finished products or to final consumer products at the successive stages of processing and marketing (*De Silva and Atal, 1995*).

Marketing: For the purpose of this paper, the definition of marketing by *Lintu (1995)* is adopted: “*marketing is basically a technology that is at the disposal of producers to identify market opportunities in the form of market needs and wants, analyse competition, and develop appropriate approaches to reach the markets and to make profit. It uses a mixture of basic factors comprising products, channels of distribution, promotion and price by which it satisfies the needs and wants of the customers in the markets. Marketing operates in an environment that is created by economic, social, cultural, technological, political, regulatory, legal, institutional and infrastructural factors, all of which are beyond the control of the individual operators doing marketing*”.

Therefore, marketing provides the tools with which people can create more economic values for NWFPs and the products made from them. Proper marketing also assists in a more equal distribution of such created values among the people involved. Marketing is therefore vital not only to medium and large-scale industrial enterprises but also in helping small farming and forestry communities move from a subsistence economy to one in which they can start and sustain profitable enterprises on their own. A proper understanding of the market of any NWFP will require sound knowledge on the potentially marketable products, the markets for the product, the competitors supplying the product, the specific strengths of the producer/gatherer in supplying the markets in relation to the competitors and the means of getting a wider share of the market compared with other competing suppliers. This forms the basis for this paper in believing that proper processing and marketing arrangements for valuable NWFPs can form an engine for poverty alleviation at the local level.

Due to the diversity of NWFPs and their beneficiaries, the *markets for NWFPs are segmented* into local, national/urban, regional and international, with varying characteristics and potentials for poverty alleviation. For example, local markets for NWFPs are usually small in size but with diverse products and the benefits go directly to the local households involved. The number of people involved are usually numerous and widely disperse in various localities, often poorly organised and generally use simple tools in processing their products. The gathering and processing of locally traded products are generally seasonal in nature and labour intensive. The process of exchange takes place in village markets between the gatherers/producers and final consumers. Most of the products traded are consumer goods, i.e. they are not processed further by any industrial activity. The quantification of the local trade is extremely difficult due to its sporadic nature and because only a part of it is monetary-based (*Lintu, 1995*).

There are national markets that support trade of NWFPs in specific countries. National/urban markets are triggered by customary food habits and local traditions transferred from rural areas to urban centers or from one part of the country to another as people travel and resettle. In particular, the increasing number and income level of city dwellers make these markets expand and require particular marketing approaches, as people who have moved to cities often maintain their cultural habits. Significant opportunities could be identified through appropriate market and marketing studies.

The international trade in NWFPs is composed of imports and exports of many products at different stages of processing. Some of these are unprocessed goods from the forest while others have undergone processing to a lesser or larger degree. Many of the products are often traded in rather small quantities compared to other commodities. Most NWFPs from Africa that enter the international trade are often raw materials for further processing in the countries of destination. There are also a number of value-added goods based on NWFPs that are internationally traded. The market size, growth and its specific requirements are determined by factors far away from the supplying countries. The reliable availability of marketing information is a key factor for successful marketing in export markets. *Table 1* below summarises the characteristics of the four market segments of NWFPs.

The segmentation of markets as indicated in *table 1* cannot be rigidly applied for all NWFPs. There exists some dynamism in their markets whereby some products switch from purely subsistence use to commercial export-based activities. Some products are marketed in all four market-segments but in varying quantities and qualities, and with variation in prices and institutional arrangements. Some products are sold only in local markets while others are more

prominent in international markets as a result of increasing levels of processing to meet other end uses such as food additives and active ingredients in pharmaceutical products. Some of the products are sold as bulk commodities like fodder and nuts in local markets, and Gum Arabic and resins in export markets. The aggregate of a large number of NWFPs and their individual producers makes local and national trade in many instances more important than the international trade to local producers. However, the potentials for poverty alleviation is higher with regionally and internationally traded NWFPs, especially where equitable benefit sharing considerations are put in place through better institutional arrangements.

Table 1. Summary of NWFPs market segments and their characteristics.

Factors	Local markets	National/urban markets	Regional markets	International markets
Number of products	many and diverse	medium	few	few
Stakeholders	local people, middlemen	middle men, retailers, industry	middlemen, retailers, industry	industry
Quality	mostly uncontrolled	weakly controlled	controlled	highly controlled or patented
Level of processing	low	average	high	higher
No. of people	very high	medium	low	lower
Level of training/ specialisation	low	average	high	specialised
Prices	low	may be high but captured by the middlemen	high but usually captured by the middlemen	high but usually captured at processing end
Tenure	weak	moderate to high	moderate to high	patented/registered
Policy/Regulations	weak	weak	fairly strong	very strong
Level of organisation	poor	fair	fair	good
Information flow	poor	poor	fair	strong
Scale of production	small, no economy of scale	small, no economy of scale	limited	high, economy of scale
Capital investment	small	small	limited	high
Infrastructure	poor	poor	good	excellent
Potentials for poverty alleviation	low	medium	high	high

Processing: Some NWFPs are eaten raw; some go through simple processing steps while others go through sophisticated processing before reaching the end user. The objective of processing NWFPs may be to extend shelf life, for value adding and/or for better hygiene (*De Silva and Atal, 1995*). Processing provides the physical characteristics of the goods while marketing adds to it all the necessary services and other immaterial features to make it a complete product for satisfying the values sought in the market (*Lintu, 1995*). These may be achieved through simple cleaning of harvested materials, providing proper storage conditions, packaging, grading and

labeling of products. Increasing sophistication in processing (secondary and further processing) can follow primary processing depending on the type of product, available financial resources, available technology, available trained manpower and a ready market for the finished products. Out of the five factors mentioned, most countries in Africa lack the latter four for NWFPs that require sophisticated processing such as the extraction of active ingredients from medicinal plants for drug formulations. The issue at stake is to judge if the complete processing of NWFPs can take place in raw material producing countries with only the processed products being sold to consumer countries. Is it an economic, political, technological or social manouvre?

1.4 Structure of the report

The report is divided into five sections. Section one gives the general background and objectives to the overall project and to this report. Also given in this section are the background to the processing and marketing of NWFPs, the scope of the paper and the definition of a few concepts used in the paper. Section two examines some case studies. Section three makes a synthesis of the lessons learnt from the case studies as well as examines socio-economic impacts of NWFPs and the institutional issues that may characterise the processing and marketing of NWFPs in Africa. Section four looks at the implications of the issues discussed in the previous three sections on future prospects for processing and marketing NWFPs in Africa, while section five concludes with some major recommendations.

2.0 CASE STUDIES ON PROCESSING AND MARKETING OF NWFPs

Five NWFPs were selected for analysis in order to draw lessons for this paper. The selection criteria were based on the following:

- The importance of the species in local, national and international markets,
- The potentials to develop the products and its market in producing country,
- Some level of processing technology already in place,
- The potentials for increase in supply through better management interventions and/or cultivation, and,
- The potentials for poverty alleviation at the local level following better processing and marketing arrangements.

2.1. Processing and marketing of *Prunus africana* in Cameroon

2.1.1 Background

Prunus africana leaves and bark have been used in traditional remedies for centuries and they continue to play this role today. In the late 1960s, the potential of *Prunus africana* for modern medicines was discovered, particularly for the treatment of older men suffering from the inflammation of the prostate, a disorder that leads to urination difficulties (Ndam, 2004). This disorder is generally referred to as enlarged prostate gland hypertrophy or benign prostate hyperplasia (BPH), which affects more than 50% of men over the age of 50 in Europe and North America (ICRAF, 2000). This recent discovery has led to an international trade in *Prunus africana* bark and its manufactured products. According to Schippmann (2001) the extract from the pulverised bark is incorporated into capsules and sold under various trade names, including Pygenil, produced in Italy, and Tadenan, produced in France.

In Cameroon, *Prunus africana* trees are distributed on the mountain regions of the Southwest, West and North West provinces ranging from 700 m to 3000 m altitude (Achoundong, 1995; cited by Ndam and Tonye, 2004). However, the Mount Cameroon area constitute the zone where most of the inferences to this case study are drawn. This area is inhabited by 300,000 people distributed in 51 villages with an annual population growth rate of 3-6%. About 60% of the households in this area are involved in the production-to-consumption system of *Prunus africana* (Ndam and Tonye, 2004).

2.1.2 Production of *Prunus africana* in Cameroon

Prunus africana is produced in some 21 Sub-Saharan African countries (Tonye, 2002) with a growing annual export market value of over US\$ 220 million (CARPE, 2001). Bark harvesting is hard work, requiring collectors to climb *Prunus* trees and carry 30-70 kg loads of bark through mountainous forest. This makes the activity suitable for strong young men (Ndam, 2004). The average yield of bark per mature tree is about 75kg (Acworth et al., 1998). Cameroon is the biggest exporter of *Prunus africana* bark and bark extract with annual average exports of 1.5 million kg of bark during the 1980s. This rose to 2 million kg in the early 1990s. Even in 1990/1, with an official ban on exports in force by the Cameroonian government, 3.9 million kg were exported (Cunningham, 1997). The existing wild stock in the mountain ranges of Cameroon is already facing over-exploitation calling for some regulatory measures, as well as domestication measures to complement natural regeneration. The contention is on the transition from wild to cultivated materials, as local people, who are dependent on wild stock for income generation, may be the losers if they have to compete with richer and more powerful entrants into commercial scale cultivation.

2.1.3 Processing of *Prunus africana*

Prunus africana bark is harvested with cutlasses and stakes, tied into bundles and carried home. Dirt and debris are removed and the bark is dried in the sun before being sold to middlemen or directly to factories for processing (Ndam, 2004). This implies that the role of local producers in the processing chain is limited to the drying stage where bundles of 20-30 pieces of fresh bark are sun-dried to less than 38.5% moisture content (Ndam and Tonye, 2004). The dried bark is then supplied to Plantecam, which until recently was the only processing industry in Cameroon. Plantecam chips the bark and converts them into a paste of a non-crystalline extract that contains as much as 20% pure extract depending on the solvent used. The paste is exported to France for final extraction and purification for the active ingredients. The purified extract might be sold to other companies for formulation into capsule or tablets, which are then packaged and sold to final consumers (Ndam and Tonye, 2004). About 400 kg of fresh bark, representing 200 kg of dried bark, are needed to make 1 kg of extract (Cunningham et al., 1997).

2.1.4 Socio-economics of *Prunus africana* production and trade

Prunus africana is one of the most highly commercialised NWFPs from Cameroon with an increasing international trade value. Commercial exploitation started in 1972 (Schippmann 2001). *Prunus* is traded in the form of dried bark and as bark extract. In Cameroon, a harvester collecting 30 kg of bark per day can earn an average of US\$ 0.4 kg⁻¹. This price can increase to US\$ 1-2 kg⁻¹ if the middleman is removed from the trade chain. For the harvesters living around the Mt Cameroon area, bark collection accounts for about 70% of their total household income (Ndam, 2004). About 60% of the households in this area are involved in the production-to-consumption system of *Prunus africana* (Ndam and Tonye, 2004).

Prunus africana is exported mainly to Europe, where France is the biggest importer followed by Spain. Extracts are re-imported from France, Spain and Italy. At least four European companies have interests in *Prunus africana* bark for medicinal purposes: Laboratoires Debat (France) and its subsidiary company Plantecam Medicam in Cameroon; Madaus (Germany, Spain); Prosynthese (France); and Indena Spa (Italy). Bark is bought for US\$ 0.3-0.4 kg⁻¹ in Cameroon at the factory gate (Ndam and Tonye, 2004) and for US\$ 2 kg⁻¹ from Kenya (WWF, ud). Capsules filled with 25 mg to 50 mg of the bark extract are marketed in Europe, a 15-tablet box costing US\$ 7-8. The over-the-counter value of the retail trade in *Prunus africana* is estimated at US\$220 million a year (CARPE, 2001). Extract in tablets or capsules are marketed under two main trade names: "Tadenan", produced by Laboratoires Debat (France) and "Pygenil" produced by Indena Spa (Italy).

2.1.5 Institutional aspect of *Prunus africana* production and trade

Cameroon Forest legislation: The Cameroon government has recognised the promotion of NWFPs as a means to alleviate poverty in rural areas and to generate revenue for the national economy. This was institutionalised with the creation of the "Directorate for the promotion and transformation of forest resources" in the Ministry of Environment and Forestry (MINEF) under Decree of 28 April 1998. Two sub-departments were created, one for the promotion and transformation of NWFPs and the other for wood products. The policy and regulations affecting the

exploitation of NWFPs in Cameroon are primarily influenced by the National Forestry Law of January 1994, which specifies forestry, wildlife and fisheries regulations, including regulations on the exploitation of *Prunus africana*.

The financial laws also have some regulatory role on the exploitation and trade in NWFPs in Cameroon, especially with regards to the taxes and fees paid. The 1999 Finance Law fixes an arbitrary tax of US\$ 0.018 kg⁻¹ of any NWFP harvested and a fee of 5% on any NWFP exported. The impact may be very minimal as the tax represents less than 5% of the value of raw materials.

In addition, MINEF has identified *Prunus africana* as one of the six most important NWFPs in Cameroon that needs to be promoted for socio-economic development. However, the only national legal protection afforded specifically to *Prunus africana* in relation to trade in its bark was a temporary ban on its exploitation in Cameroon in 1991, which was lifted in 1992. Despite the official ban in 1991, a greater quantity (3900 tons) of *Prunus africana* was harvested and exported between 1991 and 1992 than in any preceding year, indicating the high level of corruption in the production zone (Cunningham, 1997).

Prior to 1987, Plantecam Medicam, as it was known then, operated within a strict monopoly in the exploitation of *Prunus africana* in Cameroon. They set and adhered to strict harvesting guidelines such as no felling and no girdling but only the stripping of opposite quarters of the tree to allow for bark regeneration. Thereafter, a breakdown in this monopoly came with the issuance of licenses to a number of companies and individuals. This led to a dramatic increase in field operatives working in an area with corresponding increase in unsustainable practices, notably the felling of trees, total bark removal and non-respect for quotas set. The lesson to be learnt here may be that increasing commercial competition without putting in place adequate management regimes, based on sound inventory data may probably lead to a corresponding increase in the amount and intensity of bark exploited. Therefore, the issuance of permits is not necessarily a guarantee of sustainability, especially when permits are issued with no harvesting controls being implemented (Sunderland and Tako, 1999).

CITES legislation. Concerns on the future of *Prunus africana* led to its listing in Appendix II of the Convention on International Trade in Endangered Species of wild Fauna and Flora (CITES) in 1994, becoming effective in 1995 (Sunderland and Tako, 1999). In theory, this means that exporting countries must issue export permits and import countries must check these permits upon entry (Cunningham et al., 1997). The implication is that both exports and imports need to be monitored (Ndam, 2004) with export permit strictly based on sound inventory and management information (Sunderland and Tako, 1999). This should ultimately mean that the bark entering the importing countries is harvested from a sustainable source. However, the reality is somewhat different with unsustainable exploitation of *Prunus africana* still commonplace and quotas and permits are being issued without reference to adequate biological baseline information (Sunderland and Tako, 1999). However, monitoring the trade of *Prunus* is difficult, partly because it is traded in five different forms – unprocessed dried bark, bark extract, herbal preparations in the form of capsules, as a constituent of a hair tonic and as wood.

However, the impact of listing *Prunus africana* by CITES has been partially effective in reducing threats because it has helped to raise awareness about the problems posed by international trade. Nevertheless, the quality of reporting to CITES is inadequate, especially on the part of importing countries (Schippmann, 2001). Several non-governmental, governmental and international bodies are now involved in programmes to promote sustainable management of wild populations, cultivation and monitoring of the trade. For example, for some years the Mount Cameroon Project has been working with villagers to promote the sustainable management of *Prunus*. Villagers are involved in monitoring the forest to guard against *Prunus* poachers and to help ensure, in the event of legal harvest, that only a part of the bark is removed (Ndam, 2004). It is hoped that this and similar efforts will suffice to ensure that future supplies of the bark are harvested in sustainable ways.

2.1.6 Equity and benefit sharing

Much income is generated from pharmaceutical uses of *Prunus africana*, especially after processing to finished products (Ndam and Tonye, 2002). The interesting issue is that most of the values associated with these products do not accrue to the producing countries since processing facilities to consumable products are located in Europe or America. In 1999, the finished product from its bark was worth US\$ 200 million to the pharmaceutical companies in Europe and North America but the raw material (bark) was worth only US\$ 700,000 to Cameroon (CARPE, 2001). This gives a low real value capture of only 0.35 percent, which in real terms may only cover administrative costs, with little or nothing left for development in the sector.

