



ICPALD



REGIONAL SYNTHESIS OF THE COUNTRY REPORTS ON

PROGRAMME FOR FORMULATING A STRATEGY FOR PRODUCTION, VALUE ADDITION AND MARKETING OF PRODUCTS FROM ARID AND SEMI ARID (ASAL) IN THE IGAD REGION

Edited by S. J. Muchina Munyua and Sheila Mbiru



MAINA KARABA

*Dedicated to a friend in need and friend in deed - God, most merciful most
gracious rest your soul in eternal peace - Amen*



TABLE OF CONTENTS

Abbreviations	5
Acknowledgement	7
An overview of the NWFPs in the IGAD region	11
1.0 Background	11
2.0 Introduction to the non wood forest products	12
3.0 Descriptions of some selected non-wood forest products in the IGAD region	14
3.1 Plant gums, resins and essential oils	14
3.2 Indigenous fruits and related forest materials	15
3.3 Ethno-medical, ethno-veterinary and ethno-botanical products (forest medicine)	15
3.4 Bee keeping and honey production	16
4.0 Some ecological aspects of NWFP production in the IGAD region	17
5.0 Resource mapping NWFPs in the IGAD region	19
6.0 Production, processing and marketing of NWFPs	19
6.1 The role of ecology on sustainability of NWFPs production and utilization	19
6.2 Meeting the rising demand for NWFPs	19
6.3 Indigenous technical knowledge and traditions that sustainably conserve NWFPs	20
6.4 Enhanced Market information system for NWFPs	21
6.5 The role of associations and networks in production and marketing of NWFPs	21
7.0 Economic contribution of NWFPs in IGAD member states	22
7.1 Job creation	22
7.2 Valuation of NTWFPs	22
7.3 Types of forest values	23
7.4 Commercialization of NWFPs in the IGAD region	23
7.5 Food security	24
7.6 Role of Trees and NWFP in Social Beliefs	25
8.0 Policy and legal frameworks	25
9.0 Research and Development - herbal medicines, gums, resins and other products	26
10.0 Constraints to optimal utilization of NWFPs in the IGAD region	27
10.1 Production and over exploitation of NWFPs and other forest resources	27
10.2 Processing, value addition and marketing	27
10.3 Inappropriate policy and legal framework and producer and marketing groups	28

10.4 Research and documentation	28
10.5 Training, information exchange, awareness raising and extension services	28
10.6 Institutional issues and considerations	29
10.7 Stakeholder involvement	29
11.0 Conclusions	29
12.0 Recommendations and suggested way forward	29
12.1 Production and harvesting of NWFPs in the IGAD region	29
12.2 Post harvest storage,	30
12.3 Processing, value addition and marketing	30
12.4 Appropriate policy and legal framework and producer and marketing groups	31
12.5 Research, documentation and training	31
There is need to strengthening curriculum at universities and tertiary levels to adequately incorporate NWFPs in the diverse programme and provision of support to post graduate training in NWFPs in the various sectors. It is also critical to scale up and document best bet technologies and practices. Other important issues include;	33
These include promoting and facilitating venture capital, establishment of business incubation centres for mentoring product development and scaling up of best practices within a regional network with focal points in member states; mainstreaming of NWFPs to climate change, conflict mitigation, cross border trade, individual and community intellectual property rights, equity and bio-rights as well as standardisation and certification.	34
14. References	35

ABBREVIATIONS

GDP	Gross Domestic Product - a measure of total economic activity of a nation
GPS	Geographical Positioning System
INGO	International Non-Governmental Organisation
KARI	Kenya Agricultural Research Institute
KWS	Kenya Wildlife Services
MoLAE	Ministry of Livestock, Agriculture and Environment, Puntland
MoU	Memorandum of Understanding
MoU	Memorandum of Understanding
NAGAPPEN	National Association of Gum Arabic Producers, Processors and Exporters of Nigeria
NGARA	Network for Natural Gums and Resins in Africa
NGO	Non-Governmental Organisation
NWFPS	Non wood forest products
ToR	Terms of Reference
UN	United Nations
UNDP	United Nations Development Programme
WTO	World Trade Organisation

DISCLAIMER

This report is prepared for the Inter-Governmental Authority on Development's Programme on Production, Value Addition and Marketing of Non Wood Forest Products from Arid and Semi Arid Lands (ASALs) in the IGAD Region. It was the need, to mainstream NWFPs into the national economy that led IGAD to facilitate the development of "a regional strategy for production, value addition and marketing of non wood forest products from Arid and Semi Arid Lands (ASALs) in the IGAD Region". The overall objective of the programme was to contribute to food security, income generation and alternative livelihoods in the ASALs by exploiting and promoting eco-(bio) enterprises from non timber products existing in the ASALs. The consultancy was commissioned by IGAD, as part of the larger study on strategy development, to i) Undertake review literature to identify underexploited and/or new crop species that exist in wild and/or in limited cultivation in the sub region with a view to promoting and increasing cultivation, multiplication and production; ii) Document, where available, the multiplication and release to research institutions of small quantities of seeds of most promising species cultivars and ecotypes; iii) Explore the present and future research on value addition and market chains (processing and packaging of the new foods and products) in IGAD member states; iv) Undertake preliminary studies on marketing systems for these products and foods to ensure a sustainability of production in IGAD and member states; v) Identify rural cottage industries and community groups for the processing and packaging of the respective foods and vi) Review the possibility of local and international exhibition of these products.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of either the Inter-Governmental Authority on Development (IGAD) or the member state (Djibouti, Ethiopia, Kenya, Somalia, Sudan and/or Uganda) concerning the legal status of any country, territory, city or area or its authorities concerning the delimitations of its frontiers or boundaries. The opinions expressed in this paper are solely those of the author and do not constitute in any way the position of the IGAD nor the institutions in the member states studied.

Dr. Solomon M. Munyua
Regional Consultant

Date of publication: May 2011

ACKNOWLEDGEMENT

I acknowledge with gratitude the invaluable opportunity given to me by IGAD Secretariat through the Director Agriculture and Environment to coordinate the review of the literature available Production, Value addition and Marketing of Non Wood Forest Products (NWFPs) from Arid and Semi Arid Lands (ASALS) in the IGAD the member states with a synthesis of the key issues in the region.