Despite a regeneration tax that was established by the Cameroon government, this totalled some US\$ 103,900 from the exploitation of 5814 tons of *Prunus africana* bark in 1997 (Ndam and Tonye, 2004), giving an average regeneration charge of just US\$ 0.018/kg. This level of charge can certainly not meet the replacement cost of volumes exploited, since 50-90 % post harvest mortality results from strip-barking the trees and exposing them to stem-boring insects (Ndam and Tonye, 2004). Moreover, the sustainable harvest level for *Prunus africana* in Cameroon has been estimated at 200 tons, meaning that the 5814 tons exploited in 1997 was over 29 times higher than the annual sustainable harvest rate (Tieguhong, 2003).

2.1.7 Revenue sharing in the Mount Cameroon area

The revenue from *Prunus africana* production is collected and partly shared among communities in the Mt Cameroon area. The bark was worth US\$ 700,000 to Cameroon in 1999 and US\$ 200 million to the pharmaceutical companies in consumer countries (CARPE, 2001). The share of revenue to local communities over a nine months period was US\$ 35,700 (5.1%), of which US\$ 2260 (6.3%) was earmarked to village development fund, 1530 (4.3%) to group functioning costs and US\$ 31,920 (89.4%) divided among 60 members of the Mapanja *Prunus* Harvesters Union (Ndam and Tonye, 2004). This implies that each member of the Union received US\$ 532. This is more than the GDP per capita of US\$ 500 for Cameroon in 2000. Union members get seven to eight times higher income than non-members in the Mt Cameroon area, as the average household income from *Prunus* harvesting is just US\$ 71 (Ndam and Tonye, 2004).

This union is a community-based organisation in the Mt Cameroon area that has developed their own local benefit sharing system to guide and ensure equity in the revenue generated from *Prunus africana* harvesting. The major reason for success is that union members cut off intermediary middlemen from the trade chain. They also have greater access to market information and are less likely to be duped by traders. The major lesson to be drawn is that when local people are organised, they make greater income from NWFPs activities. A summary using SWOT analysis for *Prunus africana* production and trade in the Mt Cameroon area revealed the need for higher export and regeneration charges in order to ensure equity in the distribution of revenue generated and the financial sustainability of production (Table 2).

Table 2. SWOT Profile for *Prunus africana* production and trade.

Strengths	Weaknesses
1. Product is highly commercialised 2. Increasing commercial value 3. Increasingly global aging population 4. Increasing global interest in herbal medicines 5. Existing wild population 6. Producer communities being organised into CBOs 7. The 1994 legislation and the 1999/2000 Finance Law in place 8. No competing product yet for the treatment of prostate cancer	1. Poor rent capture of 0.35% 2. Over-exploitation of wild population 3. Poor harvesting methods 4. Inequality in the distribution of benefits 5. No government law on distribution of benefits 6. Lack of text of application and weaknesses in monitoring. 7. Low regeneration fee of US\$ 0.018/kg 8. No local processing pharmaceutical companies
Opportunities	Threats
1. Market research for better rent capture 2. Better organised revenue sharing systems at local level 3. Quota system 4. Sustainable harvest methods	1. Illegal production and trade 2. Corruption 3. Processing companies acquiring monopoly status 4. Leakage with low re-investment 5. Browsing by animals and insect stem borers

5. Conservation through domestication programmes	6. Natural disaster like volcanic eruptions and fire
6. Text of application of laws and regulations and better law enforcement.	7. Limited knowledge on sustained yield
7. Creation of independent regeneration fund	8. Pressure from population growth rate of 3-6%
8. International research organisations to fill knowledge gaps	9. Mass production by other countries
	10. Discovery of competing products

Source: *Tieguhong, 2003.*

2.1.8 Appraisal of revenue system and equity from *Prunus africana* trade

As observed in *Table 2*, there is much strength and many opportunities associated with increasing revenue capture through increased charges on *Prunus africana* production and trade. The current revenue capture is just 0.35% for the producer country (Cameroon) and 99.65% for the processing country while the regeneration charge is only US\$ 0.018 kg⁻¹ of exported product. Here, the problems of low fees and low revenue capture are glaring. This is in accordance with *Tonye (2002)* who states that the manufacturers based in Europe and the USA earn 94% of the benefit generated in *Prunus* business and only 1% flows to the communities at the base of the production chain. In the USA, a kilogram of pure extract of *Prunus* sells at US\$ 991 but bark collectors are paid US\$ 0.017-0.35 per kg. On average, 205 kg of bark is required to produce 1.0 kg of pure extract. This means 96.5% of the income from *Prunus* is captured by foreign companies and not by Cameroonian farmers (*Grain, 2000*). *Tonye (2002)* recommends that an international recognition of the communities' effort to promote the sustainable management of *Prunus africana* and its proper harvesting are steps that the processing companies must take to ensure an improved income for communities from this plant. An increase in fees would allow for equitable distribution of revenues between producer and processing countries. Moreover, there would be greater equity because local communities would have a higher amount of money from the portion of money attributed to them. This would lead to greater local support for sustainable management and protection of the resources. Economic efficiency and sustainable management of the product might be more assured because better funding for regeneration and conservation would be expected. In the absence of an increase in charges, the resource would be over-exploited; supply would be highly reduced to sustain the industries that have to meet the needs of their growing market of elderly people.

Low fees are known to create disincentives for exploiters to use efficient means of harvesting, transportation, storage, processing and marketing of forest resources (*Whiteman, 1999; Gray, 1983*). In addition, when fees are low, there is little chance of paying fee collectors well, which may lead to poor level of collection. In the light of these issues, higher and equitable fees are necessary for the efficient implementation and for revenue generation for sustainable resource management and development.

2.1.9 Outlook for *Prunus africana* production and trade

The outlook for economic viability of *Prunus africana* production and trade seems to be very positive with the increasing interest in natural ingredients for the treatment of diseases in the developed world. For instance, prostrate disorders have been observed to be more associated with old age in North America and Europe, where the major market for *Prunus* products resides, and the number of old people continues to rise. In addition, the *Prunus* currently has no competing natural active ingredient for pharmaceutical uses. The implication, based on demographics and lack of natural substitutes, is that there may be a continuous need of *Prunus*-based medications for prostrate gland disorders in several years to come. For instance, the global demand for *Prunus africana* bark and its extract rose from 2450 tons in 1995 to more than 2780 tons in 1996 and again to 3091 tons in 1997 (*Schippmann 1997*). The current annual market demand has soared to 4000 tons with predictions of increase to 7000-11000 tons in the next decade (*ICRAF, 2004*).

However, the opportunities that this product could offer to both the local and national economies of Cameroon are hampered by weak market arrangements that have resulted in low prices in raw materials (US\$0.3-0.4/kg) captured at the factory gate (*Ndam and Tonye, 2004*).

2.1.10 Lessons learnt

1. Issuing permits and liberalising the market is not a guarantee for sustainability. Increasing commercial competition by issuing permits without putting in place adequate management regimes does not necessarily guarantee sustainability and better markets. The issuance of licenses should be preceded by proper management regimes and harvesting quotas put in place to avoid abuse by overzealous individuals.
2. When local people are organised, they can make greater incomes from NWFPs activities because of integrated factors such as better transportation, bulk sales and better information on markets.
3. Low revenue capture from trade transactions at the local level leads to over-exploitation of highly commercialised species.
4. Domestication and cultivation of *Prunus* on a massive scale is a priority for sustainability.

2.2. Processing and marketing of Gum Arabic in Sudan.

2.2.1 Background

The history of the use of Gum Arabic is an interesting one that spells out the challenges and opportunities for its sustainable production and trade. Gum Arabic is the oldest and best known of all natural gums. Its uses date back about 5000 years to the time of the ancient Egyptians. Among its many applications, Gum Arabic was used as a binder in cosmetics and inks, and as an agent in the mummification process. Within commercial circles it is also known as Gum Acacia, Turkey Gum, and Indian Gum and by many other descriptive and colourful local names (*Green Planet, 2003*). Egyptian fleets shipped Gum Arabic as an article of commerce. It was eventually introduced to Europe through various Arabian ports acquiring the name "Gum Arabic" after its place of origin. For a long time, Gum Arabic trade was carried on through ports controlled first by the Byzantine Empire and then the Ottoman Empire, thus giving rise to the name "Turkey Gum". An export trade was also developed for a time around Bombay - thus, "East Indian" or "Indian Gum" (*Green Planet, 2003*).

Gum Arabic is a natural exudate obtained by tapping the branches of Hashab (*Acacia senegal*) trees and closely related species like Talh (*A. seyal*) that grow mainly in Sub-Saharan Africa, SSA (*FAO, 2002*). To a limited extent they also grow in Australia, India and South America. The main producing and exporting countries in the "gum belt" of Africa include Cameroon, Chad, Mali, Niger, Nigeria and Sudan. Other minor African producers include Eritrea, Ethiopia, Kenya, Mauritania, Niger, Senegal and Tanzania. Overall, Africa contributes 95% to world Gum Arabic production but Sudan alone dominates with a production share of about 85% (*USAID/Nigeria Gum Arabic Program, 2002*).

In Sudan, Gum Arabic production is a traditional skill that has evolved over many generations, handed down from fathers to their children. From east to west across a substantial strip of Sudan south of Khartoum lies the Gum Belt on the southern periphery of the Sahara desert, mainly between latitudes N11 and N14. Gum Arabic production has remained the economic and social life wire of the Sudanese living in this region. Gum production is evolving from tapping in the wild to a scientific agroforestry operation providing higher and more reliable yields as well as better quality of production.

2.2.2 Applications of Gum Arabic

Apart from local uses, Gum Arabic has diverse applications in pharmaceutical, cosmetic, food and textile industries. It is used in the production of sweets, chewing gum, cookies, candies, chocolates, flavours, confectioneries, paints and other industrial products. In the pharmaceutical industry, it is used to manufacture capsules to coat pills, and to manufacture vitamins, lotions, mascara, cake makeup, etc. Other industrial applications include flocculating agent in ore refining of certain minerals, paper coatings, textile sizing and finishes, metal corrosion inhibitors, office glues, emulsion prints, and pesticides, lithographic inks for the treatment of photosensitive plates, and many others. Gum Arabic is also used medically as a demulcent to soothe irritation, especially of the mucous membranes and has been shown to lower the cholesterol levels in the blood of laboratory animals.

2.2.3 Production

Gum Arabic is produced in Sudan within the Gum Arabic belt that covers about 20% of the country's area. It forms a major source of income to farmers in Kordofan, Darfur and eastern Sudan. Production begins with the Sudanese farmer, who tends and protects his *Acacia* trees throughout the year in a traditional shifting cultivation system. The old system has persisted for centuries because of its vast land area that also encourages natural regeneration of *Acacia* species. Following his understanding of local conditions and expertise acquired over many years, the farmer taps his trees when the gum exudes from incisions in the branches. The tools employed are either traditional tapping axes or the more recently introduced Sunki, which looks like a traditional native hunting spear (*Karama, ud*).

Mature trees, 4.5-6 m high and 5-25 years old are usually tapped. The gum dries after about six weeks into rough spheres that are manually collected. Collection takes place at intervals during the dry season from November to May and two main harvests are taken in December and April in major producing areas. Higher average temperatures generally lead to greater gum production; with yield per harvest rarely exceeding 300 g. Up to three further collections are made at three-week intervals. The farmer then transports the gum to sell it in one of the thirteen gum auction markets. A young tree may yield 0.4 to 7 kg annually (*WitasCrittter Herbal, ud*).

Several tonnes of Gum Arabic are produced through this process. For example, Sudan, Nigeria and Chad are the major producers of grade 1 Gum Arabic in Africa, with a global production share of over 95% of which Sudan alone accounts for over 85% in 2001 (see *Table 5* below).

Table 5. Major grade 1 Gum Arabic producers.

Country	Production (in metric tonnes)				
	1997	1998	1999	2000	2001
Sudan	17400	24200	21000	23000	24000
Chad	2400	3200	3200	3100	3300
Nigeria	1000	500	0	0	0
Total	20800	27900	24200	26100	27300

Source: Adapted from *USAID/Nigeria Gum Arabic Program, 2002*.

The most important problems facing Gum Arabic are yield variability and drought. However, research aims at boosting productivity and utilise Hashab in agro-forestry systems that contribute to environmental sustainability, desertification control and increased production of other types of gums. *Acacia* trees are grown from seedlings that are planted when they reach the height of 15- 20 cm. Gum production can begin when trees are 5 years old although gum may be tapped from the trees after 3 years. However, the quality and yield are consistent only after 5 years. Also, according to a British importer, old crop gum Arabic has a better viscosity than new crop gum.

2.2.4 Processing of Gum Arabic

Historically, Gum Arabic was simply sold in its natural state with little or no processing. Much raw material continues to be sold but it is now pre-cleaned to remove bark, sand and impurities. This is done to improve quality. After cleaning, bark and foreign matter should be below 0.5% in food grade powdered *Acacia* gum. The Gum Arabic Company (GAC) provides different grades of gum derived from *Acacia senegal* trees - principally the Cleaned Amber Sorts Grade and the Hand Picked Selected Grade. Bigger tears and lighter colours provide the gum of choice for food, beverage and pharmaceutical manufacturing. Gum Arabic is also processed in Sudan into the forms needed for incorporation into the final products. These processes include "Kibbling", or making uniform pebble-sized pieces, granulating, and powdering.

At Port Sudan, the Khartoum Gum Arabic Processing Company (GAPC) maintains a fully equipped laboratory and warehouses, smoothly ensuring quality-tested supplies for export. The company, which is 60 per cent owned by the GAC, operates a modern processing plant at the port, providing powdered and kibbled Gum Arabic to order with a high standard of processing according to European standards of hygiene (*Tom, ud*). The major drawback is that

many companies still prefer to buy the raw material and process it themselves (*Tom, ud*). Worse still, Tom asserts that although Sudan is the world's principal supplier of Gum Arabic, it is not used for final product manufacturing in the country itself, but quite often it finds its way back to Sudan in foreign-manufactured soft drinks and confectionery.

Sudan now exports only semi-processed or processed kibbled variety Gum Arabic instead of crude gum lumps. The kibbled variety can be used as such or further processed. It must also be noted that European countries import more crude material than the US. European countries re-export a lot of processed Gum Arabic to the US. In 1993, 40% of USA Gum Arabic imports were processed. The percentage for European imports of processed gum is lower than for the US but an exact figure was not available.

Some problems of variation in products and their quality can be overcome by the application of standards and related grading. Such rules are available for many NWFPs both at the raw material and at various processing levels. For example, the grading of Gum Arabic is based on physical parameters such as colour, shape, size and purity, which makes the grading rather simple and it can be done by the producers themselves. Sudanese production of Gum Arabic is fairly tightly controlled and the grading system is used as an industry standard. Different grading systems are operated in other exporting countries but supplies from reputable dealers can match Sudanese material. The two main grades are 'hand-picked-selected' (HPS) and 'cleaned'.

Variations in consignment quality and a lack of local cleaning facilities have been addressed by importers in the US and Europe who purchase material on the basis of approval of pre-delivery samples and then process to ensure that product specifications are met. The three main specifications that are widely used by importers of raw Gum Arabic are: moisture content 12-14%, optical rotation -25- -35, and foreign matter <3-5%. These specifications must be met before exporting is possible. Also the microbiological count for *Salmonella*, *Escherichia coli* and *Staphylococcus aureus* must be negative.

Local merchants buy the gum at agreed floor price or higher. The gum is then delivered to cleaning sheds, where the gum is selected and graded into three distinct grades: clean amber sorts "CAS", siftings and dust. The merchants then sell the graded gum to the GAC. The gum, packed into 50 or 100-kg burlap bags, is then transported to exit ports from Sudan, mainly Port Sudan on the Red Sea. GAC provides different grades of Gum Arabic from the distinct two types of Gum Arabic - Hashab or Kordofan derived, from *Acacia senegal*, trees and Talha, derived from *Acacia seyal* trees.

2.2.5 Exports of Gum Arabic from Sudan

The Gum Arabic Company limited (GAC) is a private company specialised in foreign trade of Gum Arabic. The GAC was established in 1969 and is owned by about five thousands share holders, in addition to the Sudanese Ministry of Finance owning 30% of its capital (*Karama, ud*). Thus, GAC today has about 35 years experience in Gum exports. It has a well established geographical coverage of the production areas in the Sudan in addition to extensive assets and facilities that make it the best, logistically, worldwide in the area of the protocol of monitoring, purchasing, preparing, and exporting Gum Arabic (*Karama, ud*). GAC functions as an exclusive monopoly of exporting Gum Arabic from Sudan. All exports are subject to quality checks and grading by the Sudanese Standards and Metrology Organisation.

GAC is the exporter of a wide range of grades of the best quality Gum Arabic and a reliable source of continuous and sustainable supply of Gum Arabic for exports in all seasons of the year. It provides customer tailored methods of payments with flexible contracting forms. GAC exports only natural, organic products, free of chemicals and G.M.O. Gum Arabic exported by GAC is mainly crude of the grades: Hand Picked Selected (HPS), Cleaned Gum, Siftings and Dust. However, Gum Arabic is traded in processed forms as well: mechanical or sprayed dried forms and application-specific forms.