My gratitude goes to the IGAD team in Djibouti (Mr. Maina Karaba, Mr. Ahmed Habbane and Ms. Tegueste Shimelis and Nairobi Ms Grace Wangari Ng'anga, Ms Zukekha Abbas Mr. Kizito Sabala, Ms Karen Mwangi, Fleria Okello, Mr Chege and Mr. Hamza) and the national resource persons/experts - Dr. Mohammed Nabil (Djibouti), Dr. Elerohi Mulugeta (Ethiopia), Mr. Meshack Muga (Kenya), Mr. Mohammed Warsame (Somalia), Dr. Mohammed Ballal (Sudan) and Dr. Bob Humphrey Ogwang (Uganda) for their logistical support, provision of background information, co-operation, support and advice. The technical briefs and updates by Mr. Maina Karaba, Mr Ahmed Habbane and the national resource persons/experts were invaluable when undertaking the assignment. I am especially indebted to Ms Grace Wangari Ng'anga and Ms Zukekha Abbas for organizing travel, meetings, interviews and the exhibition during the 2010 pastoral week in Nairobi. Ms Ng'anga deserves special praise for their excellent services at populating the database and coordinating the hosting of the regional NWFP consultative meeting in Nairobi (13th – 15 April 2011).

Thank you to the teams from the Bee Keeping Centre, Ministry of Livestock, Kenya the Kenya Association of Traditional Healers and NGARA and KEFRI, for participating in the exhibition during the 2010 pastoral week at KICC, Nairobi, Kenya. To all those individuals in IGAD and in the member states who took time out of their busy schedules to share their knowledge and experience with me and the national resource persons/experts, we are grateful. Your contributions were highly valued and appreciated.

None of the field studies would have been possible without the services ground pilot, Mr Chege – to him and other, I say *"ansante sana"*. Finally I would like to thank the IGAD team for the confidence that entrusted on me, and the EU for funding the study.

EXECUTIVE SUMMARY

The overall objective of the Intergovernmental Authority on Development (IGAD) Strategy for Production, Value Addition and Marketing of Products from Arid and Semi Arid Lands (ASALs) in the IGAD Region is to contribute to food security, income generation and alternative livelihoods in the ASALs by exploiting and promoting eco-(bio) enterprises from non timber products existing in the ASALs.

The specific objectives of the strategy that are designed to contribute to the diversification of the livelihood systems in the ASALs by creating new opportunities for trade and availability of foods and products from ASALs include:

- i) To undertake a baseline survey of the status of dryland products to identify under or over-exploited species that exist in wild or limited cultivation in the IGAD region with a view to promoting and increasing cultivation, multiplication and production
- ii) Develop appropriate training modules to build capacity of producer groups, private sector and user communities to enhance the production and marketing of dryland products
- iii) Undertake training for producer groups and private sector to increase the effectiveness and efficiency of involvement of these groups in production and marketing of dryland products as well as promoting rural cottage industries and community groups for processing and packaging these products
- iv) Market and product development for various dryland products through research, value addition and market chains (processing and packaging of new foods and products as well as exhibiting, publishing and dissemination of the results of the new products and crops in the region;
- v) Facilitate micro-credit linkages for producer groups to promote production and marketing of dryland products through investments in multiplication and release to research institutions of small quantities of seeds of most promising species cultivars and ecotypes;
- vi) Facilitate community / private sector partnership to ensure the sustainability of the dryland products. It is expected that the artificial and misplaced prejudice to NWFPs as inferior should end due to the concerted efforts by IGAD and the public and private sectors in member states to publicize, market, popularize and avail the products in quality, quantity and price that is acceptable and competitive in the local, regional and international markets.

The study reported here was commissioned by IGAD primarily to undertake a desk survey of the status of dry land products in IGAD member state as part of a wider assessment of under or over-exploited species that exist in the naturally or in limited cultivation in the IGAD region with a view to promoting and increasing cultivation, multiplication and production for trade and investment in biological resources. The key non wood forest products that this study focussed on include: gums, resins, indigenous fruits and vegetable, spices, aloes, dyes, tannins, medicaments, essential oils, fodder, honey and bee products, which are mainly associated with a number of plant species. The study was conducted from November 2010 to April 2011.

The importance of non wood forest products (NWFPs) in IGAD member states to the national economies has, with few exceptions including honey, frankincense, and gums and resins, all but remained obscure. This is despite the fact that most rural communities in the IGAD drylands depend to a very great extent on NWFPs including herbal medicines and livestock fodder for their

daily survival. Many recent studies have revealed that the arid and semi arid lands (drylands or ASALs) have enormous economic potential and are the home of vital non wood forest products such as dyes, medicines, resins, gums, perfume, honey, fruits and other important emerging natural products that are made from indigenous plants. Global trade in natural ingredients has increased dramatically in the past ten years with trade in herbal medicines for example is estimated at 10 billion annually and is growing in excess of 10% per year (CBI Market Surveys (2003)).

The renewed interest in natural products from such pure and unpolluted sources as those being produced by IGAD member states has risen quite high with bio-enterprises emerging as potential new sources of employment and wealth creation for populations in the ASALs. It is important that IGAD member states position themselves to curve a niche' for themselves in these expanding regional and international markets.

In identifying useful plant crops for ASALs and promoting commercialization of NWFPs, it is necessary to take cognisance of other plants of economic importance that are threatened by climate change, predatory exploitation and desertification. Some of the key constraints on the commercialization of NWFPs identified in the study include:

- inadequate quality control of the products
- un-streamlined supply chain
- poor pricing and linkages with markets
- unclear policy on the development of NWFPs
- inadequate product standards
- poor access to capital including credit
- poor production practices
- inadequate data on some of the products and the markets among others. It is concluded that the following interventions should be undertaken in order to enhance the sustainable production and commercialization of NWFPs in the IGAD region:-
- Map the resources in all IGAD member states and integrate and re-emphasize development of the NWFPs in the national forestry plans, enshrined in the cultural heritage, health, food, wildlife and gender empowerment policy plans, the national economic recovery action plan, the strategic rural poverty alleviation schemes, and other established human and development initiatives.
- Establish economic viability of producing and marketing the various NWFPs supported by extensive regional and international market research.
- Encourage and facilitate the public and private sector to invest in research and development of commercially viable species, training and extension education programmes. The latter are important to safeguard, integrate, raise awareness on and transfer existing indigenous NWFPs use-wisdom amongst the different consumers, particularly the youth.
- Collaborative resource surveys (particularly in NWFPs endowed regions) to ascertain, identify and quantify indigenous (as well as exotic) NWFPs' ecological niches and their potential for promotion. It is also important to establish NWFP germplasm that can be commercially produced and exchanged.
- Establish regional mechanisms for standardization and certification of production, post harvest handling, processing and packaging NWFPs, with well defined patent rights.
- Capacity building on micro-credit, entrepreneurial and NWFPs processing skills, hygiene,

and bookkeeping at producer level.