The crude Gum Arabic is exported either in burlap or jute sacks. The US regulations require that only new, unused jute sacks be used. Semi-processed and processed kibbled variety, granules and powdered Gum Arabic are exported in drums, polyethylene lined multi-wall paper bags or polyethylene lined cardboard boxes. The gum, when stored in cool (21° -24° C) and dry places, has an unlimited shelf life. Exported gum is mostly transported by vessel. This is much cheaper than transport by air. For example, in 1993, 70 % of the US imports of Gum Arabic were transported by vessel. Since the shelf-life is virtually unlimited, the slower transportation by ship compared to transportation by air is not a limiting factor.

The two most important exporters to the US since 1989 have been Sudan and France. These two countries have dominated the trade with a market share of 85-95%. The UK holds the third place with a 3-4% share of the market (*Karama, ud*). EU imports totaled 23.2 thousand metric tons in 1993. US imports for the same period were 5.5 thousand metric tons. About 40% of the US imports were processed Gum Arabic meaning that the European market would be easier to penetrate than the US market for exporting crude gum. European imports consisted mostly of crude Gum Arabic. European countries (mainly France) re-export processed Gum Arabic to the US.

2.2.6 Socio-economics of Gum Arabic to local and national economies of Sudan

Sudan is at the lead in both production and export of Gum Arabic, accounting for about 80% of the world exports of this commodity. It contributes over 13 % of the foreign exchange earned by Sudan (*Country report, 2003*). The world market for gum as food additive alone was over US\$10 billion in 1993 (*Coppen, 1995*). About a sixth of the population, of Sudan or some five million people, are involved in the harvesting and production of Gum Arabic (*Karama, ud*). According to *FAO (1993)*, 26 200 and 25 000 metric tons of Gum Arabic, valued at US\$ 36.7 million and US\$ 53 million, were exported from Sudan in 1980 and 1990, respectively. This gives unit prices of US\$ 1.4 kg⁻¹ in 1980 and US\$ 2.12 kg⁻¹ in 1990. Based on the 1991 Sudanese figures, the price of Gum Arabic of the hand picked quality varied from US\$0.85 kg⁻¹ to US \$2.8 kg⁻¹. This was sold at US\$ 3.0 kg⁻¹ on the European market (*WitasCrittellHerbal, ud*).

2.2.7 Role of Research and Development

The Gum Arabic research programme is one of the seven categories of research in the Agricultural Research and Technology Corporation (ARTC) of the Sudanese Ministry of Science and Technology. ARTC is entrusted with planning and executing applied research in crop production and protection including Gum Arabic. Each ARTC programme publishes the results of its research in Annual Reports and in the Sudan Journal of Agricultural Research (*ARTC, ud*).

Research results have increased consumers' confidence with regards to the safety of using Gum Arabic as a food additive. For instance, it has been reported that eating Gum Arabic for more than twenty days exhibited no effect on glucose tolerance, stool weight or appearance. Extensive data available from studies in animals and in man suggest Gum Arabic to be one of the most extensively tested food additives because it is also one of the safest with no upper level limits recommended by the FAO/WHO committee. The GAC financially supports the Sudan Research Programme on the use of Gum Arabic for treatment of patients suffering from chronic renal failure (CRF). The company is also building a research institute exclusively for gum research in the Kordofan Region, which will also serve as an international contact point for universities and for people who want to conduct research in Sudan (*Karama, ud*). According to the research programme, strong emphasis is placed on Gum Arabic as a natural, organically-produced ingredient and also on stimulating demand in Sudan to cut costs and make use of available distribution channels.

Within Sudan, research has helped national institutions to supply Gum Arabic in a different form, with due recognition of the fact that they have been trading in its simple raw state for too long. This recognition has ushered investments in plants that can process Gum Arabic into a powder form. Faced with the complexities of distributing processed products from Africa, the management of the Gum Arabic Processing Company has also realised the need to join forces with an established European company to build processing plants that meet international standards. In the same vein, a joint venture with European companies dealing with Gum Arabic is seen as an ideal way to run the distribution of products (*Karama, ud*).

2.2.8 Institutional arrangements for Gum Arabic trade

In Sudan the Ministry of Commerce and Trade declares a value-based fee equivalent to 5% of the floor price annually on all exports. The money is channeled to the Forest National Corporation (FNC) and is used for the production of cheap and quality-planting materials for farmers. This may explain the success of agroforestry development with *Acacia spp* as a major component. A well-developed market for gum has also persisted for decades under the GAC monopoly.

2.2.9 Outlook and role of substitutes

The existing potential of Sudanese to supply Gum Arabic can meet world demand four or five times over, but today Sudan exports only about 50% of what the world was consuming 40 years ago. About 10 years ago, the world was using around 70,000 tons of Gum Arabic every year, while today only 42,000 tons are used, in spite of the increase in population (*Karama, ud*). This is due to the role of substitutes as many of the world's food producers have turned to substitutes for Gum Arabic. Substitutes seem to have put the Sudanese farmer in a pitiful position. Despite the many synthetic products replacing the uses of natural gums, their use continues for specific purposes. Moreover, the future for an increase in demand for Gum Arabic seems bright with the increase in consumers' consciousness for green products. The strength of Gum Arabic against the substitutes is that it is a product that has been known for many thousands of years, and such historic importance is unlikely to diminish drastically in the nearest future. Moreover, the artificial substitutes do not match it for quality or cost of production (*Karama, ud*).

2.2.10 Opportunities and threats to future markets for Gum Arabic

Opportunities/Strengths:

1. Gum Arabic has a long, safe history of use in food industries; recent toxicological data on particular properties has been assessed and approved. Advantages for food applications of gum Arabic: emulsification, acid stability, low viscosity at high concentration, adhesive and binding properties, good mouth feel. Therefore, the use of gum Arabic cannot be totally substituted by the use of other gums or starches because they do not perform the same functions.
2. No cartel exists, numerous producers/exporters in the world.
3. Demand for natural ingredients by health conscious consumers who demand natural ingredients and this offers Gum Arabic tremendous potential.
4. Research on Gum Arabic aims to boost productivity in agroforestry systems that may contribute to sustainable supplies and increased production of other types of gums.
5. New applications for Gum Arabic are being investigated.
6. Maintenance of stringent quality control methods throughout the harvesting and preparation of Gum Arabic for export by the national GAC.
7. Presence of long standing export market structures with 13 local auction producer markets.

Threats/Weaknesses:

1. Irregularity of supply and consequently widely fluctuating prices.
2. Availability of close substitutes, such as modified starches, other gums and biosynthetic polysaccharides, which threaten the market for Gum Arabic.
3. Also inconsistency in quality can be seen as another threat.
4. Weak international support to locally processed gum by Gum Arabic Processing Company.
5. Variability in yield subject to climate variation, drought, locust infestation, rising living costs.
6. Mass production by other countries, such as Nigeria and Chad. At one time Sudan was the exclusive supplier of Gum Arabic. However, because of the political situation, Chad has also developed as a supplier and Nigeria is becoming an increasingly important player in this key local market. For instance, in 1998, 95% of world exports came from three countries: Sudan (56%); Chad (29%; up from 5% in 1978); and Nigeria (10%). The case of Chad shows that new competitors can successfully enter the market or expand their market share. However, more niche markets opportunities are opening for producers in South American and Asian markets such as Argentina, Brazil, China, Mexico and Pakistan (*Green Planet, ud*).
7. Smuggling across borders and transportation problems.

2.2.11 Lessons learnt

1. A change of attitude by advanced economies to accept high standard of processed Gum Arabic products from Sudan is a prerequisite for the development of the gum-processing sector in Sudan. This is because many companies still prefer to buy the raw material and process it themselves. According to *Tom (ud)*, the processing issue is more political than economic because the industrialised countries will not give the third world the technology that will upgrade local processing of gum.
2. National demand for Gum Arabic needs to be stimulated to ensure direct use in Sudan because most of the consumption is out of the country. Processing companies may prefer to locate near consumer centers for accessibility, safety and economic reasons.
3. The Gum Belt has the potential to supply all the world's requirements for Gum Arabic, but investment is required to process more of the raw product.
4. Quality and hygiene are major determinants of price and acceptability of Gum Arabic and need to be taken seriously by producers.

2.3. Processing and marketing of Devil's claws (*Harpagophytum procumbens*) in Namibia.

2.3.1 Background

Devil's Claw (*Harpagophytum* spp), is a traditional medicinal plant from Southern Africa (*Wynberg, 2004; Kathe et al., 2003; Cole, 2003*). Local tribal people have used it for centuries as an effective medicinal plant for reducing blood pressure and curing disturbances of organs such as the kidney, liver and bile, with hardly any side effects (*Kathe et al., 2003*). On the contrary, modern western medicine uses the plant chiefly to treat ailment of joints such as osteo-arthritis and rheumatism. Its efficacy and lack of side effects have led to the listing of the tubers of *Harpagophytum* and its products in the European Pharmacopoeia, the European Scientific Cooperative on Phytotherapy (ESCOP) and the German Commission E that evaluates useful herbs and publishes monographs listing uses and side effects (*Cole, 2003*).

Devil's Claw is found and produced mainly in Namibia, but also occurs in Botswana and some of the Northern regions of South Africa (*Wynberg, 2004; Cole, 2003*). In all, some 600 to 700 tons of dried material is traded each year, worth an estimated US\$ 100 million in the international trade (*Cole, 2003*). A complex set of relationships characterises trade in Devil's Claw, determined to a large extent by the role of the state and that of industry, the NGO and CBO sectors (*Wynberg, 2004*). These scenarios in turn provide different sets of national and local benefits. Overall, however, Devil's Claws commercialisation results in local harvesters and national economies receiving a minute proportion of benefits from the trade and virtually no value-adding in the country (*Wynberg, 2003*). Although government policies are in place to protect the resource and monitor its trade, their implementation is weak and thwarted by inadequate human and financial resources. The difficulties of competing against highly sophisticated industries, combined with poor collaboration between producers and local traders, further weaken the bargaining power of producers.

2.3.2 Production of Devil's Claw in Namibia

Most of the production of Devil's Claw tubers comes from the wild, although there is also some controversial cultivated material. The method for harvesting Devil's Claw vary considerably from location to location and depend to a large extent on the intensity of operation, the level of awareness among harvesters and the implements at hand (*Wynberg, 2004*). These factors in turn are greatly influenced by the levels of organisation among harvesters and by the presence of extension and support services. Two main harvesting methods can be distinguished: complete removal of the plant and the environmentally superior method that entails harvesting of the secondary tubers whilst leaving the parent tuber intact (*Ntseane, cited by Wynberg, 2004*). The latter method is considered ecologically sustainable because it allows for complete natural regeneration of plants as well as ensures a reliable source of income for locally dependent people (*Kathe et al., 2003*).

The largest supply of Devil's Claw on the international market originates from Namibia whose export has increased from about 180 tons in 1975 to approximately 1000 tons in 2002 (*Table 6*). A total of approximately 4000 tons of dried material has been exported from Namibia between 1995 and 2002 to various destinations (*Cole, 2003*).

Table 6. Export (tons) of Devil's Claw in Namibia (1995-2002)

Year	1995	1996	1997	1998	1999	2000	2001	2002
Export	284	314	251	603	604	380	726	1019

Source: *Cole, 2003*

2.3.3 Processing

Local processing of the root is relatively simple and entails washing, peeling and slicing the tuber into approximately 0.5 mm thick pieces, generally on the same day as harvested. Slices are then typically sun-dried in a well-ventilated area, sometimes on nets suspended off the ground. The drying procedure takes 2-5 days but is dependent on the time of the year and weather conditions. Sliced and dried pieces are subsequently packed into bags and stored awaiting sales (*Wynberg, 2004*). There is no value-adding in Namibia. All further processing takes place in the raw material importing countries. The technologies for extracting active ingredients are patented by three companies, two in Germany and one in Asia (*Gruenwald, 2002*; cited by *Cole, 2003*; *Hachfeld, 2003*). This raises concerns considering the provisions of the Convention on Biological Diversity (CBD) and the Trade Related Intellectual Property Rights (TRIPS), and the need for industrial development for developing countries. *Hachfeld (2003)* suggests that a first step to value-adding in source countries might be to undertake large scale crushing of sliced and dried material in Namibia instead of exporting the sliced tubers.

2.3.4 Export markets of Devil's Claw

Devil's Claw has been traded internationally for over 50 years, most exports going mainly to Germany (*Wynberg, 2004*). The demand for Devil's Claw on the international market has increased considerably over the last decade with a three- to six-fold increase between 1995 and 2002, reaching a level of over 600 tons exported from Namibia alone in 1998 and 1999 and over 1000 tons in 2002 (*Cole, 2003*). In 2001, 92% of the trade originated from Namibia, 5% from Botswana and 3% from South Africa. Importing countries include Germany, France, Spain, Switzerland, Portugal, Italy, UK, USA, Korea, Japan, Belgium and Brazil (*Wynberg, 2004*).

2.3.5 Socio-economics of Devil's Claw

In Namibia, Devil's Claw production takes place in some of the most inhospitable and arid parts. These areas are considered marginal for conventional agriculture and only suitable for grazing. The local inhabitants are characterised by low levels of education, acute poverty and with limited access to income-earning opportunities (*Wynberg, 2004*). This implies limited livelihood options, with the collection of wild Devil's Claw tubers forming a major cash income avenue for over 10,000 tribal people in Namibia (*Kathe et al., 2003*). Annual income per harvester varies between US\$10-50 depending on volumes harvested. Although this amount looks low, it represents an important source of income in communities where only a minority of people has formal jobs (*Wynberg, 2004*).

2.3.6 Policy and institutional issues

Legislative measures are responsible for domestic trade control, including the issuing of extraction, transport, phytosanitary and export permits for raw Devil's Claw (*Hachfeld, 2003*). The legislation guiding the harvesters may have great impacts on the harvesting of the plant. In Namibia, Devil's Claw is protected under Schedule 9 of the Nature Conservation Ordinance of 1975. From 1975, a permit was required for the collection, transport, possession and/or sale of Devil's Claw (*Cole, 2003*).

In 1986, the harvest permit system was considered ineffective with less than 10% of the harvested material collected by people with valid permits (Nott, cited by *Cole, 2003*). As a consequence, an export permit to monitor exports replaced the harvesting permit system. This lasted for only three years and the harvesting permit system was reinstated in 1999 to stop the collection of Devil's Claw in communal and private sectors and to provide more information on the localities and quantities of materials traded. This was due to a dramatic increase in export figures

of dried Devil's Claw, from approximately 300 tons in 1996/7 to over 600 tons in 1998/9, and to reports of unsustainable harvesting practices and exploitative prices being paid to harvesters (*Hachfeld, 2003*).

The Division for Specialist support Services (DSSS, Namibia's CITES Management Authority) within the Ministry of Environment and Tourism (MET) is responsible for issuing export permits. To export Devil's Claw from Namibia, a phytosanitary certificate issued by the Ministry of Agriculture, Water and Rural Development (MAWRD) is required with other necessary documents, such as an invoice, waybill, permit, etc. The weakness of this system is that both the certificate and the permit are done routinely rather than after a thorough inspection of the material and with often little other record keeping by the exporters (*Hachfeld, 2003*).

A permit is required for the cultivation or research on Devil's Claw. Proposals in this respect are discussed with the Namibian Devil's Claw Working Group (NDCWG) and permits are issued by the DSSS. Another background recognised by MET is the problem of land tenure and harvesting. With the need for a collecting permit, the harvester has to state the harvesting locality with approval of the landowner to harvest. This addresses the issue of land tenure and harvesting mostly associated with hired harvesters that enter communal lands without the permission of traditional authorities. The official harvesting season starts at the end of the rainy season from March to October (*Hachfeld, 2003*). Decision-making is done through the Devil's Claw Working Group, a stakeholder group set up in 1999, and the government gives increasing recognition to the importance of maintaining a sustainable trade in the plant (*Wynberg, 2004*).

In Namibia, the main responsibility for Devil's Claw falls under the Directorate of Special Support Services (DSSS) in the Ministry of Environment and Tourism (MET). Other key governmental institutions include the Phytosanitary Section, which issues phytosanitary certificates for the export of Devil's Claw, and the National Botanical Research Institute (NBRI), which is responsible for species collection and identification and also maintains a seed bank in the MAWRD. In November 1999, Namibia convened its first Devil's Claw Stakeholder Workshop. A major recommendation was the formation of the NDCWG, which was then established in January 2000 as a multi-stakeholder group. The main aim is to improve information dissemination and to coordinate research and other efforts at a national level. To date, the NDCWG has been instrumental in initiating many efforts regarding Devil's Claw, including policy evaluation, the Namibian National Devil's Claw Situation Analysis (NNDCSA) and hosting the first Regional Devil's Claw Conference in February 2002. A Regional Devil's Claw Working Group was also established in February 2002.

The establishment of these Working Groups is seen as a significant step towards improved collaboration between the range of states and stakeholders in these countries. The only significant NGO active in the field of Devil's Claw in Namibia is the Centre for Research and Action in Africa, Southern Africa Development and Consulting (CRIAA SADC), which was involved in setting up the Sustainably Harvested Devil's Claw project (SHDC) with rural harvester groups in 1997. Permit conditions introduced by both Namibia and Botswana confine harvesting to the dry periods between March/April and September/October, a restriction imposed mainly to curb over harvesting (*Wynberg, 2004*).

Concern regarding the sustainability of Devil's Claw was also highlighted at the international level when, at the (CITES) eleventh Conference of Parties (CoP 11) held in Kenya in April 2000, Germany proposed that both species be listed on Appendix II. Namibia and other southern African range states did not support the listing and the proposal was withdrawn, primarily because of the absence of scientific data available to support such a listing (*Cole, 2003*). However, a comprehensive nation-wide survey of Devil's Claw has recently been conducted in Namibia as part of the NNDCSA. Other countries are expected to do the same to meet the requirements for CITES listings and to improve resource management strategies (*Cole, 2003*).

2.3.7 Equity and benefit sharing

The income in foreign earnings for Namibia is significant. For example, the value of the sales of Devil's Claw in 2002 can be estimated to be worth as much as US\$ 2.7 million (*Cole, 2003*). On average, the raw material is exported for US\$ 1.40-1.80 kg⁻¹, while the finished product retails for approximately US\$ 140 kg⁻¹. Harvesters typically receive US\$ 0.50-1.20 kg⁻¹ (*Wynberg, 2004*). Middlemen receive US\$ 1.8 kg⁻¹ and exporters US\$ 3.2 kg⁻¹ (*Cole, 2003*). This implies that prices paid for dried material of *Harpagophytum* show great differences between the amount paid to the harvesters, the middleman and the prices paid to the exporters by the buyers from overseas (*Hachfeld, 2003*).

However, higher prices are being paid to harvesters in connection with some harvesting projects. Harvesters associated with those projects get no contact with the middleman as the project contacts the buyers directly. Another situation where harvesters may get more is when buyers are interested in organic certified products (*Hachfeld, 2003*). For example, *Cole (2003)* lists the amount of money received by harvesters in Namibia in 2002 to range between US\$ 0.45 and 1.35 kg⁻¹ but for organic material he states that as much as US\$ 2.5 kg⁻¹ was received.

How equitable are financial benefits shared among stakeholders in the trade chain of devil's claw? At community level, direct financial benefits rarely exceed 0.85% of the retail price and typically comprise on 0.4%. Local exporters usually obtain only 0.2% to 0.4% of the retail price (*Wynberg, 2004*). Can these financial shares bring the local producers out of poverty as well as ensure sustainable financing of proper management of the raw material base? Does a low price imply low impacts on raising the standards of living of producers? What level of prices will lead to greater and acceptable impacts? The answers to these questions need further investigation.

2.3.8 Outlook for Devil's Claw production and trade

In Germany, the percentage of prescriptions by physicians of *Harpagophytum* for the treatment of poly-arthritis and back and joint pains has increased significantly, from 40% in 2000 to 60% in 2001. *Harpagophytum* accounts for approximately 74% of the treatments for rheumatism in Germany (*Gruenwald, 2002*; cited by *Cole, 2003*).

In Germany, *H. procumbens* is the third most frequently used medicinal plant, with sales of approximately 30 million Euros (*Cole, 2003*). The turnover grew by 113 % between 1999 and 2000, and by 59% between 2000 and 2001. The increase in demand for Devil's Claw can be attributed to the following:

- an increase in the number of people suffering from arthritis and other locomotive disorders;
- well-substantiated clinical and other research data;
- the demonstrated effectiveness and safety of Devil's Claw products; and,
- intensified marketing initiatives by product manufacturers (*Cole, 2003*).

However, some caution regarding the continued demand for Devil's Claw on the international market is advised. In some cases, the demand is directly related to government policies on herbal medicines in importing countries. For example, the increase in prescriptions in Germany can be attributed to Devil's Claw being listed on Medical Aid schemes and therefore claimable by users. Furthermore, France has recently (beginning of 2003) de-listed almost 600 medicines from Medical Aid schemes and many of them fall into the Herbal Medicine category.

The total production of Devil's Claw in Namibia has grown to over 1000 tons in 2002 and markets are expanding in the USA, South America and Asia, showing prospects for increasing demand in the coming years. Moreover, a number of initiatives at international, regional, national and local levels are tackling questions regarding Intellectual Property Rights (IPR), the Convention on Biological Diversity (CBD), benefit sharing, transfer of technology and product certification. These are all aimed at strengthening the markets and marketing of Devil's Claw.

2.3.9 Opportunities to Devil's Claws market

The following facts and factors underline the opportunities for Devil's Claw:

1. Devil's claw is indigenous to Southern Africa with a high wild stock still in place;
2. There has been an over six-fold increase in the demand for devil's claw in a decade showing the prospects for continuous growth;
3. Registration of Devil's Claw products in European pharmacopoeias;
4. Expanding US, Asian and South American markets for Devil's Claws;
5. Increasing consumers' preference for natural products;
6. Increasing local, national and international concerns on benefit sharing, transfer of processing technology and product certification with due reference to economic and ecological sustainability; and,
7. Highly motivated multi-stakeholder working group in place.

2.3.10 Threats to Devil's Claws market

There are also threats to the market:

1. Variability of climate;
2. Harmful harvesting techniques such as complete removal of parent tubers;
3. Change in drug policies on herbal medicines that may not favour *Harpagophytum* products; and,
4. Weaknesses in implementing the permit system.

2.3.11 Lessons learnt

- Importers are sensitive to quality of raw material supplied with implications on prices offered.
- More organised harvesters get higher prices by cutting of the middleman from the trade chain.
- Reluctance exercised by processing companies in advanced countries to cede processing technologies to Namibia and other raw material producing countries.
- The presence of middlemen reduces the price earned by primary producers.

2.4. Processing and marketing of rattan in Cameroon.

2.4.1 Background

Before the 1960s, the bulk of rattan harvested in Cameroon was used as a service material within the framework of the village economy. Since then, a combination of factors, including urban growth and western influences, have favoured the harvesting of rattan for commercial purposes (Defo, 2004). With 18 out of 22 known African rattan species, Cameroon is one of the richest countries in West and Central Africa in terms of the rattan diversity. However, only three of the species are of great commercial importance in Cameroon - *Laccosperma secundiflorum*, *Eremospatha macrocarpa* and *Laccosperma robustum* (Sunderland, 2001; Defo, 2004). Although Cameroon has many regions where the exploitation of rattan for commercial purposes is relatively important, this paper focuses on the Yaounde Basin (3°05'-4°00' N, 11°25'-12°50'E) where some in-depth research has been carried on its processing and marketing. The region is in the humid forest zone of the country, which is characterised by the Guinea type of Equatorial climate (Defo, 2004). The region comprises both towns and rural areas and the major participants in the production-to-consumption system include harvesters, artisans and consumers. The population density of the area varies from 10 km⁻² to 40 km⁻² (Defo, 2004).

2.4.2 Production of rattan

Rattan is widespread in the humid forest zone of Cameroon and is harvested solely from wild stocks. Harvesting is mostly done by men who use simple tools such as cutlasses to cut mature stems from clusters (the rate of stem harvesting varies from 40%-100%) and to clean away the sheaths and spines. Thereafter, they arrange the stems into bundles of about 50-80 pieces (2-3 m long weighing 30-35 kg each) for transportation to their local villages. Carrying heavy bundles of rattan from far off jungles through the bushes and forest makes the job strenuous. This explains why nearly all the harvesters are young men of less than 40 years. These men generally alternate rattan harvesting with other income-producing activities (Defo, 2004).

2.4.3 Processing of rattan

As in other African countries, local people in Cameroon have used rattan canes for centuries, mainly for fine weaving, basketry, housing construction and making furniture. During the period of European colonisation, traditional production started to change and a new style of rattan processing was introduced. The modern rattan cottage industry, which produces new designs of baskets, shelves, beds, tables, chairs and many other items, has witnessed the progressive development of a commercial dimension in both rural and urban areas.

Many of the rural harvesters return to their villages with their bundles of rattan stems, where they are later processed or made into items for sale. Before processors can utilise the canes, they are dried in the sun or in kilns to reduce the moisture content and to ward off insect attack and staining by fungi. The canes are fashioned into various products and are sometimes varnished prior to sale to give them a shiny and attractive appearance and to ward off termites and other insects. The inner part of the flexible stem is used for making furniture and weaving baskets. The larger diameter canes, from *Laccosperma secundiflorum* and *L. robustum* are used to form frames, while the smaller diameter ones, from *Eremospatha macrocarpa*, are often split and used for weaving around the framework (Defo, 2004). Villagers and farmers manufacture rattan products as a sideline activity, but in urban areas rattan artisans work full time, often in small street side workshops.

The city of Yaounde is the center of commercial activities in all rattan produced and processed in this region. There are 120 processing units manned by 272 direct workers (proprietors, employees, pieceworkers, apprentices and family help or assistance) (Defo, 2004). The increase in the number of craftsmen joining the trade in rattan products was triggered by the economic recession and its corollary unemployment. For instance, the number of basket makers increased by 44% following the recession (Defo, 2004). The processing of rattan in Yaounde takes place in microstructures with the following general characteristics:

1. The average workforce per processing unit is 2.3 persons.
2. The working capital and the average cost of equipment are US\$83 and US\$66, respectively.
3. The tools used are simple, manual, rudimentary and limited to hammer, knife, measuring tapes, gas for burning, brushes and metal saw.
4. The infrastructure is not enviable. About 44% of rattan processors work in the open and 40% in sheds or verandas. Over 50% of processing units operate in homes of craftsmen.

These characteristics are typical of an under-developed processing sector with processing simplified to three discrete stages: 1) preparation of material, during which the craftsmen scrape, dry, measure, cut, split and arch the rattan; 2) assembly or setting, which comprises forming the basic framework, weaving and/or veneering and padding; and 3) finishing, during which the craftsmen attach the blades, decorate and coat with varnish or paint (Defo, 2004). This results in a number of consumer products (baskets, trays, armchairs, tables, shelves, flower pots, hats, etc.) that are generally traded locally, with little export because of competition with exogenous models from South East Asia that are more refined because of higher level of technology employed in the finishing of products.

2.4.4 Marketing of rattan

Global trade and subsistence value of rattan and its products is now estimated at US\$ 6.5 billion (Catriona, 1997). In Central Africa, the value of African rattan trade in three urban markets (Douala and Yaounde, Cameroon; and Kinshasa, DRC) was estimated at close to US\$ 290,000 in the year 2001 (Sunderland, 2001).

Rattan is marketed either in the raw state to processors or as processed products to consumers. In cases where harvesters cannot process their rattan, they carry them directly to roadsides and transport by car or truck to the urban rattan market in Yaounde. Here, the harvesters sell their cane directly to processors, receiving around US\$ 0.22 m⁻¹ of *Laccosperma* spp. and US\$ 0.03 m⁻¹ of *Eremospatha* sp. (Defo, 2004).

Nowadays, the marketing of finished rattan products by craftsmen is generally a short chain. Products are sold directly to consumers - to other villagers or passers-by in rural areas, or to city dwellers in the urban markets. As a result, middlemen are quite scarce. The market prices range from around US\$ 0.36 for a small basket to US\$ 380 for a higher dining set (Defo, 2004). Nearly all the products are sold on the domestic market, with only a very small quantity going for export. The export market remains largely unexplored but has a lot of potential given the international demand for rattan products. One of the issues to be addressed though is that the quality of the African end products is not as good as those produced in South-East Asia (Defo, 2004). However, as far back as the colonial period, the export industry was not restricted to raw canes because significant trade in rattan products existed. For example, Cameroon and Gabon supplied France and its colonies. In 1928, Cameroon exported finished cane furniture to Senegal for the expatriate community there (Hedin, 1929; cited by Sunderland, 2002).

2.4.5 Socio-economics role of rattan

In the rattan production villages of the Yaounde region, rattan is of economic, social and cultural importance, ranking second only after agriculture in village production systems. The proportion of households involved in rattan production system is 35% and about 42% of the global household income comes from this activity. Involved households make up to US\$276 from rattan as against US\$ 174 from cocoa production and US\$ 202 from food crops production. Overall, households involved in rattan production system make an average income of US\$822 against US\$655 for those not involved and US\$ 704 for all categories of households. Harvesters can earn around US\$ 288 per year, while rural craftsmen can earn around US\$ 376 (*Defo, 2004*).

Across West and Central Africa the story is similar for all rattan producers and processors. For example, in Ghana, thousands of minor and major players earn valuable income from harvesting, processing or trading rattan. The major rural rattan collectors generally carry out their harvesting around other farming activities, earning up to US\$ 350 per year. The major urban rattan processors tend to be involved on a more full time basis, and good operators can potentially earn more than US\$ 800 per year (*Adu-Anning, 2004*). In comparison with other forms of natural resource utilisation the rattan sector is highly profitable and it requires little capital investment and therefore the monthly profit margins are relatively high (between US\$27-200 in Rio Muni) (*Sunderland et al., 2004*). Moreover, rattan harvesting and processing can form an important economic safety net for young men in situations of economic recession. For example, 44% of craftsmen became rattan basket makers in Yaounde after the Cameroon economy went into recession resulting in an increase in unemployment levels (*Defo, 2004*).

2.4.6 Institutional issues

Since the colonial administration, all forest lands and resources thereon belong to the state while local populations are only allowed traditional user rights (usufruct rights). This provision has been enacted in various ordinances, laws and decrees produced by the Cameroon government over the years. Improvements to these regulations were made with the introduction of the 1994 Forestry Law and its decree of application in August 1995. By this law, the exploitation of any NWFP requires that the exploiters obtain an approval and a permit. With these, the exploiter is supposed to pay a fee of US\$ 0.018 kg⁻¹ to the public treasury and also establish a waybill for the conveyance of the product. The question that remains to be answered is whether this fee is equitable and economically feasible, and whether such a fee should be applied bluntly across all categories of NWFPs, i.e. those traded locally, regionally or internationally.

At the level of markets, unprocessed rattan and its by-products are supposed to be sold after having paid a tax to the local council where the business is done. The amount depends on the turnover. According the fiscal provisions in force, the rattan craftsmen are classified under the global tax scheme of US\$ 28.25 to US\$ 141.24 per year according to the size of processing units (*Defo, 2004*). These taxes are paid to the central treasury.

With regard to product development, the Cameroon government has recognised the promotion of NWFPs as a means to fight poverty in rural areas and to generate revenue for the national economy. This was institutionalised with the creation of the Directorate for the promotion and transformation of forest resources in the Ministry of Environment and Forestry (MINEF) in 1998. Two sub-departments were created, one for the promotion and transformation of NWFPs and the other for wood products. Despite this effort, there is no strategy, policy or action at the local level to promote the development of NWFPs such as rattan. The government has not yet put in place any subsidy or micro-finance scheme to catalyse investment in the development of small-scale cottage industries based on rattan or other NWFPs.

However, government actions, although of limited impact on the rattan industry, have been on the organisation of annual contests for craftsmen, the financing of the Cameroonian Institute of 'Enfance Batemba', where craftsmen are trained and the support for some penitentiary establishments with some activities on rattan basketwork (*Defo, 2004*).

2.4.7 Opportunities

- Little capital is needed to start up a rattan cottage industry, meaning that little investment would suffice at national level to boost the rattan industry in Cameroon.
- There is still ample supply of raw material from the wild and cultivation can supplement existing supplies.

- Rattan canes are flexible, long lasting and suitable for making many items, meaning that a wide range of markets can be explored.
- Strengthening producers' and processors' associations could assist by fostering unity and good relations among members, controlling raw material prices, exchanging knowledge on marketing channels, capturing donor financial support, regulating and encouraging sustainable harvesting practices to protect existing wild stocks, and promoting rattan cultivation and plantations.
- The improvement of processing technologies in drying and oil-curing of rattan products, as is done in Malaysia, may form a major development strategy for the rattan sector in Cameroon.

2.4.8 Constraints

- Extraction output is low as 28% to 44% of the length is abandoned on the branches or are entangled in the canopy (*Defo, 1998*). Harvesting of rattan is destructive and high rates of extraction from clusters impede development of suckers by clones or vegetative regeneration. This may hamper the sustainable supply of rattan from natural stands.
- Poor infrastructures and the continuous use of rudimentary tools results in poor finishing of products to meet the appeal of international markets.
- Producers and processors are poorly organised with weak horizontal linkages. Self-financing remains the only source of funding of rattan producers; perhaps because of poor credit worthiness of individuals.
- Weak institutions lead to inadequate policy and regulatory measures and open access lead to unsustainable harvesting practices. Resource shortage within working distances has increased transportation cost by 10-25%. There is an increase in harassment from public service workers with the enactment of the finance law.