- Build data and information database and network, seed databases and technological transfer networks and platforms among different NWFPs producers and users and to enhance NWFPs development at both the local and national levels.
- Develop a supportive market oriented regional policy framework to guide the realignment of national policies and supportive legal frameworks to support and strengthen the above initiatives. The policy and legal frameworks should protect individual and community ownership rights, in as far as they can be defined and/or identified.

An overview of the NWFPs in the IGAD region

1.0 Background

Quite often, one will encounter the terms Non-Wood Forest Products (NWFPs) and/or Non-Timber Forest Products (NTFPs) while reading documents on forestry. The definitions of the two terms (including their possible harmonization) and classification of products / services was the subject of extensive debate in various fora throughout the 1990s (FAO, 1995; Shiva and Mathur, 1997). Today both terms are internationally acknowledged and often used inter-changeably. However, there is some difference in the scope of the commodities covered by each which ought to be recognized. FAO has adopted a working definition in which “Non-Wood Forest Products consists of goods of biological origin other than wood, derived from forests, other wooded lands and trees outside forests” (FAO, 1999). This term excludes all wood. NWFPs on the other hand include wood for uses other than timber and hence cover a wider category of products/resources/services. For purpose of this study the term Non-Wood Forest products has been adopted.

NWFPs have been with man since creation and will continue to play an important role in livelihood support. An analysis done sometimes back showed that NWFPs are important to three main groups (FAO, 1995b); rural populations who have traditionally used these items for livelihood and social and cultural purposes, urban consumers, and traders/product processors whose numbers in the NWFPs sector increase as urban markets for these products grow.

NWFPs usually provide essential food and nutrition, medicine, fodder and other related domestic requirements to rural populations as well as urban consumers. They are particularly important in relieving hunger periods in the agricultural cycle, can provide employment during slack periods and act as a buffer against risk and house-hold emergencies (Campbell et al, 1991; FAO, 1995b; Wilson, 1990). Additionally, NWFPs play an important social and cultural role among various African communities in the Diaspora. For example, an estimated 105 tonnes of “bush plums” (*Dacryodes edulis*) and 100 tonnes of “eru” (*Gnetum africanum* and *G. buchholzianum*) are exported from Central African countries for Africans living in France and Belgium (Tabuna, 1999). Significant quantities of khat (*Catha edulis*) are exported from East Africa to Somali communities in Europe and America.

In economic terms, NWFPs contribute substantially to national economic growth and international trade. A study in South Africa showed that 400-500 species are sold in the country and sub-region for traditional medicines (Williams 1996 as reported in SCBD, 2001). Another study in the same sub-region revealed that wild plant resources contribute an income of US\$ 194 -1114 per household per year (Shackleton *et al*, 2000). At a global level, herbal medicines entering the international market were valued in 1996 at US\$ 14 billion (SCBD, 2001). There is increasing trade in medicinal plants from Southern Africa to China. With improved access to information on markets and technology, there are prospects for continued growth of some of the NWFPs.

Despite the immense importance of NWFPs, their significance in general and economic value in particular is rarely taken into account in land use planning or in assessing gross domestic product (GDP). This is partly because of the subsistence or local market nature of most of the commodities

which often go unrecorded in official national statistics and partly due to the previous tendency where emphasis was on wood/timber and NWFPs were considered only as incidental (FAO, 1995b). These omissions and anomalies need to be corrected since, as observed above, NWFPs can play a significant contribution in house hold incomes of the rural poor and, in a number of cases, to the GDP of national governments/economies.

2.0 Introduction to the non wood forest products

Non-timber Forest Products (NTFPs), also known as non-wood forest products (NWFPs) or special forest products (SFPs) are all the resources/products that may be extracted from forest ecosystem and are utilized within the household or are marketed or have social, cultural or religious significance, excluding saw-timber, pole timber, natural gas, oil, sand, gravel, shale and building stone all of which are covered under other sections. These include plants and plant materials used for food, fuel, storage and fodder, medicine, cottage and wrapping materials, biochemical, as well as animals, birds, reptiles and fishes, for food and feathers that have perceived economic or consumption value sufficient to encourage their collection and removal from the forest¹.

The estimated 150 NWFPs in the international markets can be broadly classified into edibles and non-edibles. The former include edible plants and animals, honey, oils, fish, spices among others while non-edible products include grasses, ornamental plants, oil for cosmetic use, medicinal products, among others. These two classes can further be divided into four general categories which can be redefined as indicated in table 1:

- i. Edibles* such as mushroom, the most well known and documented edible forest products and many other food products gathered from the forest. Since most of these products are not traded widely and are usually collected and consumed by the harvesters themselves, it is difficult to assess their economic magnitudes. These products include ferns, berries or other fruits, nuts, ramps (wild onions), herbs and spices.
- ii. Medicinal and dietary supplements:* Majority of these plants are wild harvested and traded as botanical products while a few are harvested and processed into medicines.
- iii. Floral products:* These include plant products such as fern and grapevines used for decorative applications. These unique forest products may appear in floral arrangements, dried flower decorations, and ornaments.
- iv. Specialty wood products* include handicrafts, carving and turnings, musical instrument containers (basket), special furniture pieces as well as utensils.

1 FAO 1990

Table 1. Main categories of NWFPs

Plant products		Animals and animal products	
Categories	Description	Categories	Description
Food	Vegetal foodstuff and beverages provided by fruits, nuts, seeds, roots, mushrooms, among others.	Living animals	Mainly vertebrates such as mammals, birds, reptiles kept/bought as pets
Fodder	Animal and bee fodder provided by leaves, fruits, among others.	Honey and beeswax	Products provided by bees.
Medicines	Medicinal plants (e.g. leaves, bark, roots) used in traditional medicine and/or by pharmaceutical companies	Bushmeat	Meat provided by vertebrates, mainly mammals
Perfumes and cosmetics	Aromatic plants providing essential (volatile) oils and other products used for cosmetic purposes	Other edible animal products	Mainly edible invertebrates such as insects (e.g. caterpillars) and other “secondary” products of animals (e.g. eggs, nests)
Dying and tanning	Plant material (mainly bark and leaves) providing tannins and other plant parts (especially leaves and fruits) used as colorants	Hides and skins	Hide and skin of animals used for various purposes
Utensils, handicrafts and construction materials	Heterogeneous group of products including thatch, bamboo, rattan, wrapping leaves, fibres	Medicine	Entire animals or parts of animals such as various organs used for medicinal purposes
Ornamentals	Entire plants (e.g. orchids) and parts of the plants (e.g. pots made from roots) used for ornamental purposes	Colorants	Entire animals or parts of animals such as various organs used as colorants
Exudates	Substances such as gums (water soluble), resins (water insoluble) and latex (milky or clear juice), released from plants by exudation	Other non-edible animal products	e.g. bones used as tools
Other	e.g. insecticides, fungicides		

Source: FAO 1996 - <http://www.fao.org/docrep/003/y1515b/y1515b03.htm#TopOfPage>

3.0 Descriptions of some selected non-wood forest products in the IGAD region

Some selected socially and economically important NWFPs in the IGAD region are described briefly below:

3.1 Plant gums, resins and essential oils

Plant gums are usually water soluble compounds made up of polysaccharides and small quantities of protein and mineral salts (cations). Plant gums, which are made up of polysaccharides and small quantities of protein and mineral salts (cations), are of two types: exudates (ooze from the tree/shrub as a result of injury and are the main forms produced in Africa) and seed gums (isolated from the endosperm portion of some seeds). The two most important commodities are *gum Arabic* and *gum karaya*. *Gum arabic* is a dried exudate obtained from the stems and branches of *Acacia senegal* or *A. seyal* which are native to the hot and dry regions of Africa including IGAD Member states².

Plant resins are solid or semi-solid materials, which are insoluble in water but soluble in certain organic solvents. The resins found in Africa can be classified into two categories: oleo-gum-resins and oleo-resins. The term oleo-gum-resin means that the product contains an essential oil component, a water soluble gum and alcohol soluble resin. Oleo-gum-resins are represented by *myrrh* and *frankincense* which, like *gum arabic* are ancient commodities that have remained important articles of trade to the present day. *Myrrh* is an exudate produced from *Commiphora myrrha*, a species confined to the Horn of Africa in Ethiopia, Kenya and Somalia. Outside Africa, it is found in Arabia. *Frankincense* (incense) is an exudate from species in the genus *Boswellia*. There are eight species of *Boswellia* found on the Horn of Africa. *B. sacra* and *B. frereana* from Somalia produce the most valued incense in the world. Incense from *B. papyrifera* from Eritrea, Ethiopia and Sudan is the most widely traded while incense from *B. neglecta* is produced in commercial quantities from Ethiopia and Kenya but traded mostly within the sub-region.

In the IGAD region Ethiopia, Somalia and Kenya are the three leading producers and exporters of *myrrh* and *frankincense*. Virtually all the resources are natural stands except in a few cases in northern Ethiopia where the *Boswellia* species are being used in the rehabilitation of degraded sites. In areas where commercial production is well established, there exist a form of natural resource management based on indigenous knowledge. Although land is owned communally, clans within the Somali community have the responsibility of managing resources within their areas of jurisdiction, which is well respected. *Myrrh* or incense trees are protected from felling by local traditional rules and regulations. In line with these traditions only the dead and/or dry branches or trees are cut. *Myrrh* production through tapping is also well organized by the “Malmaleys” i.e. *myrrh* (malmal) tappers, a system that ensures sustainable production from the resources.

3.2 Indigenous fruits and related forest materials

3.2.1. Wild fruits

Wild fruits collected and eaten raw or processed by local communities contain vital nutrients including essential vitamins, carbohydrates, protein, and minerals which are especially important during famine and for growing children and the aged, who are prone to malnutrition and related diseases. The range of wild fruits in Africa is quite large and diverse and varies according to the prevailing ecological conditions of a given area. Among indigenous or naturalized fruits with commercial potential in Africa are: *Tamarindus indica* (tamarind), *Ziziphus mauritania* (ber), *Adansonia digitata* (baobab), *Vitellaria paradoxa* (karite), *Parkia biglobosa* (nere), *Sclerocarya birrea* (marula), *Uapaca kirkiana* (uapaca) and *Azania garckeana* (azania) for savannah and dryland zones and *Irvingia* spp. (Andock), *Baillonella toxisperma* (Moabi), *Ricinidendron heudelotii* (Njansan), *Coula edulis* (Ewome), *Monodora myristica* (Nding), *Garcinia cola* and some *Xylopia* species.

3.2.2. Spices

Fruits and nuts of many other NWFPs species are used as spices or condiments including *Monodora myristica*, *Tetrapleura tetraptera*, *Afrostryax lepidophyllus*, *Xylopia aethiopica*, *X. parviflora*, *Aframomum citratum*, *A. melegueta*, *Scorodophoeus zenkeri*, *Piper guineensis*. The list of spices is enriched by roots *Mondia whiteii* and *Dorstenia* sp. and barks of *Afrostryax lepidophyllus* and *Scorodophoeus zenkeri* that are used as spices in many countries.

3.2.3 Snacks

Some of the NWFPs, like *Garcinia kola*, *Coula edulis*, *Cola nitida*, *Cola* sp., *Dacryodes edulis*, *D. macrophylla*, *Anonidium manii* and *Trycoscypha* spp., are directly consumed as snacks. The uniqueness of all these species is that they do not need particular transformation (except *Coula edulis* fruit).

3.2.4 Wines

In some of the regions certain palm trees, especially *Raphia* sp. and *Elaeis guineensis* produce a sweet sap called “palm wine”, which is very appreciated by the local people. To improve on the flavor of the palm wine some communities add the bark of some other species such as *Khaya* sp., *Garcinia lucida*, *G. kola*, among others which gives the wine a bitter taste.

From the available literature it was difficult to determine with any level of certainty the volume, quality and regularity of supply and demand of the various wild fruits, spices, snacks and wine, and what needs to be done by the public and private sector to sustain or enhance production, processing, value addition and marketing of the popular and available wild fruits, spices, snacks and wine to meet the current and future demand. The consultative national and regional meetings should suggest practical ways in which member states and IGAD can facilitate and support key stakeholders along the NWFPs marketing chains to identify areas of intervention that would result in the greatest benefits to a majority of the stakeholders.

3.3 Ethno-medical, ethno-veterinary and ethno-botanical products (forest medicine)

Traditional medical practices, ethno-medical, ethno-botanical and ethno-veterinary, in regions of

Africa are widespread and deep rooted. Most medicines are from plants with a majority coming from forests and allied ecosystems. The perceived importance of a given medicinal plant varies with the location and generally includes *Garcinia lucida*, *Prunus africana*, and *Pausinystalia johimbe*, *Erythrophleum lasianthium*, *Cassine transvaalensis*, *Alepidea amatymbica*, *Warbugia*, *Harpagophytum procumbens*, *Albizia anthelmintica*, *Myrsine africana*, *Prunus africana*, *Strychnos henningsii*, *Warbugia salutaris*, *W. ugandensis* and *Zanthoxylum chalybeum*. Some of these species have been proposed for wide scale cultivation and/or conservation. It is generally acknowledged that majority of the rural communities depend on ethno-medical, ethno-botanical and ethno-veterinary products for themselves and their livestock and crops, the volume, quality and value of these products used and future demand is not fully documented. Some of this data and information may be availed during the national and regional consultative meetings.