2.4.9 Outlook for rattan processing and marketing in Cameroon

Rattan-related harvesting, processing and marketing activities have witnessed a significant increase in the last 10 years, which coincides with the period of economic deterioration in Cameroon. Rattan products are increasingly becoming fashionable in towns and cities as well as internationally. In addition, the rising cost of timber has also boosted demand for cane as a less expensive alternative. Therefore, the rattan market has the potential to grow and provide a continuous source of revenue for participants. However, the growing market may promote uncontrolled harvesting and a combination of deforestation, excessive timber logging, and over-exploitation may greatly reduce rattan populations. Moreover, current harvesting techniques are inefficient, wasteful and detrimental to regeneration. This may hamper future supplies of raw materials if the trend is not controlled and artificial regeneration in plantations introduced to supplement wild stocks, as is the case in Southeast Asia.

What future does rattan hold for Cameroon? Their current production, processing, utilisation and trade are poorly understood, albeit relevant to many rural economies. However, during the colonial period, there was a significant trade in rattan and its products in Africa. In particular, Cameroon and Gabon supplied France and its colonies. In 1926, Cameroon exported 100 tonnes of raw rattan to France, valued at US\$50,000 and in 1928, US\$50,000 worth of finished cane furniture was exported from Cameroon to Senegal for the expatriate community there (*Hedin, 1929*; cited in *Sunderland, 2001*). Promising avenues for the Central African rattan industry lie in innovations in processing that can add value and durability to its final products as it is being done in Malaysia. Also, if rattan products are to enter international markets and compete with those from Asia, a lot needs to be done in the areas of organisation, training and infrastructure. Some suggestions for improving the rattan industry in Cameroon are sustainable harvesting of wild stocks, plantation establishment, increase availability of affordable sources of capital and standardization of quality grading rules (*Defo, 2004*).

2.4.10 Lessons learnt

As a result of the absence of intermediaries, most of the market price of rattan products is captured by producers. However, this seems to limit the scope of the markets to the local level, especially where the local producers are poorly organised. Intermediaries seem to have a better knowledge of regional and international markets than the local people, which enable them to exploit markets out of the region of production.

2.5 Processing and marketing of Marula products in Southern Africa

2.5.1 Background

Despite the importance of indigenous fruit trees as sources of food and income for many rural communities in Africa, their development, commercialisation and domestication have generally suffered from lack of adequate attention. The implication has been a wholesome reliance on introduced tree species like mangos for fruit needs (*CP-Wild Consortum, 2004*). One of these indigenous fruit trees in Southern Africa is Marula, *Sclerocarya birrea* A. Rich (Hochst). The Marula tree grows on open savannah grasslands across Southern Africa, in Namibia, South Africa, Botswana, Swaziland, Mozambique and Zimbabwe. It bears huge amounts of juicy fruits, providing a vital source of nutrients to people in the form of fruit, juice, jam, flavourings, caterpillars and other benefits such as medicines, shade, fuelwood and wood for handicrafts (*Sullivan, 2004*). Marula is a multipurpose indigenous tree and fruit in woodland areas, with a potential for diversification of products for a variety of markets. Some of these products include: Marula oil, Marula beer, amarula cream, Marula bark for medicinal purposes, fresh Marula fruit and juice, Marula jams, Marula dried fruit skins to drink as a substitute for coffee, roasted seeds, cosmetic creams, etc (*Brain, ud*). The versatile nature of Marula tree products offers it the potential for commercial processing and product development for evolving markets.

2.5.2 Production of Marula fruits

Although the Marula tree has multiple uses, the main ones relate to the fruit (*Sullivan, 2004*). Marula is raised from seeds but propagation may also be achieved through cuttings. Marula trees are commonly selectively retained when farmers clear the land for agriculture. These trees make up the bulk of trees left standing on many rural farms in production areas. The trees can be coppiced, regenerating rapidly and normally farmers plant it closer together and trim it at the top and sides. Generally, Marula is a fast-growing plant and fairly drought-resistant, reaching 3.5 m in 8 years on the 600 mm mean annual rainfall isohyet. Flowering takes place in the dry season when the trees are leafless. The fruit is abscised when ripening commences so that final ripening takes place on the ground. Estimates of seasonal fruit crops from individual trees in southern Africa have been made assuming a mean fruit fresh weight of 18 g. Values per tree range from 315 kg (17,500 fruits) to 1650 kg (91,500 fruits). This implies that the Marula tree is a high producer of fruits that may translate to sustainable supply of raw materials.

2.5.3 Processing of some Marula products

Processing of marula has traditionally been a household activity, primarily carried out by women for domestic use. While this is still very important, the use of marula as an income is important for many households. At a more commercial level, processing begins with fruit collection, which is also mostly done by women, collecting from wild trees. The next stage is the removal of the pulp from the skin, and the nut from the pulp, and finally the kernels from the nuts. In most cases, all of this is done by hand.

Pure Marula juice can be effectively extracted by hand. Machines can be used at this stage of the processing, but the resulting pulp is made up of the skin and flesh together. Pulp is then immediately packed and frozen for use at a later date, with no loss in nutritional values of fruits. The most common method of concentration is the application of heat at reduced pressures to remove water by evaporation. Many equipment types are used to achieve this with different designs aimed at preservation of quality and economy of operation. Recent advances in equipment design and possible future developments are available in literature. Marula fruit pulp contains five times more valuable vitamin C than oranges (*SIDA, 1994*) and poor people consume the fresh fruits to prevent common colds. Consumer preference, ease of transport and preservation of quality have encouraged the production of fruit juice concentrates (*Addison, 1986*).

Marula oil is normally extracted from the nuts by cold pressing. The nuts are locally prepared in quantities of 0.5 kg and more (*Hailwa, 1998*). They are put in the mortar then stamped with pestles and then squeezed several times until a considerable amount of oil is separated from the residue. The oil has numerous traditional food uses, important ethno-medicinal and cosmetic applications (*Houghton, 1999; Zharare and Dhlamini, 2000*). Local markets are available for these purposes (*Grain, ud*). Crude marula oil has exceptional resistance to oxidative rancidity (*Lombard, 2002*). In recent years, Marula oil has undergone a process of research and development and other

investigations. The use of marula oil confers to personal care products, moisturising features, protection against transepidermal water loss, and improvement in skin smoothness (*Houghton, 1999*) and uniqueness.

Other functional features of Marula oil, related to the presence of antioxidants are under research and development. Members of the Southern African Marula Oil Producers' Network now produce oil commercially. Production is done in Botswana, Namibia, South Africa and Zimbabwe. Crude oil is standard refined for cosmetic application in England by Statfold Seed Oils (*Lombard, 2002*). Marula edible seed oil is rich in nutritious proteins and minerals and contains active anti-oxidants with high heat resistance and stability. The oil contains up to 28% protein and some iodine and compares favourably with extra virgin olive oil. Marula essential oil, with its delicious and unique flavour, is an effective skin conditioner as its cosmetic and anti-oxidant properties soften, soothe and re-hydrate the skin. The oil from the big nuts is used for cooking, skin moisturiser, medicine and insecticide (*SIDA, 1994*).

The Natural Wild Fruit Cream Liqueur (Amarula Cream) is another important product from the ripe fruits of Marula trees. The wine comes about when the juice is squeezed out of the Marula fruits. The Marula flesh is then fermented or brewed under conditions similar to winemaking. After fermentation, the Marula wine is distilled in copper pot-stills. The young liqueur is then matured in small casks of oak for approximately two years and enriched with pure Marula extract - obtained through a special process that captures the unique flavours in a concentrated form. The final step in the creation of Amarula Cream is blending of the liqueur with the finest, fresh cream until a smooth consistency is formed. The creaming process is of the highest standard, resulting in a cream product that is completely stable, rich and soft. The final product has an alcohol content of 15-17% alcohol by volume (*Hailwa, 1998*). So far, extraction of marula wine has been only a woman's job. CRIAA SA-DC Marula Oil Production Project (1998) developed a press to process Marula oil, which easily extracts the juice from fresh fruits, being at least twice as quick and with nearly twice the yield as the traditional method (*Hailwa, 1998*).

2.5.4 Marketing of Marula products

Marula products have local, regional and international market outlets. At the local level, people buy Marula wines, beers and oils to meet traditional needs such as during wedding feasts (*Hailwa, 1998*). In Namibia, Marula is a valuable tree species because it makes the most popular beer in the northwestern regions. In the past, this beer was made only for personal consumption. However, it is a high value product at the street markets where a 750 ml bottle is priced N\$5.00 (*CRIAA SA-DC, 1998*). The alcohol content of the beer is equal to canned beer and is prepared from fresh fruit (*Roodt, 1988*).

In 1997, about 3500 kg of kernels were collected and sold at N\$ 12.00 per kg. For this reason, a Trial Marula Oil Production Project came up with an oil-processing tool known as prototype 2 press. The press is robust and made principally from scrap metal and has an excellent chance of performing well in rural setting (*CRIAA SA-DC, 1998*). Oil is sold at around N\$ 100 per litre (*Hailwa, 1998*). This is exported to Europe for pharmaceutical purposes. The trial Marula oil project shows that interest in Marula oil from commercial parties is as strong as ever, and negotiations with premier potential buyers show that the project is on the verge of an important commercial breakthrough (*Hailwa, 1998*).

In Namibia, the economic role of Marula products is enormous as these products are available everywhere in open (informal) markets. Marula wine is now sold between N\$5 to N\$10 per litre. In African restaurants in Windhoek, Marula wine is one of the products preferred by many people. The price of Marula wine at these restaurants is N\$15 per litre. With regard to kernels, there are over 1000 women from nine cooperatives in northern Namibia involved in oil production. It has been noticed that, to a great extent, these women do manage themselves showing that there is good scope for a large and effective economic operation in the near future (*Hailwa, 1998*). The role of the middleman has been eliminated by the women cooperatives.

2.5.5 Socio-economic importance of Marula products in Southern Africa

In Southern Africa, the Marula tree and its products are important socio-economic resources for numerous health, income and nutritional benefits. When fruits are matured, they fall to the ground and are collected, mainly by women and children. One of the marvels of the Marula tree is that its fruits fall when they are ready for consumption. This makes harvesting possible for everyone, and provides a truly open access food source. Children eat them on their way to school, and old women of the community can earn a little money independently by collecting from this windfall. This ease of harvesting is an important quality, as it means that there is no desire to cut down the tree for its fruits, a fate sadly experienced by other fruiting trees in many parts of the world. Coinciding

with the start of the school year, the trade of Marula beer provides important family income (US\$30-80 per season) in Namibia. This is a significant sum in a region where the minimum wage is US\$1 per day (Sullivan, 2004).

Over 2500 women in 42 villages in the Limpopo Province of South Africa have been empowered with business and marketing skills in the IUCN project "There is Another Way that Works". What started as an empowerment initiative in 1995 by the IUCN Regional Office for Southern Africa (IUCNROSA) in partnership with local women is now a commercial enterprise (IUCNROSA, 2002). The business has already sold three tons of oil and ten tons of pulp to local and international markets, with domestic and international sales of US\$ 1.2 million anticipated in 2005. The business has therefore broken into the highly competitive beauty industry and has gained a competitive position. Success comes from the principles of Fair Trade, applied by the Marula Natural Products Pty Ltd that buys fruits from the surrounding communities at a fair, community-negotiated price. The communities are involved throughout the procurement of raw materials through processing of products, including pulp and kernel extraction as well as oil pressing. The project produces completely natural, high-quality oil that has been well received in the cosmetics industry. The vision of IUCN is to profile these eight entrepreneurs in the hope of showing the world that there is indeed another way that works when it comes to sustainable development (IUCNROSA, 2002). Marula Natural Products use no artificial farming methods, no pesticides and no artificial additives.

The Commercial Project from the Wild (CP-Wild) project in South Africa in partnership with Mhala Development Centre and small-scale farming communities have helped to provide the latter with an income-generating package consisting of indigenous fruit trees and the knowledge of fruit processing. Through the project's involvement, it has become possible for this NGO to supply quality Marula pulp to commercial fruit juice processors. Mirma Products has benefited from the project by already receiving orders for 2000 tons of Marula pulp from fruit juice processors. This would make it possible to employ many more people than the 5000 they are currently employing to collect Marula from the veld (CP-Wild, 2004). Therefore, the project has directly impacted on the lives of many rural people giving them a possibility to establish small-scale cottage industries. A number of new products were developed and it is likely to be the start of a continuous product development process. These products have not been patented as they are not new products. They are just different forms of existing products that are neatly repackaged to meet consumers' required standard of hygiene and quality.

2.5.6 Institutional issues

Apart from national policy strategies, there are strong regional initiatives in Southern Africa involved in the promotion of natural products, with efforts that may be considered to surpass those of individual governments. In recent years, a number of community development projects in Botswana, Zimbabwe, Namibia and South Africa have begun harvesting and pressing oil from the Marula nut. Some of these include:

The Southern Alliance for Indigenous Resources (SAFIRE). This is a Zimbabwean NGO that has been operational in Zimbabwe since 1994. Its main focus is on improving rural livelihoods through the improved management and utilisation of the natural resource base. Despite its geographical location and its national focus, SAFIRE also collaborates with many regional partners resulting in its regional influence. Its vision is to be a regional leader and service provider of first choice in benefit driven sustainable natural resources management by rural communities. Its mission is to facilitate the development and application of innovative approaches to diversify and improve rural livelihoods based on the utilisation, commercialisation and sustainable management of natural resources.

SAFIRE provides technical support services to communities, community-based organisations (CBOs), local government authorities, central government agencies, partner NGOs, regional and international organisations and bilateral and multilateral funding agencies (SAFIRE, 2004). Important to this paper is its role in supporting natural products development and marketing as well as supports to the development of small and medium-scale enterprises that are based on natural products. This is achieved through business training, natural product research and development, market research and development, marketing information systems and micro-credit financing.

The high diversity of natural resources found within Zimbabwe's communal lands and the equally diverse rural livelihood activities suggests that there is a range of opportunities that can be derived from their management and utilisation. Foods, beverages, fuels, construction materials, medicines, household implements and crafts are a few of the forest products that communities already derive from the forests. SAFIRE is one of a few environmental NGOs in Southern Africa that has made successful attempts to commercialise some of these livelihood activities including community based natural resources management as a key activity in the development of the enterprises.

Managing our Indigenous Tree Inheritance (MITI): This was one of SAFIRE's major five year programmes (1997-2001) funded by DANIDA and the Netherlands. This programme was aimed at providing support in the rehabilitation of the natural resource base in communal areas adjacent to the refugee camps. The MITI project, concentrating on woodland resources and operating in the former refugee camp districts, now has a much wider scope covering needs such as enterprise development, institutional development and training. MITI is being implemented in collaboration with five Rural District Councils in Eastern Zimbabwe and with the Commercial Bank of Zimbabwe (CBZ).

The goal of MITI is to achieve economic development of communal areas based on sustainable productive use of natural resources, with a focus on woodlands and trees. The benefits of MITI have extended to several thousand rural people in over a hundred different communities, and its secondary impacts have been felt in the development and evolution of CBNRM across the region (*SAFIRE, 2004*). A total of 30 natural resource based enterprises were researched and 25 of them are at various stages of implementation, directly involving 3000 people. It was estimated that the net worth of the 25 enterprises translated into approximately US\$600,000 per year. Research involved studies on marketing, pricing, product development and resource base off take levels. For 11 of the 25 enterprises, the off-take from the natural resource base had been quantified and was being actively monitored. 98 villages participating in 25 different enterprise groups successfully set up village resource management plans with the support of grant funding from the RDC.

Southern African Natural Products Trade Association (SANProTA) is a trade association whose main objective is to build a viable and enduring natural products industry in the region based on resources accessible to poor rural people. It is currently operational in Botswana, Malawi, Namibia, Zambia and Zimbabwe (*SANProTA, 2002*).

SANProTa is very active in research and development (R&D) with a budget of US\$40,000 earmarked to bring some products into the market in the first half of 2003 with a rise to US\$ 180,000 in 2004. In response to technical training needs, SANProTA carries out training workshops on the production, processing and marketing of key NWFPs, such as Marula and baobab. To facilitate participation of people from all groups, SANProTA covers all tuition and course materials as well as accommodation and living expenses in Harare. The only cost incurred by participants is their own travel costs, although a limited number of travel assistance grants are also available.

Another important activity of SANProTA is that it is very active in signing win-win partnerships with international partners interested in natural products. For example, in 2003 SANProTA signed a preliminary partnership agreement with the French company, Aldivia S.A., to collaboratively develop and market a range of natural oils from southern Africa. This partnership and its oils were promoted at In-Cosmetics Trade Show held in Paris April 2004. Aldivia is a specialist lipids company working with the cosmetic industry worldwide. Such partnerships are seen as strategies that are likely to lead to value-added trade opportunities for members. SANProTA also exhibits its products at natural products trade Expos. For example, it was present at the Natural Products Expo Europe in June 2003 and the Natural Products Expo West in March 2004. The March show attracted over 31,000 manufacturers, retailers and media from over 80 countries, showing a record interest in the ever growing \$36 billion natural products industry. For manufacturers, suppliers and buyers in the natural products industry, the opportunities in the global marketplace have never been greater. SANProTA takes advantage of this potential for its members by presenting their products to attract the international market.