3.4 Bee keeping and honey production

Honey and beeswax are two important NWFPs that have a strong relationship with plants. It is also important to bear in mind that as the honeybees pollinate a wide range of vegetation they derive the nectar and pollen they need. Pollination of many flowering plants is economically important and critical for sustaining biodiversity, agriculture and forestry. Beekeeping is an important traditional activity in rural Djibouti, Ethiopia, Kenya, Sudan and Uganda and to a lesser extent Somalia. The diverse flora and fauna of the vegetation of the country is providing excellent bee forage making it highly suitable for sustaining a large number of bees colonies. Ethiopia is known to hold Africa’s largest apicultural resources (Table 1). The apiculture sub-sector in the IGAD region is dominated by smallholder producers who practice traditional production system using traditional hives. This traditional production system is less productive with the average of 5-6 kg of honey yield per hive per year, while from the improved one, on average of 15-20 kg is possible. The poor post harvest handling and storage only serves to reduce the quality and thus marketability of the honey. The honey produced is so crude that it will not compete in the regional and international markets.

Table 1. Ethiopia’s honey and beeswax production (tons) compared to Kenya’s in the IGAD region (Source: FAO, 2005).

No.	Country	Honey production	Beeswax production
1	Ethiopia	39,000	4,300
2	Kenya	21,000	2,400

Beeswax is a valuable hive product obtained from honeybees. It is a by-product of the honey production. Beeswax is largely collected from traditional hives. Wax yield from traditional hives is 8-10% of the honey yield, compared to 0.5-2 % from modern hives. Unfortunately the traditional harvesting and post harvesting practices result in very high losses of wax over and above lower quality product. With adoption of appropriate harvesting technology and post harvest handling, however, the quality and thus marketability can be improved. Ethiopia is the 5th biggest wax exporter to the world market.

It would be interesting to determine the volume of honey and beeswax imported into each of the IGAD member states and what needs to be done by the public and private sectors to gradually

replace the imported honey and beeswax with locally produced products and what IGAD can do to support and/or enhance the process. Presently production of honey and wax are still very traditional with little or no safety precautions and/or hygiene. The use of fire to repel the bees is very destructive to forest fauna and flora, and insects. It is therefore of paramount importance to improve honey production as one of the economic activities in all honey producing areas of the IGAD region.

4.0 Some ecological aspects of NWFP production in the IGAD region

The mean national forest cover in the eastern Africa sub-region reaches 13 percent: Uganda (30 percent) is the country with the highest forest cover in the region; less than one percent of forest cover is documented for Djibouti and Somalia. Typical open forests in the region are open *Acacia* and *Commiphora* woodlands, dominated by *Acacia spp.* (e.g. *A. nilotica*, *A. bussei*) and *Commiphora spp.* respectively. In the drier parts of East Africa, bush- and shrubland are dominant. Lowland moist forests, which belong to the Central African moist forests, can be found in Uganda and Kenya. Other important forest types include the afro-montane upland forests (e.g. *Juniperus procera*, *Olea africana*), mountain forests (eg. *Prunus Africana*), Miombo woodlands (eg. *Warburgia salutaris*), coastal and riverine forests and mangroves.

The most important habitats for the exploitation of NWFPs in Eastern Africa are the woodlands. All species providing exudates, such as *Acacia senegal*, *Boswellia sp.* and *Commiphora sp.*, are derived from woodlands located in the arid and semi-arid lands. Closed forests are in general limited to the western parts of East Africa and the highlands. Important NWFPs of the lowland forests are bushmeat, bee products and medicinal plants. Most of the NWFP are exploited from natural stands. Some species, such as *Acacia senegal*, are also produced in plantations. *Prunus africana* is principally derived from wild resources; however, efforts have been made recently to establish *Prunus africana* plantations and to integrate the species into agroforestry systems. Intensive cultivation systems already exist for introduced species in Africa, such as *Bixa orellana*, *Chrysanthemum sp.* and *Cinchona sp.*, that can also be considered as agricultural cash crops.

NWFP for which over-exploitation is documented include *Prunus africana*, *Warburgia salutaris*, *Acacia farnesiana* (Tanzania), *Xylopiya aethiopica* (Tanzania) and *Podocarpus sp.*, the bark of which is mainly used for beehive construction. Traditional honey harvesting also contributes to the degradation of forests and woodlands due to the utilization of fire, with its high risk of starting bushfires. The main NWFPs for the respective countries are shown (Table 3).

It is imperative that the key research and intervention areas that will enhance natural resource management and conservation of biodiversity are identified and the associated social and economic costs and benefits are estimated to better inform present and future planning. It is also important the areas that need supportive policy and legal framework are identified the structures used to detect the need for institutional reform in each of the member states triggered as appropriate.

Table 3. Main NWFPs in Eastern Africa

Country	Main NWFP	Selected statistical data available
Djibouti	Fodder plants	No information available
Eritrea	Exudates (gum arabic from <i>Acacia senegal</i> , olibanum from <i>Boswellia papyrifera</i>), utensils (leaves from the doum palm <i>Hyphaene thebaica</i>)	In 1997, Eritrea exported 49 t of gum arabic, 543 t of olibanum and 2 064 t of doum palm leaves
Ethiopia	Exudates (olibanum, gum arabic, myrrh from <i>Commiphora myrrha</i>), medicinal plants, honey and beeswax	· Ethiopia is one of the world's largest producers of olibanum with an annual production of 1 500 t · Annual production of gum arabic reached 350-400 t in 1988-94 · In 1976-1983, annual honey production ranged from 19 400 to 21 000 t, representing 24 percent of the total African honey production
Kenya	Fodder plants, medicinal plants, exudates (e.g. <i>Boswellia spp.</i>) and tannins (<i>Acacia mearnsii</i>)	Annual production of tannins is estimated at 9 700 t/year, with exports up to 7 800 t/year
Somalia	Exudates (myrrh, opopanax from <i>Commiphora sp.</i> , olibanum)	Annual production of myrrh is estimated at some 4 000 t, worth US\$16 million. Exports of olibanum reached 200 t in 1987 (<i>Boswellia carterii</i>) and 800 t in 1988 (<i>Boswellia frereana</i>).
Sudan	Exudates (gum arabic, gum karaya from <i>Sterculia sp.</i> , olibanum), fodder, fruits, sheanut butter (<i>Vitellaria paradoxa</i>), medicines, dyes (henna from <i>Lawsonia inermis</i>), honey and beeswax, bushmeat	Sudan is the main producer of gum arabic (from <i>Acacia senegal</i> and <i>A. seyal</i>), widely used in the food, pharmaceutical and technical industry. In the 1996/97 season, the total exports of gum arabic, mainly derived from <i>A. senegal</i> , was 17 759 t.
Uganda	Honey and beeswax, bushmeat, medicinal plants,	The only statistical data available indicates the exportation of 50 kg of sheanut butter (<i>Vitellaria paradoxa</i>) in 1996.
Tanzania	Fodder plants, medicinal plants, honey and beeswax, birds	Important exported medicinal plants include <i>Cinchona sp.</i> (exploitation of plantations of this exotic species yielded 756 t of bark in 1991 worth US\$258 000) and <i>Prunus africana</i> (annual exploitation of 120 t worth between US\$240 000 - 1 200 000).

Source:

FAO-Sub regional synthesis: Eastern Africa - <http://www.fao.org/docrep/003/y1515b/y1515b08.htm>

5.0 Resource mapping NWFPs in the IGAD region

Forests are the repositories of natural wealth in terms of flora and fauna. The economic value of same has long been recognized. The stock inventories have been an integral part of forest resources assessment although these inventories account primarily for timber species. Though not included in forest inventories non-wood forest products (NWFP) form a very important source of livelihood to communities living in the vicinity of forests and in pastoral areas in the IGAD region. To promote commercial utilization of NWFPs and other natural resources, identification and mapping of the species with commercial potential should be the first step. The second step would be to conduct product development study, which would clarify the feasible exploitation and marketing of the resource with special emphasis on the knowledge, technology adoption, financial capability and availability of infrastructure of the area. Value addition and exporting new product may be too complex for pastoralist and pastoralist business institutions while private traders also may not interested to take risk at the start.

To date, no systematic attempt has been made so far to map these resources in IGAD member states. At the Regional Centre for Mapping Resources for Development (RCMRD) satellite data supported by ground truthing (verification) has been used to generate a forest type map, forest density map, non-timber forest products (NWFPs) map and a map showing total economic value (TEV) of selected trees in some areas of Kenya, Southern Sudan and Somaliland in Somalia. Since, the utilization of forest depends on the total economic value of trees these maps were integrated in GIS to generate a NTFP map. These efforts need to be systematically expanded to cover all key NWFPs producing areas in all IGAD member states³.

6.0 Production, processing and marketing of NWFPs

6.1 The role of ecology on sustainability of NWFPs production and utilization

Sound ecological information is a major factor in the sustainable production of NWFPs. At the very basic level, sustainable use requires information on: density and size-class structure of the plant population producing the NWFPs (i.e. resource stock) and how much of the desired resource this population is able to produce in a given period of time (i.e. yield). An overall strategy for collecting this information in ensuring optimal production has been developed in some of the IGAD member states. The six steps process involves species selection, forest inventory, yield studies, regeneration surveys, harvest assessments and harvest adjustments. The basic concept is to provide a constant flow of diagnostic information about ecological response of the species to varying degrees of exploitation. Sustainability is achieved through a continual process of reciprocal feedback where the demographic reaction of the target species must result in a corresponding adjustment in harvest levels. However, the above recommended measurements are expensive and time consuming, and very few species have been studied from this perspective. Nevertheless, they provide rational approach to sustainable management and hence conservation of biological diversity.

6.2 Meeting the rising demand for NWFPs

The maintain and expand the NWFPs markets at national, regional and international markets

dictates that the suppliers determine the prevailing and future market demand and to develop practical strategies to guarantee regular supplies of consistent quality NWFPs. Irregular supply and variable quality have detrimental effects on the market and may force the market to look for alternatives. Several reasons have been advanced to explain the variations in the production of NWFPs including drought, excessive pressure on the resource, and changes in the weather patterns affecting the period of flowering and fruiting, low levels of public and private sector investment and poor and unsupportive policy and legal framework. To sustain the volume and quality of products in the market it has been proposed that the existing natural vegetation be conserved while those critically endangered and/or in high demand be domesticated. It is important to determine what the status is in each of the IGAD member states and what role the communities, local and international investors, member states and IGAD have and how best to meet these roles.

Increases in global demand for natural products of the types indicated in this report means there is high commercialization potential provided that support to promote trade, quality production venture capital and resource development are properly provided. There are signs of increasing commercialization over the last two decades following trade liberalization and involvement of private sector. Most of the NWFPs such as gum-incense, honey and wax, herbal medicines and essential oils sub-sector have strong tradition and a large potential in the countries. The challenges to commercialization are, however, several. These include: poor infrastructure, lack of marketing information, poor capacity in business plan development, low level of investment in training collectors and exporters, limited credit and finance resources to run successful NWFPs based enterprises, lack of capacity and technology in adding value to the products to compete with other products, poor quality control due to limited physical facilities. Low business management skills, lack of business mentorship and institutional supports for collaboration among producers to form national and local associations, low quality branding and packaging, poor access to financial services.

6.3 Indigenous technical knowledge and traditions that sustainably conserve NWFPs

Culture and religion play a great role in conservation of forests and open grasslands. In Africa certain communities, such as the Khaya forests at the Kenyan coast among the Mijikenda and the Ekwar forests among the Turkana in Kenya, set aside particular forest areas that are often maintained as sacred groves in which harvesting of produce is banned or closely controlled. Although the strength and extent of these cultural considerations are diminishing due, in part, to western cultural influence (education, religion), they remain potent factors and learning points in the sustainable management of NWFPs and services. Traditional technical knowledge, information and skills are often not documented in most aspects of life in IGAD member states which eventually erodes livelihoods while threatening resources as communities try to adjust and establish new equilibrium with declining resources in the face of increasing population and demand. It is important that during the in country and regional meetings the status of traditional knowledge, information and skills system in the management of forest resources and the steps being taken by the various categories of stakeholders is clearly outlined. Suggestions on how to rationalize and harmonize the approaches in the member states and in the IGAD region shall be arrived at and actualized.

6.4 Enhanced Market information system for NWFPs

Presently many projects in the IGAD region are producing improved NWFPs while the markets have remained generally informal and it thus is difficult for local people to have access to information about potential markets and prices and/or have any control over the prices they receive. A Marketing Information System (MIS) is a structured approach to collecting, analyzing and communicating information about markets and marketing. An NWFPs MIS can organize the collection, analysis and dissemination of many different types of marketing data. This is particularly relevant when monitoring information that changes frequently, such as prices, since this is where local producers often have the most difficulty. It is not necessary to monitor prices that are known to remain stable, although participants may want to identify these in their initial situational analysis.