The Kgetsi Ya Tsie Women's Community Trust (KYT) is an African Development Foundation (ADF) grantee working to provide women in rural communities across Botswana's Tswapong Hills with local income opportunities through the harvesting and processing of local natural products – from oils and soaps, to natural herbs and jams. Laboratory tests conducted at the University of Botswana have confirmed that its Marula oil is of the highest quality, arguably the highest in the world. KYT is producing and marketing Marula oil and soap to natural products distributors in southern Africa and, through Phytotrade Africa, to cosmetic manufacturers and natural cooking oil producers in Europe and North America. KYT purchases its Marula nuts from its women members, who receive about 75 percent of the sales revenue from most of the trust's product lines. All of KYT's oil is hand-pressed at its Lerala facility. Spread across 25 villages in the Tswapong Hills, the over 1100 women are harvesting and marketing a range of natural resource products. Working within the Trust, they are harnessing traditional, indigenous knowledge to the demands of the international marketplace. Supported by a revolving loan fund to provide capital for equipment and supplies, they are generating an income to support their families. The vast majority of the price paid goes directly to the primary producers. A small percentage is retained by the Trust to cover essential marketing costs (*Pearce, ud*).

2.5.7 Financing the development of Marula products

The networks of national and regional initiatives in Southern Africa have been able to mobilise financial resources for the development of Marula products in rural areas across the region. This is contrary to the self-financing scenario experienced in the processing and development of most NWFPs in Africa. A typical example to show the need for micro-finance support is offered by *Sibanda (2002)* in the dry parts of Zimbabwe's marginal region of Rushinga that saw the development and implementation of a Marula oil enterprise. According to Sibanda, this financial support was driven by the need to improve productivity and promote sustainability in natural resource management, for greater economic gain and responsibility at the local level. This is a typical goal for NWFPs development and poverty alleviation in Africa. The next few lines summarise the structure of such a financial support as was presented during the Johannesburg Conference on Sustainable Development in August 2002.

Financial support was provided to the Batanai group in Rushinga of Zimbabwe. This community was involved in both the commercial extraction of Marula oil as well as the management of the resource base. SAFIRE and the MITI were the implementing agencies for the financial support. SAFIRE's approach to enterprise development is participatory, which enables communities to identify their resources and plan their own business initiatives. In this regard, SAFIRE facilitated the establishment of two funds available to the five rural district councils (RDCs). These funds are the district environmental grant fund (DEF) and district environmental loan guarantee fund (DELGF) managed under the auspices of the MITI programme to support micro-enterprises in five districts including Rushinga. These were accessible to all rural residents of the district and supported enterprises that derived raw materials from the environment.

This was facilitated by the Commercial Bank of Zimbabwe (CBZ), which operates community banking. However, the RDCs were not the sole signatories to the funds for accountability reasons. The DEF was a grant fund that supported rehabilitation activities or conservation work in the district. An equivalent amount of US\$200,000 was disbursed. Loans for enterprise development were granted through a collateral fund, the DELGF. A total collateral (as a revolving fund) equivalent to US\$50,000 was made available to NRBEs. Funds were deposited with the bank and potential entrepreneurs were granted loans through their respective RDCs. The establishment of the fund paved way for financial access by these communities as the bank requirement for sufficient collateral to be granted loans was covered by the RDCs. Ultimately, a culture of banking with rural communities was enhanced.

2.5.8 Accessing the funds

In each district, a natural resource committee (NRC) approved proposals for the enterprises prior to handing them for final approval at district level. Any community member was eligible to access the funds, either as individuals or in a group. The NRC ensured that the proposal complied with the criteria for funding, which included availability of the resource base and financial viability of enterprise. In the case of the Batanai Group, the financial viability was judged from the cashflow of its business plan showing an internal rate of return (IRR) of 265%, a net present value (NPV) in excess of US\$80,000 and a net benefit cost (NBC) ratio of 1.98. The return on assets (ROA) increases throughout the first three fiscal years of operations from a minimum -0.17 in the first year to a maximum 0.74 in year 3. The fixed asset turnover ratio increases throughout the four-year planning period from 0.29 to 29.4. Other requirements included general consensus of the community and its leaders to allow the potential entrepreneur to operate the business and extract resources from the area as well as institutionalising a management strategy that supports plough back to the community and sustainable harvesting of the resource.

Resource status and sustainable quantities were determined through participatory resource assessments with district team members and SAFIRE staff. This was particularly useful for all the enterprises. An indication of the availability of the resource in a particular area, a resource enough to sustain the proposed enterprise on the long term was therefore established.

After the NRC approved the proposal, it would then be submitted to the full council for final approval for funding to the bank. However, the council meeting might grant full or phased funding, i.e. at their discretion. The bank would then release funds accordingly. Batanai group received an equivalent start up capital of US\$ 3665. A subsidy was initiated on the interest rates whereby the loans were valued at 25% interest rate, which was 19% lower than the bank rate. This implies that the financing of these entrepreneurs was based on cheaper funds although they were being administered by the commercial banks. Oil pressing machines were acquired using these funds. Training was also received from SAFIRE's product development team on processing, quality control, record keeping and marketing of the oil. A grace period of 2 months was granted to the enterprises before which repayments of loans were effected.

Although implementation was not regular, loan tracking was built in the monitoring system and with the assistance of the district team members, who comprised government and non-governmental agencies in the district, helped in the development of a participatory monitoring system. The system comprised of monitoring both the resource extraction as well as the business cash flows. The repayment rate on loan was 100% due to the high income realised from oil sales. Production levels for the Batanai group averaged 160 kg of Marula oil (an equivalent of US\$6176 at US\$38.60 per kg) per month. Overhead costs for the enterprise was at 27% the value of products, making a very viable business. Raw materials are purchased from local communities who directly harvest from the environment under supervision by local NRCs. This ensures equitable contribution of community members in participating in the enterprise (*Sibanda, 2002*).

2.5.9 Opportunities for Marula product and market development in Southern Africa

- There is high national and regional demand for Marula products by primary consumers leading to a high level of local utilisation.
- Marula yields diverse products with potentials for market development. For example, growing importance in the cosmetic industry.
- Local and/or foreign companies are increasingly getting involved in processing Marula products
- Regional and international markets for Marula products are growing rapidly, probably associated with the global trend of increasing interest in natural products.
- High level of research and development by companies, national and regional organisations on developing new products from Marula trees.
- Harvesting of Marula fruits is non-destructive to the resource base, which means that enterprises can have good knowledge on the supply side. Marula tree species are very productive.
- Presence of assistance to entrepreneurs willing to commercialise new products.

2.5.10 Constraints

- One of the biggest constraints is the seasonal availability of fruits. The small-scale farmers will have to wait for two additional years before their fruit trees come to production.
- No current legislation on Marula products that will protect their intellectual properties and prevent larger companies coming in and doing things faster (*Njoni, 2004*).
- Most NGO activities are localised and there is limited funding to decentralise important activities to involve more communities.

2.5.11 Outlook

Currently, there are millions of Marula trees in Southern Africa, and humans currently use a very small proportion of the fruits from these. There is continuing traditional importance of Marula and it provides reasonable income to those families who turn it into an enterprise. The success of enterprises based on natural products is directly related to product development and innovation. Marula has greater potential for product development in Southern Africa than any other natural product. For example, consumer testing and selection was conducted to come out with the most viable marketable products using 25 products developed from four fruiting species in Southern Africa. Three out of the six products finally selected for future commercialisation were from Marula. These included Marula nectar, Marula jam and Marula yoghurt flavouring (*CP-Wild, 2004*). It is necessary to formalise the extraction of marula wine and expand the mechanical extraction of oil from marula kernels. This will add more value to the tree and will enable many people to protect and increase the number trees (*Hailwa, 1998*).

More research is needed into fruit storage procedures and the use of kernel material as a commercial by-product of fruit processing. The commercial exploitation of the marula may require a selection and breeding programme so as to develop the best cultivar for profitable processing. The response of potential consumers of all cultural groups in the market area must be evaluated for sound investment in processing to be undertaken.

In order to ensure that all of these local values are maintained, land tenure rights and resource management systems must be strengthened. Where long-term species selection or methods of processing can be linked to traditional knowledge bases, it will be important to ensure that benefits can be shared along the market chains. Respect for traditional, non-monetary values are vitally important if the full benefits from monetary markets are to be reaped. In the past, these social and ecological values have often been neglected in resource management decisions, but perhaps highlighting both these and the monetary values of the Marula tree can reverse this trend.

By developing effective policies for equitable and sustainable use, we can be confident that the great Marula tree will continue to be a familiar feature in the landscape of southern Africa, continuing to provide food security, income streams and other benefits to both local communities and future generations. Future research should focus on the institutional structures that can assist small-scale ventures to function sustainably and the duplication of the same in other regions of the sub-continent (*Sullivan, 2004*).

2.5.12 Lessons learnt

Business development approach matters: Instead of focussing on the development of a single product it is better to develop business approaches that can be employed at grass roots level for economic development. Efforts should not be geared at developing brand new products but rather at repackaging and redesigning existing products and knowledge into a more business orientated approach (*CP-Wild, 2004*).

Regional sharing of information is important: The regional approach to the development of Marula products is helping in the exchange of ideas to develop several products for regional and international markets and business ventures. Examples of business ventures include: trader corporations, small-scale women entrepreneurs and ventures with Marula pulp manufacturers.

High quality products are the cornerstone of increasing consumer demand: Markets expect a more commercial and professional looking product with high quality standards. Most people at grassroots level can indeed produce products that would satisfy a more commercial market and, in the process, a number of organised business entities could be established. This would require enough resources being allocated for the activities, getting them organised and giving them the necessary training and incentives.

Start up capital is a major instrument for product development at local levels: Micro finance support at subsidised rates to poor rural communities can go a long way in promoting natural resource based enterprises. Business relationships with financial providers build rapport and create market niches for the banks (loans) – provision of collateral to the rural poor.

3.0 SYNTHESIS OF LESSONS LEARNT

3.1 Overview

NWFPs provide a livelihood support system for forest communities in terms of food, medicines, income and employment. However, most forest communities remain poor, struggling to make a living rather than improving their status. This trend raises concern whether NWFPs constitute a “poverty trap”, a safety net or a real resource for rural development and poverty alleviation. The answer is not straightforward because the NWFPP sector is influenced by several factors, including the varying nature of the products, and a number of economic, institutional, political and technological factors that are not easily discernible.

On the economic side, markets are usually fragmented and dispersed, knowledge and information systems are often poorly developed and financial opportunities for investment often limited. The dispersed markets imply many suppliers that are poorly informed on markets prices of products, or, where informed, have poor access to these markets due to poor infrastructures and high costs of transportation. In the light of these shortcomings, a three-tier market structure (*Pswarayi-Riddihough and Jones, 1995*) often evolves for different NWFPPs with varying characteristics and pitfalls that are worth mentioning. These include: marketing by individual local producers, marketing through middlemen and marketing by village/community groups or associations.

3.1.1 Marketing individually

Local producers marketing their products individually represent weak competition with meagre resources. This limits the bargaining power in the market, which is further weakened by a poor financial position and inability to keep up with rapid changes in market conditions. The small size of their sales makes it difficult for them to sell to companies interested in bulk purchases and steady supplies. Individual local producers are generally unaware of the most profitable markets for their produce, and such ignorance is compounded by inadequate information on market conditions and prices. For example, in Cameroon, a harvester of *Prunus africana* earn an average of US\$ 0.4 kg⁻¹ but this price could increase to US\$ 1-2 kg⁻¹ if the middleman is cut off the market chain (Ndam and Tonye, 2004). In Namibia, harvesters of devil's claw receive US\$ 0.50 kg⁻¹, middlemen US\$ 1.8 kg⁻¹ and exporters US\$3.2 kg⁻¹ (Wynberg, 2004; Cole, 2003). In contrast, rattan producers in the Yaounde region who sell their products directly in the city of Yaounde get 75% of retail price (Defo, 2004).

3.1.2 Marketing through a middleman

Middlemen have maintained a stronghold on the market scene because they are able to provide farmers with resources essential to their work, quick credit, collection and transport of products, non-bureaucratic and quick payment for goods. They remain essential for commodities that require time, storage, space and energy inputs, for example, for products that must be dried, stored, transported, processed and packaged before distribution. In many cases these commodities are sold and bought several times, adding value at each step, before reaching the consumer. The technology and finance to perform these functions are usually beyond the reach of low-income primary producers and are left to middlemen who have the resources.

3.1.3 Marketing through village or community groups or through NGOs

Marketing by village or community groups has been seen to be more beneficial to the producers than the first two structures. For example, the 60 members of the Mapangja Prunus Harvesters Union in Cameroon get seven times higher annual income than non-members harvesting *Prunus* (Ndam and Tonye, 2004). The 1100 women involved in the Kgetsi Ya Tsie Women's Community Trust (KYT) receive about 75% of the sales revenue from products (including Marula oil) promoted by the trust. This is characterised by the fact that dispersed producers become more organised, get more information on markets of products, have stronger bargaining power with exporters or importers, take advantages of large-scale transport and marketing, have greater access to credit facilities to buy processing tools, and gain greater confidence from importers for sustainable supplies. People working together are more capable of developing business plans than individuals. This goes well with the Botswana proverb "it takes many hands to tackle life's many challenges", depicting the value of community-wide effort in achieving success in community development.

3.2 Necessary and sufficient conditions to promote processing and marketing of NWFPs.

Apart from the shortcomings and opportunities identified on the overall market structures for NWFPs, there are ten generic lessons learnt from the case studies that can be instrumental in shaping the development of processing and trade of NWFPs in Africa. These include:

1. **Organised producers of NWFPs take advantage of market opportunities, get more benefits.** When local people are organised, they can make greater income from NWFPs activities because they behave like the middleman. The case studies on *Prunus africana*, rattan, Devil's Claws and Marula clearly illustrate this.
2. **Low revenue capture at local level can lead to over-exploitation of highly commercialized species.** Most local producers of highly commercialised NWFPs in Africa often receive less than 1% of the foreign retail value of the exported end product. With such low amounts received, local producers with virtually no alternative source of income in most cases are forced to exploit larger quantities of resources in order to earn enough money to maintain their living conditions. This trend can easily degrade the resource.
3. **Quality and hygiene are major determinants of price and acceptability of NWFPs.** Markets expect a more commercial and professional looking product with high quality standards. Importers are sensitive to quality of raw material supplied with implications on prices offered. For example, the prices of different grades of Gum Arabic are associated with quality. Rattan products in West and Central Africa are not getting into international markets

because they are of lower qualities than the more competitive products from South East Asia. Therefore, the quality of NWFPs is a cornerstone for stimulating and increasing consumers' demand. However, the production of high quality products requires resources that are often lacking at the level of individual producers. Getting individuals organised and giving them the necessary training and incentives can help in circumventing this. This may enable local people to produce products that would satisfy a more commercial market.

4. *A change in attitude by developed countries is an ingredient for increased processing in the developing countries.* This is a prerequisite for the development of the NWFP sector in Africa because the current trend is that foreign monopolies are only interested in cheap raw materials for their industries as observed in the cases of Gum Arabic in Sudan and Devil's Claw in Namibia. The processing companies are located in developed economies and are often reluctant to cede or move processing technologies to raw material producing countries. This normally makes economic sense to the producing companies (political and economic stability, closer to the end markets), and a change in favour of moving technology and processing capacity to countries where the raw material supply is located is more a political than it is an economic issue.

5. *Business development approach matters.* Instead of focussing on the development of a single product it is better to develop business approaches that can be employed at grassroot level for economic development based on different products. Efforts should not be geared at developing brand new products but rather at repackaging and redesigning existing products and knowledge into a more business orientated approach. A community can add value to its products through improved marketing strategies. Diversifying the number and type of end users for each product will reduce the risk of not being able to sell one's product. There are several ways to do this. First, products can be sold on local, regional, national or international markets, or a combination of all of them. In addition, producers can sell to end users who have different uses/markets for the product themselves. For example, Marula can be used as fruit, jams comestics, wines, creams etc. Communities can differentiate their products in order to command higher prices using market strategies. Products can be labelled to differentiate them in the marketplace, e.g. organic, wild, green, natural, or socially responsible. This may require certification by a third party for to assure consumers of quality standards.

6. *Regional sharing of information is important.* A regional approach to the development of many NWFPs is often helping in the exchange of ideas to develop several products for regional and international markets and business ventures. Examples of regional business ventures and business support activities include: trader corporations, provision of credits, sales promotion and marketing, research and development, purchase and supply of inputs to local producers, etc.

7. *Start-up capital is a major instrument for product development at the local level.* Micro finance at subsidised rates to poor rural communities can go a long way in promoting natural resource based enterprises. NGOs can help to build business relationship with financial providers and create a market niche for the banks (loans) – provision of collateral to the rural poor. At the initial stage, communities often need the support of professional bodies to change informal institutions into formally registered trusts and to gain administrative and financial skills. In other words, for rural enterprises to become viable and sustainable, they have to go through the same set of steps as other businesses. Therefore, external financial and institutional directives to build rudimentary rural financial skills form a good foundation for NWFPs development at the local level. Efforts to add value locally should not be based on complete subsidies. While it may be acceptable to subsidise processing in the short term, business plans must show that the subsidies will be eliminated eventually or else such programmes could not be viable options for wider replication in the real world.

8. *Liberalising the market of NWFPs should be treated with caution to avoid over-exploitation of resource base.* Increasing commercial competition by issuing permits without putting in place adequate management regimes is not necessarily a guarantee of sustainability and better markets. The issuance of licenses should be preceded by proper management regimes, knowledge of the resource and harvesting quotas put in place to avoid abuse by overzealous individuals.

9. *Stimulating local and national demand for NWFPs will enhance product and market development.* By having a strong local demand and markets for the end products of the various NWFPs is it possible to take a lead role in further product development and manufacturing. That is, local expertise and “feeling for” the end products must be built up.

10. *The growing interest in organic products is an opportunity for NWFP development.* High quality natural products are gaining markets and there is an increasing demand for them in foods, medicines and comestics in developed countries. This trend holds true for the NWFPs described in this report. However, with the trend for green

products increasing, most industrialised countries will insist on eco-labelling of products and the respect of international quality standards as preconditions for importing the products. The signal is that to continuously gain this growing market, all NWFPs development will require that international quality and, increasingly also ethical, specifications of standards at all stages of production, processing and marketing are taken into consideration.

These lessons are not exhaustive, but from the few mentioned one would wonder what the overall issue of processing and marketing NWFPs means to local communities, national governments, regional governments, the international community, and development/donor agencies. What can be the impacts in terms of poverty alleviation and employment? Does the NWFP sector require the support currently being given by the international community in the pursuance of millennium development goals or should other resources and sectors be targeted? Should the attention and support be sustained, increased or reduced? The answers to some of these important questions may come from available socio-economic data on NWFPs mentioned in this report.

3.2.1 Socio-economic impacts of NWFPs in Africa

The socio-economic impacts of NWFPs operations are enormous and range from local, national, regional to international levels. At the local level, many examples can be cited. The harvesters of *Prunus africana* bark in the Mt Cameroon Area get about 70% of their annual cash income from the activity (Ndam, 2004). In Southern Cameroon, Fondom and Titi, Manga (2000) found an average annual household income of US\$ 2630 from the sale of *Gnetum africanum*, a leafy vegetable. Villagers adjoining the Campo Ma'an National Park in Cameroon earn a monthly income of US\$ 45 for collectors of oil palm and raphia wine, US\$ 20 for processors of odontol, US\$ 60 for manufacturers of rattan chairs and US\$ 45 for collectors of bush mango per household per season (Sonne, 2001). The local markets of NWFPs in the humid forest zone of Cameroon were estimated at US\$ 1.6 million during the first six months of 1996 (Eyebe et al., 1999). The commercial value of njansang kernels (*Ricinodendron heudelotii*) in a single market, New-Bell, Douala in Cameroon was estimated at US\$ 248,700 in 1998 and US\$ 464,235 in 1999 (Ngono and Ndoye, 2004). In Ghana, major harvesters of rattan, who generally carry out their activities during the low farming periods, are earning up to US\$ 350 per year while the major urban processors may earn an annual income of US\$ 800 (Adu-Anning, 2004).

Many examples exist to show the importance of NWFPs to national economies. In Sudan, over 13 % of the foreign exchange earned is generated from the Gum Arabic trade alone (Country Report, 2001). The forest sectors of the Republic of Benin, Mauritius and Senegal respectively make 57%, 65% and 16% of their forest revenues from NWFPs (Tieguhong, 2003). Medicinal plants contribute over 57% to the forest revenue of Madagascar (Walter, 1996). In South Africa, the annual informal trade of medicinal plants is worth US\$ 35 million to the primary producers while secondary users such as traditional healers generate some US\$ 280 million from the resale of these materials. Secondary trade in Devil's Claws generates some US\$ 7-10 million in Namibia (Le Breton, 2000).

On a regional scale, the bush mango (*Irvingia spp.*) trade to Gabon, Equatorial Guinea, Nigeria and the Central African Republic was valued at US\$ 260,000 in 1997 (Ngono and Ndoye, 2004). In the SADC, regional trade in medicinal plants is worth over US\$ 700 million. More recent estimates put this value at US\$ 1 billion, which is far and above the regional income from, say, tobacco (Le Breton, 2000).

The markets for NWFPs also have an important global economic dimension. For example, the global market for medicinal plants is said to be increasing, with a 1996 estimate valued at over US\$ 14 billion. The global retail value of *Prunus africana* products alone is estimated at about US\$ 220 million per annum (Ndam, 2004). Similar estimates are not available for most countries and products in Africa, and even where available, they do not account for values exchanged and traded at the local levels or values of NWFPs consumed by households. It seems evident, therefore, that there is some gross underestimation of the values of NWFPs to local, national, regional and international economies.

In addition to the direct contribution to the forest and household revenues of African countries, NWFPs also make great contributions to income through employment. For instance, some 450,000 traditional healers that make use of medicinal plants are found in the SADC region. In Namibia, some 15,000 people are involved in the trade of Devil's Claws (Le Breton, 2000).

Moreover, the economic potentials of some NWFPs for local income generation and poverty reduction are currently higher than from traditionally known cash crops such as cocoa and coffee in Africa. For example, the average prices of a kilogram of *Irvingia spp.* and *Ricinodendron heudelotii* in the humid forest zone of Cameroon were estimated to be more than twice the average price of the same quantity of cocoa beans between 1996 and 1999 (Ndoye and

Tieguhong, 2004). Also in the humid forest zone of Cameroon, the average monthly income to harvesters of edible palm weevil larvae is about US\$ 71 and US\$ 50 to retailers of roasted larvae sold as snacks along roadsides or in bars. Such income is significantly higher than that obtained by unskilled workers in town or by the producers of cocoa (US\$ 28) or coffee (US\$ 50) (*Dounias, 2004*). Another example can be taken from the Chivi district of Zimbabwe, where 37% of rural household cash income comes from NWFPs, while only 13% comes from arable and pastoral agriculture (*Le Breton, 2000*).

From the above few figures, many of which are underestimated, any development worker involved with the NWFPs sector may be proud to proclaim that NWFPs may have great impacts on poverty alleviation given the right institutional and resource environments. The right institutional environments may give way to better policy and legal frameworks that are important in resource allocation and investments for development in processing and marketing of NWFPs. In this light, this paper gives special attention to the types of institutions that may create an overall conducive environment for the processing and marketing of NWFPs in Africa.

3.3 Institutional issues

3.3.1 Overview of institutional issues

Many NWFPs consumed or traded as food items, medicines or fancy products are subject to restrictions and regulations on their use and commercialisation. The reasons for these controls are either economic, social, biological, political or a combination of these. Institutional issues associated with legislation, controls and restrictions manifest themselves at local, national, regional and international levels.

Due to the importance of NWFPs to local communities, many local initiatives and institutional arrangements in the form of village harvesting/marketing groups or cooperatives have been organised to ensure that the benefits from their products are maximised and equitably shared and sustained. Examples have been given in the case studies on Marula and *Prunus africana* above.

At the national level, many governments have put in place legislation and created committees and departments within ministries in charge of natural resources to cater for regulatory and policy issues governing the production, processing and trade in NWFPs. For instance, Cameroon has a separate department for the promotion of the transformation of NWFPs in the Ministry of Environment and Forestry.

Some NWFPs are of regional significance in the sense that they are produced in a number of countries within a region or across regions. In such situations, the role of national legislatures and regulations may not suffice to control trade transactions in their products. The most discernible reason is that such products would be smuggled from countries where regulations are strong to countries where regulations are weak. This scenario would lead to poor reporting on production and trade in the product and would hamper any policy (such as banning the export of raw material) geared at ensuring in-country value-addition. In recognition of this fact, many regional initiatives, such as the Devil's Claw Regional Group in Southern Africa, are in place to enhance and/or control regional research, information sharing, market studies and product development. Moreover, regional efforts have more potential of attracting the international interests of companies and development agencies/donors than is the case at individual country level. This is because the examination of regional markets provides a better focus on the most promising crops, target markets and beneficiaries.

Apart from national and regional institutional arrangements, the 1992 United Nations Conference on Environment and Development (UNCED) brought into focus (under Agenda 21, Chapter 11) the promotion and development of NWFPs through value addition, domestic processing, and promotion of small-scale forest-based enterprises for rural income and employment. Many governments are now committed to NWFP development, although most African countries do still not have the resources and capacity to carry out large-scale commercial processing of NWFPs. Many changes are taking place, the level of awareness is increasing and many international efforts are being geared to assist developing countries to develop their own industrial base. The NWFP sector can benefit greatly from such opportunities if African countries can fully use them and tap the benefits by developing local technologies, increasing quality standards of products and recognising and retaining property rights to their products.

3.3.2 Institutional supports in the development of local processing technology

The United Nations Industrial Development Organisation (UNIDO) can be of great assistance in local industrial processing. Secondary processing activities for local "value addition" require considerable research and development but local research capabilities are weak and may need strengthening for development work on NWFPs. In some cases, the obstacle is lack of conversion of applied research results to industry. In this case, facilities to develop processing parameters and products at a pilot scale can help. UNIDO can be of help to bridge this gap by introducing its polyvalent pilot plant for processing medicinal and aromatic plants and other NWFPs. This plant has enabled researchers to produce final products for test on markets. The plant allows for simplicity of design, installation, operation, maintenance, and repair. It is adaptable for developing indigenous technologies locally and has been introduced in many situations.

3.3.3 The role of institutions in quality standards control

The International Standards Organisation (ISO) is very important for establishing and approving quality and standards for industrial products. This is also applicable to NWFPs processing and marketing. Processed products must comply with national and international specifications. There are International Standard Specifications for most processed NWFPs. In addition to these, importing countries and buyers may have their own requirements. Processing methods must account for these requirements. In most case, quality has to start with the use of good quality raw materials and post-harvest treatments that avoid contamination. Quality requirements for medicinal plants are still more stringent in terms of toxic materials and active principles. Compound medicines demands much research in order to develop specifications by which a standardised uniform product is obtained. Export products also involve legal requirements governing registration and packaging.

Stringent requirements are being introduced to safeguard the environment, to reduce pollution caused by use of synthetic chemicals and reduce health risks due to side effects of using synthetic materials. Increasingly, the machinery and processes used in industries require validation to comply with ISO norms, particularly the ISO 9000 series. The products have to conform to specifications and other pharmacopoeial or buyer specifications. Furthermore, eco-audit procedures will be required for safeguarding environmental damage. Organic production will reduce the risks of contamination of products and the environment with synthetic chemicals.

A new specification, the ISO 14000 series, is expected to add an environmental dimension to the quality standard. This will be equivalent to the European eco-audit and management scheme (EMAS) currently in effect in Europe. These requirements have to be taken into account when planning industrial production of NWFPs in developing countries, as ISO regulations will have an impact on marketing of the products. The awareness of quality criteria is increasing in developing countries and new regulations governing safety of products, quality specifications and good manufacturing procedures are being enacted.

3.3.4 The role of institutions in marketing

The harvesting of NWFPs is coming under increasing scrutiny from certification programmes because of their key roles in the sustainable management of forest resources worldwide. Certification is a market-based tool that is becoming a hot topic in many natural resource sectors. According to *Dankers (2002)* and cited by *Walter (2003)* certification is a procedure by which written assurance is given that a product, process or service is in conformity with certain standards. It is often linked to the provision of labels for certified products, processes or services. A certification logo or label enables potential customers to differentiate products, based on the social and environmental "qualities" of the commodity they decide to buy. This market opportunity is to motivate many producers to adapt their management practices to meet certification criteria (*Mallet and Marion, 2000*).

The primary goal of certification is to bring about positive environmental and social change in resource stewardship. Producers and harvesters can use certification criteria everywhere as a model for best practices. Certification is only one tool among many to move towards more sustainable production systems. It will take further refinement of certification programmes to meet local realities, more producers and harvesters willing to test the certification and increased demand by consumers for certified products before the full benefits of NWFP certification are felt.

According to *Walter (2003)*, there are four main categories of certification schemes that are of major relevance to the production, processing and commercialisation of NWFPs:

- i) Forest management certification;
- ii) Social certification;
- iii) Organic certification; and,
- iv) Product quality certification

Certification entails costs but local NWFPs producers can group themselves to make the cost of certification cheaper. With lower costs and the strong consumer recognition for organics, certification may be most appropriate for many NWFP harvesting operations (*Mallet and Marion, 2000*).

Fairtrade is also an option for NWFP certification, although only for southern producers. To qualify as a Fairtrade product, producers must fulfil specific criteria relating to social conditions of the workforce, such as paying a minimum wage, respecting terms of employment; not using child labour; also, there are conditions for profit sharing and investing back into the community. If a producer fulfils these criteria, his products qualify for Fairtrademark and access to Fairtrade markets (*Mateke, 2001*). Fairtrade is beneficial for small producers since its primary focus is on ensuring that they receive a fair deal for their products. Secondly, the costs of certification are borne by the retailer and consumer rather than by the producer.

3.3.5 The role of international trade agreements to strengthen property rights

The **General Agreement on Trade and Tariffs** (GATT) is a series of agreements aiming to deregulate international trade by reducing tariffs and encouraging multilateral negotiations on trade issues. It paved the way for the establishment of the World Trade Organisation in 1995 as a more powerful Organisation for resolving disputes. WTO aims to provide intellectual property rights (patents, trade secrets, trademarks) and measures for enforcing these rights (*WTO, 2003*).

The **Convention on International Trade in Endangered Species of Wild Fauna and Flora** (CITES) was ratified by more than 111 nations with a list of endangered species for which international trade is either prohibited or strictly regulated.

The **Agreement on Trade-Related Intellectual Property Rights** (TRIPs) provides more enforceable protection for trade-related intellectual property rights (*WTO, 2003*). It encourages developing countries to conduct more research and innovation, and helps better access to new technology, including environmental technology. The current situation is pathetic because European and American companies own all the patents to African high valued NWFPs, such as devil's claw, *Prunus africana* etc. This is because industrial research is carried out in developed countries. In most cases, such research is focused on cheaper synthetic substitutes as soon as a new useful natural product is discovered. On this note, African countries have to safeguard the property rights of the original resource with international conventions, while at the same time developing higher-yielding and disease-resistant varieties through genetic improvement to ensure sustainable supply of plant material at competitive prices.

3.3.6 The role of institutions in Research and Development

The common post-harvest problems encountered in the production of NWFPs mainly relate to handling and storage, processing, transportation and infrastructure, credit facilities and marketing information. The role of research and development (R&D) is to find solutions to some or all of the problems using available or acquired human and financial resources. Many national, regional and international research institutions have embarked on the assessment of resources and products, management and harvesting practices and regeneration of individual species, either within the natural ecosystems or through establishment of plantations. Linking of such research to development, by looking into processing technologies, marketing strategies, as well as the overall economics of NWFPs, has often been neglected.

There is, however, an increasing understanding that research on NWFPs must be linked to development and to the improvement of local livelihoods. In this light, apart from gaining a better knowledge of the resources and the products derived from them, and defining resource management strategies, there is the great need for improved technologies. National forestry strategies are putting these into context calling for participatory approaches involving local stakeholders in resource development.

At the regional level, countries, especially of the Southern African region, are taking major steps towards cooperative research engagements. Such is the case with the Veld Products R&D Programme in Botswana, the CP-Wild project in South Africa and the regional Devil's Claw group. Ensuring regional training programmes, sharing

information and materials and exchanging scientists, can strengthen such cooperations among countries with similar socio-economic conditions. The African Forest Research Networks (AFORNET) can play a catalytic role in this direction given the required resources. The IUFRO Research Group on NWFPs can be instrumental in providing the required technical contacts and advice on assistance.