A market information system aims at increasing market transparency for users and enables them to make more informed production, value addition and marketing decisions. The users of an MIS often:

- make informed marketing decisions;
- are able to negotiate with others in the marketing chain
- organize production and sale; and
- facilitate group discussion and decision-making.

Ultimately, as users gain more information and learn how to exploit that information they should find ways to increase the profitability of their enterprise.

6.5 The role of associations and networks in production and marketing of NWFPs

When local people and value chains are organized, they can make greater income from NWFPs activities because they behave like the middleman, who integrates factors such as better transportation, bulk sales and better information on markets. The case studies on *Prunus africana*, rattan, devil's claws and marula clearly illustrate that income can be tripled when local people are grouped. For example in Sudan, a harvester of Gum Arabic receives US\$ 0.05/kg-1, local traders US\$ 1.0/kg, middlemen US\$ 2.0/kg and exporters US\$ 5.0/kg. Marketing in community groups has been seen to be more beneficial to the producers than marketing individually or through the middleman. People working together are capable of negotiating, lobbying and developing business plans than individuals.

The collapse of the once vibrant Gum Arabic market in Nigeria due to poor institutional structures and its subsequent revitalization by a group of concerned public and private sector stakeholders in a grouping referred to as the National Association of Gum Arabic Producers, Processors and Exporters of Nigeria (NAGAPPEN) demonstrated the importance of formation producer/marketing groups to champion their interests. A similar lesson is being learned in Kenya where the Network for Natural Gums and Resins in Africa (NGARA), a private-sector led organization, has taken a leading role in the development of the sector in the country. Like NAGAPPEN, NGARA and the national association, GARA is lobbying the government for enabling policy and legal frameworks while putting in place mechanisms for improving quality and marketing of the gum, aspects that are important for long term viability. At the regional level, NAGAPPEN and NGARA are putting in place a coordinated strategy among producer countries and partners to enable them to have better control of the international trade and to share experiences in the areas of production,

processing, quality and marketing. During the regional meeting it would be advantageous for all parties to determine how best IGAD can partner with NGARA and other regional natural resource management organizations to champion sustainable utilization and conservation of NWFPs with maximization of profits at community level. Most importantly, it would be essential to establish a business incubation centre within the region to help scale up best practices and mentoring emerging entrepreneurs.

7.0 Economic contribution of NWFPs in IGAD member states

In the IGAD region, rural communities depend on NWFP as sources of food, medicines and fodder. Wild fruits, for example, are valued as “buffer food” in periods of famine and food shortage while most of the honey produced does not enter the markets, but is used for local consumption. It is generally acknowledged that economic benefits that can be derived from non-wood forest products (NWFPs) have been identified as a major opportunity for community forestry projects and potential contributors to the local and national economies. Many NWFPs are articles of commerce including medicinal plants and have indeed contributed to the economic development of some local communities and national economies. Communities are, however, yet to receive their share of the benefits despite being key actors in the marketing chains - Gums (especially *gum arabic*) and resins (frankincense and myrrh) are good examples.

To African national economies, many examples exist to show the economic importance of NWFPs: In Sudan, over 13% of the foreign exchange earned is generated from the Gum Arabic trade alone⁴. It is important that NWFPs find champions to better position them in the IGAD nation’s development agenda.

7.1 Job creation

The international trade of IGAD region NWFP is documented mainly for gums and resins, medicinal plants, bee products and tannins (extracted from the bark of wattle trees). Gums and resins are especially important sources of income for most rural people in Sudan, Ethiopia, Eritrea and Somalia. In Somalia, exudates are the third source of revenue after livestock and bananas. In Ethiopia, the number of seasonal workers engaged in the tapping and grading of olibanum is estimated to be between 20 000 and 30 000 per year. Similar figures can be assumed for Gum Arabic in Sudan, where smallholder farmers owning “gum orchards” exploit the majority of gum. Training and technology needs to improve harvesting, storage, processing, value addition and marketing in each of the member states and the region will be discussed and the way forward agreed on.

7.2 Valuation of NTWFPs

Economic values are human oriented and human assigned. Values are specific to a given context and situation. Value is the worth of a product or service to an individual or a likeminded group in a given context, often involving a complex of relationships Forest valuation should therefore, always be situation specific and result should be attributed back only to the group studied and to the actual context and situation studied¹

NWFPs can be classified as tradable or non tradable. The tradable NWFPs are significant in international trade. Non-timber forest products also constitute a critical component of food

4 Chupezi *et al.*, 2009

security; it serves as an important source of income for the poor in many developing countries. Three methods have been used for the economic valuation of Non-timber forest products including direct market price⁵, indirect market price⁶ and non-market estimates⁷, depending on the objective of the study. The first two measures are based on estimate of exchange values where buyers and sellers exchange goods or service for money or other goods and services. In the case of indirect market price, assumptions are made regarding proxy market conditions and low buyers and sellers will behave under different circumstances. In addition some workers have preferred to use the financial valuation method. It is, however, generally accepted that no method is superior to the other. Guidelines need to be developed for valuation of direct and indirect values of the NWFPs

7.3 Types of forest values

Economic value associated with forest can be classified into four categories.

- (i) Direct-use values (including consumptive and non consumptive values).
- (ii) Indirect-use values.
- (iii) Option values
- (iv) Existence and bequest values

An addition of all these value is the total economic value. The purpose of valuation is to make the value of each forest use explicit and not necessarily to put a total value on nature⁸. In most instances the contribution of the NWFPs is omitted or not able to reflect the real market or service value

7.4 Commercialization of NWFPs in the IGAD region

Commercialization of fruit, spice and medicinal plants may have far reaching implications on the survival of some of the plants partly because most of the material comes from wild harvests and partly due to the fact that information on primary production, demography and growth characteristics is usually too limited to ascertain sustainable off-take levels and increased extraction tends to put pressure on the available stocks thereby threatening the species through over-harvesting. A second aspect relates to what part of the plant is harvested. Most of the popular medicinal plants contain active ingredients either in the roots or bark. A good example is *Prunus africana* in Eastern Africa whose bark is sought after in the treatment of prostate cancer. The demand for the bark in the 1980s and early 1990s almost threatened the remaining natural populations to extinction.