Due to the fact that NWFPs can contribute to rural poverty alleviation and to food security of the poor by providing food, income and employment, they constitute major R&D foci for three centers of the Consultative Group on International Agricultural Research (CGIAR) system. These centers have been directly involved with the promotion of NWFPs through research and development in Africa. The Centre for International Forestry Research (CIFOR) is one, which seriously considers NWFPs in its livelihood and poverty alleviation programme. Within this programme, NWFPs markets are assessed and the overall socio-economic contribution of NWFPs to sustainable rural livelihoods is pinpointed. The most important programmes of the World Agroforestry Centre (ICRAF) related to NWFPs development are those on agroforestry tree domestication. The International Plant Genetic Resources Institute (IPGRI) has become much aware of the potential of trees as plant resources deserving their attention and could be instrumental in the genetic improvement of the most important commercial species of NWFPs. In this light, by avoiding duplication and tapping synergies among the three CGIAR centers, research and development of commercially important NWFPs in Africa can be enhanced.

The role of FAO should be acknowledged in the areas of transfer of technology, carrying out field projects, networking and compilation of statistics and information dissemination on all aspects NWFPs. WHO is primarily sensitive on traditional medicines from NWFPs in relation to their quality and safety to primary health care.

4.0 THE WAY FORWARD – RECOMMENDED INTERVENTIONS TO ENHANCE NWFP MARKETS

4.1 Overview

NWFPs have been debated over the past three decades as resources for survival and poverty alleviation in rural communities. Some NWFPs obviously have a commercial potential because markets exist for them and many people make use of their products. Some are purely for subsistence uses due to their low economic importance or because only few people know and make use of them. However, various socio-economic factors may lead to some subsistence NWFPs becoming commercial and some currently commercial NWFPs to lose their value. This creates some dynamism in the commercialisation of NWFPs. Therefore, not all NWFPs have the potential to alleviate poverty within the same time scale in a given community.

Based on the above understanding, the work of developing the processing and marketing of NWFPs in any given community in Africa have to be procedural and strategic requiring communities to reduce costs in order to increase their income. One of the main reasons that local producers of highly valued NWFPs may remain poor is that they do not benefit from the value that their products generate as those products move through the market chain to end users. This situation is created by lack of information, low local value addition and poor competition in the marketplace. Therefore, adding value to what local producers are already selling can generate higher revenues without increasing the off-take of natural resources (*Clay, 1995*). The following are seven basic strategies suggested for the future improvement in the processing and marketing of NWFPs in Africa.

4.2 Adding value locally on NWFPs

Local NWFP producers seldom process their products before marketing them. Can the barriers to local processing be overcome to ensure that more of the value adding processing takes place there? Are there strong economic justifications for processing at the consumer end? Processed products could earn local producers/collectors added income, increase product value, increase shelf-life and allow adjustments to seasonal excess of supplies. However, a preliminary decision, based on knowledge, must be made whether it makes sense to add value locally or not. This is a complex decision to make because it is product, time and region specific and may require the answering of an array of questions such as those suggested by *Clay (1995)*:

- What is the volume of the commodity in question?

- Where is value currently being added?
- What are the easiest/quickest ways to add the most value with the least risk?
- Which forms of processing open the product to a wider market?
- Which forms restrict its markets?
- Which forms of adding value expose the producers to risks?
- Which risks should be avoided?
- What is the seasonality of production?
- Can the investments (processing plants, driers, warehouses) for adding value to one crop be used to add value to other products during the off-season?
- Is capital readily available? Does the group have access to it? At what costs? Does a group have collateral?
- Is there sufficient labour? Do labourers have any interest in, or skills at, performing the necessary tasks? Would local people know how to manage a plant, either in technical or financial terms? Would there be resistance, a priori, to the idea of importing outside management?

If the answers to the above questions are favourable at the local level, then it would be advisable to invest in local value-addition. If not, it may be necessary to look at other strategies of adding value, perhaps through better-organised units, and transportation and marketing strategies for raw materials. It would be inefficient to use more raw materials, energy and labour to achieve the same or lower levels of profit if the local processing unit is allowed to stand on its own without subsidies. In such a case, it may be advisable for producers to group themselves and transport and sell their raw products in bulk to the most efficient commercial processors or invest in a more efficient local processing plant or establish a joint venture with a more efficient processor. Overall, the expectations from a value-added processing strategy for NWFPs in Africa should reduce post-harvest losses through better storage, reduce the weight and volume of raw products through consistent drying, increase their standardisation using international guidelines, and guarantee consistent quality and acceptability in multiple markets through processing under better hygienic conditions. These may lead to reduction in transportation and handling costs and consequently to competitive sales of products in distant markets

Increase in technological innovations on local production and processing activities can be an asset to local producers. Therefore, adopting appropriate technology is a major way producers can save their time or improve the quality of, or add value to, their products. On the other hand, technology is also an area where producers can waste a tremendous amount of time and money and become terribly frustrated with development programmes in general. Broken and rusting equipment throughout the world is not only a testimony to failed development strategies but to dashed dreams and increasing cynicism on the part of local communities (*Clay, 1995*). This calls for researchers to improve existing technologies that are suited to solving local problems of scale and expense. Such technologies should be user friendly and reliable.

In short, all technology should be carefully evaluated to determine if it is indeed appropriate, reliable and user friendly, else it can be more trouble and expense than it is worth. Moreover, value-added processing should not be done in a vacuum because very few communities have all the ingredients and facilities (reliable energy, water, packaging etc) to produce finished products. The best strategies should allow producers to potentially gain as much value as possible with the least risk. This would require a prior thorough assessment of a community's natural, human and financial resources. Communities should not attempt to produce finished products if they have little idea about what consumers outside of their areas want. This is particularly true if the distance between the producer and the consumer as well as the difference between their cultures and lifestyles is great. The role of regional exchange of knowledge about NWFPs of regional importance is pivotal in this regard.

4.3 Choosing the right marketing strategies for NWFPs

Marketing problems often beset the industrial development of NWFPs in developing countries, as it is a function of two groups, the rich and often distant buyers and the local and resource-poor producers. The buyers who control the market dictate the prices. The protective nature of the markets and price fluctuations both dictate the need to consider market strategies as a means to add value to NWFPs. It could be more advantageous to decide on the scale

of production based on local and national demands and the possibilities for secondary processing or use in the manufacture of other consumer products such as soaps, cosmetics and pharmaceuticals. For example, Marula can be used as fruit, jams, jelly, comestics, wines, creams, etc., and the various applications of Gum Arabic could be explored to the fullest. This implies reducing risk of not being able to sell one product by diversifying the number and type of end users for each NWFP. Moreover, products can be sold on local, regional, national or international markets, or a combination of all of them. In addition, producers can sell to end users who have different uses/markets for the product themselves. Communities can also use market strategies to differentiate their products in order to command higher prices by labeling to differentiate them in the marketplace, e.g. organic, green, natural, or socially responsible (*Clay, 1995*). This calls for some sort of certification by a third party, although at some costs.

4.4 Getting financial and infrastructural support for NWFPs processing and marketing

A rule of thumb suggests that there is hardly any development without investments in financial and/or human resources as well as the availability of a minimum level of infrastructure. Most rural areas in Africa fall short of at least one and in most cases all of these. The implication is that the development of NWFPs into a market driven activity requires some level on investments as well as improvement in available infrastructure.

In terms of the provision of financial resources, two activities stand out clearly and orderly. The first is to create local financial management skills because most rural communities have poor financial management skills (planning and accounting) as well as a weak culture of financial savings for future development. The second thing is to provide seed funds, either from governments, aid organisations, international development agencies or by commercial banks under the auspices of an expert institution (NGO) that will supervise or facilitate disbursement and repayment. Technical assistance programmes that build financial capacity for accounting, planning and managing individual or group enterprises are essential for improving the lot of all harvesters and processors of NWFPs (*Clay, 1995*).

In terms of improving infrastructure, most communities do not own or have access to efficient, reliable and cost-effective systems of transport. This is true not only of getting into forest areas, harvesting products and transporting them out of the forest, but getting the product to markets (or better markets), to their own warehousing or processing facilities, or getting processed or semi-processed goods to the next stage on the marketing chain. Processing technologies also require reliable energy and water supplies, which are major obstacles to the overall development of African economies.

Transportation is a problem in the sense that the bulky, remote and seasonal nature of most NWFPs makes arrangement for cost-effective transportation to areas of need difficult. The seasonal nature of roads makes sustainable supply impossible. Local individuals are incapable to purchase all-season vehicles for the transportation of NWFPs to urban markets. In many cases, the cost of transportation alone does not justify engagement in NWFP activities. Given these constraints, *Clay (1995)* suggests possible ways out for harvesters or communities:

- With the local strength in numbers, harvesters can organise themselves in groups and hire a boat or truck to pick up their produce at the edge of the forest or haul it to a regional market centre to avoid one layer of middlemen taking advantage of their limitation.
- Instead of buying transporting machines that would be used on a seasonal basis it might make sense to rent rather than buying them, which ties up scarce resources in assets that are only productive for such a short period of time.
- Communities, acting on behalf of several producers, should be able to negotiate better transportation contracts than any single individual. Also, if a community is transporting products together, it might think about selling them together. Many buyers will pay a higher unit price for a larger volume than they will for the same amount of product divided up into smaller units. It saves the buyer time and money to make one purchase, so the seller should be able to get some of that savings as a service to the buyer.
- Individual producers have little power in the marketplace. They cannot provide the quantities of product that even a small manufacturer would need. By working together, producer groups can supply some of the largest manufacturers, control larger market shares, and exert more influence over entire markets.
- The same skills and institutional structures that allow groups to sell larger quantities of product in the market enable them to purchase manufactured items in bulk, and thus save money. If one of the main reasons that local

groups need money is to purchase consumer goods, then community organisations that are being established to harvest, purchase, process and sell local products should also be used to bring in the consumer goods that community members want to purchase. A revolving fund to purchase raw products from community members can just as easily be used to purchase consumer goods in bulk and resell them to residents at a more favourable price than merchants would normally charge. The same skills are needed to run both systems. Similarly, whatever system of transport is being used to haul produce out of the area can be used to bring manufactured goods back into it.

4.5 Research and development

Research and development (R&D) work is a key ingredient required to tap the full potential of NWFPs. The success of industries based on essential oils, dyes and medicinal plant products are highly associated with R&D on natural products from plant species. Such R&D work can focus on breeding new and better oil yielding varieties, improvements on agrotechnology and post-harvest technology, by-product utilisation, value added product development and new formulations. These result in cheaper and more reliable natural raw materials, making them more competitive against their synthetic substitutes. Therefore, synthetic substitutes form major threats to the markets of NWFPs, meaning that the price of any NWFP can be greatly influenced by its synthetic substitute. The major drivers behind the production of synthetic substitutes are economic, i.e. to have cheaper and more reliable all-season supply of raw material with a more even quality. Therefore, R&D is a major tool to use in the NWFP sector to counter the threat by ensuring that research results can lead to the production of cheaper and reliable natural raw material.

Other areas of R&D work can be on the following:

- Identifying a minimum number of NWFPs with greatest potentials of contributing to local income generation. This should be based on current production, trading/marketing and manufacturing systems, and the point(s) where producers can capture more value. Develop indigenous scientific and technological capabilities in industrial utilisation of NWFPs by training overseas.
- Carrying out research to improve and adapt local technologies for adding value to the identified species.
- Strengthening R&D institutes including provision of pilot plant processing facilities for testing viability and for training personnel. UNIDO's pilot plants can be adapted for local processing of NWFPs in any community.
- In terms of improving market outlets: 1) conduct feasibility studies for new ventures in terms of investments, marketability, sustainability, economic viability and potential for joint ventures; 2) increase entrepreneurs' awareness of the potential of NWFP industrial processing through workshops, symposia and exhibitions; and 3) promote trade through visits to brokers/buyers and participation in trade fairs, etc.

Despite the strong need for R&D to improve the African industrial sector the few available research institutions are characterised by understaffing, unmotivated personnel and high turnover. Salaries remain poor and research budgets often too low to carrying out effective long-term research. The truth is that research is a costly development activity that requires investment and sacrifice to achieve desirable results. The challenge for national governments and donors is to come up with creative mechanisms to ensure that good scientists remain within national research institutions and can devote themselves fully to their work. Research budgets could be partly derived from export earnings of forest products, fixed on a percentage basis. A related approach is to set aside a percentage of the budgets of development projects for applied and adaptive research in direct support of development activities. Moreover, the necessary inputs in terms of infrastructure and facilities should be provided to encourage R&D necessary for the development and industrial processing of NWFPs.

The outlook for African countries to increase investment for R&D work on NWFPs is positive. The global trend of increasing interest in natural products in both food and medicines suggest that the vast reservoir of African NWFPs can be a source of economic development following appropriate research that would lead to high quality, cost effective and safe products. Moreover, regulations governing the registration and import of processed NWFPs to Europe and USA are being reviewed and a more relaxed set of regulations is expected. This would open up markets for useful and safe NWFPs from developing countries. The proposed European monographs on herbal medicines and raw materials now being developed by the European Scientific Cooperative for Phytotherapy (ESCOP) would make it easier for developing countries to process the NWFPs to comply with these specifications. Another

opportunity for R&D in Africa lies in strong collaboration with developed countries through transparent joint venture projects.

4.6 Information on the resource base and market conditions

As explained earlier, the lack of information keeps local producers of NWFPs in weak positions *vis-à-vis* traders. Therefore, a more transparent marketing chain would enable the local producers to have access to regular price information from key points in the marketing chain, including the *Free on Board* (FOB) price for NWFPs leaving the country. A good knowledge of all producers, buyers, sellers, importers, exporters, brokers and agencies, freight forwarders and others included in the commercial chain would enable local producers to have a stronger bargaining power with the traders. The role of the mass media (newspapers, radio, television and other forms of local communication channels) can be instrumental in increasing information flows on the markets on NWFPs. NGOs can also play a role in this regard.

Apart from the transparent flow of information on the NWFP markets, both government and industry need a thorough understanding of the resource base - e.g. information on NWFPs used by local communities, being traded or used by industry within the country and being exported - to plan the development of any industry based on NWFPs. Sound knowledge is also required on the various uses of NWFPs, their economic and social importance and the volumes and values traded locally, nationally or exported. Therefore, the role of keeping good statistics in each country on all aspects of NWFPs is underpinned.

Information flow is not only important to governments, producers and traders, but also to consumers of the products in terms of increasing awareness on availability and quality of products. This can drive demand for products. In this case, advertising of attractive and well-packaged products that meet international standards remains a key to adding value to NWFPs in Africa.

4.7 Capacity building in terms of extension and training needs

It is generally recognised that local communities do not have the required skills to process and market their products in ways that can increase their income and pull them out of poverty. They also lack the required financial planning and management skills. This implies that the development of processing and marketing of NWFPs in Africa should seriously provide training to producers on how to make higher incomes from their products and on how to make use of such income for greater economic and social impacts. This suggests that an appropriate mix of skills have to be developed on the following:

- *Production technologies* (resource management, harvesting, storage) for sustainable supply of raw materials and reduction in harvesting and post-harvest losses;
- *Processing and packaging* to add value, reduce weight, increase quality and shelf-life;
- *Marketing* to capture maximum possible income by eliminating intermediaries where possible, reducing costs of transportation and making strong price negotiations with buyers;
- *Institutional arrangements* to become more organised and understand the local and international roles and regulations governing processing and trade in NWFPs; and,
- *Financial* to know how to plan and manage income from NWFPs for greater economic and social impacts and to gain economic autonomy and independence.

However, it is important to caution that the extension and training needs of each harvester and each community will vary considerably. A one-size-fits-all extension system will probably not work very well for NWFPs. The biggest hurdle may be to get the harvester or community to realise the areas where they need help. The next hurdle is to make sure they know where to find it and seek out assistance. If harvesters or communities do not see the reason to seek assistance, even the best-designed and -run assistance programmes will have little impact (*Clay, 1995*).

4.8 Promoting policy and institutional changes for NWFP development

Many policies and institutional changes have been made by governments in Africa to promote the development of the NWFP sector. They have fully recognised the potential role of NWFPs for rural poverty alleviation and food security. The only major problem has been to translate the policies from official, well-designed texts in papers into concrete development activities on the ground. In most cases, the lack of financial and human resources have been blamed for the laxity. However, in some cases, the lack of political will has been evident in the sense that some highly commercialised NWFPs generate huge revenues but very little is reinvested in the production and development of processing and marketing. Also taxation policies may need an overhaul to ensure that a sizeable portion of revenue generated from the NWFP sector is invested in its development. Another instrument of taxation policy that has been successfully applied in the timber sector of a number of countries is the implementation of higher taxes or a ban on exports of unprocessed raw materials to encourage in-country processing. This both encourages local processing and provides funds for investment in it.

Despite the current shortcomings, it is important to stress that most African national forestry policies recognise the need to support the development of the NWFPs sector. Such policies dwell on:

- The creation of independent administrations for the NWFPs sector within the ministries in charge of forestry.
- The promotion of local community participation in all aspects of forest management and the sharing of benefits derived from forest products.
- The decentralisation of forest management responsibilities to communities in the light of community-based natural resources development and the creation of community forests under well-defined legislation.
- The promotion of NWFPs as a vehicle for poverty alleviation and overall rural development.
- The need for greater research and capacity building in the development of the NWFP sector.

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