Nevertheless, development of enterprises based on NWFPs have been shown as one way of making forest use more sustainable, both because they extend the range of forest benefits and because gathering and processing activities can be managed by communities near the forest resource with a greater proportion of the end-product revenues returning to those who manage the resource⁹. However, there are also examples where increased markets for some NWFPs

5 *Murphy et al., 2005*

6 *shackleton et al., 2004*

7 *Dixon et al., 1994*

8 *Michael 1995*

results in the degradation of forest resources¹⁰, nor does it necessarily lead to alleviation of poverty¹¹ or to economic incentives for the conservation of forests¹².

Presently most of those exploiting NWFPs are small at the level of local producers, which 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. From the available information it is evident that much of the revenue in the NWFP sub-sector is earned at the processing and branding end, which is usually located outside the raw material production areas¹³. It is important that the public sector develops and implements supportive market oriented policy and legal frameworks while purposefully targeting the NWFP sub-sector for investment if the private sector is to be encouraged to invest. The major issue at stake, however, is that some stakeholders in some IGAD member states are apprehensive that commercialization of most highly valued NWFPs may end up causing major impacts on the sustainability of raw material production. What is the actual situation and what needs to be done about it by the various actors along the marketing chain, in member states and IGAD.

7.5 Food security

The use of wild-edible plants as sources of food for humans is common throughout rural areas of the IGAD region despite the cultural taboos in some places. The use is more common and widespread in food insecure areas such as ASALs. Recent studies in various ASALs of the country reported the contribution of wild-edible plants to the food security of inhabitants. Wild fruits contain vital nutrients (carbohydrates, protein, and minerals) and essential vitamins which are important, especially for growing children, who are prone to malnutrition and related diseases. Reliance on wild edible plant is very high in ASALs due to the widespread food insecurity. Increased consumption of wild-edibles enables people to cope better with erratic, untimely rains and drought for several consecutive years without facing severe food shortages, famine and general asset depletion (Mathys, 2000). Indeed, wild-food plants are praised for their role to fill a variety of food gaps. Their availability during different times of the years qualifies them for such a role. But in most cases the biomass production from the wild-food plants is not bulky enough to cover the required needs. This is where intervention is required to enhance productivity and improve availability. Wild-food plants are mostly used for home consumption and if traded on the market, they also provide the opportunity to supplement household income (Addis et al. 2005).

In general the following are the most important constraints identified:

- Inadequate information sources on the nutritional composition (value) of edible wild plant species is limited;
- Despite the much acclaimed diversity, saliency and potential of wild edibles to livelihood improvement and poverty reduction, there is no practical action specifically targeted towards their conservation and utilization on a larger scale. Interventions by universities,

9 *Taylor, 1999*

10 *Ndoye et al, 2001*

11 *Fisher, 2001*

12 *Wilkie et al, 2001*

13 *Wynberg, 2004; Chupezi et al., 2009*

research institutes (e.g., agriculture, forestry, rural development and biodiversity conservation) and other stakeholders are critically needed.

- Young people regard them as low status vegetables, actually associated with poor people;
- Generally low yielding and the majority of the vegetables have a bitter taste (alkaloids) or sliminess, which enhance their unpopularity especially among the young, and
- Most require special preparation methods making them difficult to adopt.

7.6 Role of Trees and NWFP in Social Beliefs

Various tree species in different areas in Sudan constitute an important component in social beliefs. Some of the trees are believed to bring good luck while others are believed to bring bad luck. However, it is important to note that the local people are reluctant to mention the species, which have some magic effects because they believe that there are some evil effects associated with those tree species. Accordingly, the percentages of those who openly acknowledge or confess that they believe on magic effects or supernatural powers of trees is very low.

8.0 Policy and legal frameworks

There exists traditional protection (bans on felling) of selected trees, shrubs and other important species in most IGAD member state, though this has, to a great extent remained undocumented. In addition all IGAD member countries have in place policy and legal frameworks that govern the management and exploitation of indigenous forests and bushlands, which are largely classified as public goods. Over the years forestry laws have evolved and each country has adapted them depending on its own development strategy and socio-economic situation. In some of the member states the laws allow locals to benefit from their common rights of use in the permanent protected forest and bush-lands. Under given provisos of existing laws dwellers can harvest forest foods, medicines and any other important forest products from national parks, recreation forests, forest reserves, among others., although the exploitation of wood for house construction, tools and canoe fashioning may be restricted or not depending on the member state. Yet in some member states access of dwellers to non-permanent forest is only authorized within the framework of common right of use designed exclusively to fulfil the subsistence needs and thus commercialization is discouraged. Commercial harvesting of NWFPs these countries requires payment of taxes/fees/duties/royalties.

Institutional issues are quite important in the sustainable management of NWFPs but often tend to be left out. Perhaps the low level and informal nature in which most of these commodities are handled in producing countries results in their not being well captured in national statistics, while traditional technologies of production make standardization and certification difficult. Nevertheless, there are a number of institutional aspects that can be taken into account to ensure sustainable resource management in the IGAD region. Amongst these are:

- The development and implementation of supportive conservation and market oriented policy and legal frameworks
- Strategically investing public resources to encourage private sector investment in NWFPs
- Clear identification of producers and their organization into producer groups whose capacity can be improved through training in sound methods of harvesting and post harvest handling.
- Training community, producer and marketing groups/associations in good management of resources including aspects of marketing.

9.0 Research and Development - herbal medicines, gums, resins and other products

In all IGAD member states medicinal plants industry plays an important role in nation's healthcare system and in terms of government expenditure, it plays a major cost saving role. For example a study in Ethiopia on the role of traditional medical care revealed that the traditional medicine trade value in the year 2005 was estimated as ETB 2 billion (some 8% of the total budget), whereas the total federal government budget expenditure in the same year was estimated at ETB 24.7 billion.

Interesting phyto-medicine development research activities are currently on-going at the Ethiopian Health and Nutritional Research Institute (EHNRI), Kenya Medical Research Institute and the Djibouti Medicinal Sciences Institute and other research and tertiary institutions in the region where phyto-chemical and pre-clinical researches are conducted by isolating active component of herbal remedies. Some of the efforts include development of phyto-medicine for human tapeworm, animal tapeworm, skin disorders, hypertension, Bronchodilator and mastitis treatments all based on traditional claims.

Presently there is very limited knowledge available on the value addition for indigenous medicinal plants in IGAD member states. Value addition is essential for the economic success of medicinal plants related enterprise and also to enhance the medicinal value of the raw drugs obtained from wild plants. Suggestions for value addition of medicinal plants:

- ♦ Semi-processing of the materials to a value added product through the adoption of different techniques.
- ♦ Guidelines for harvesting; storage, drying and grading and civil structures, required for value addition, and
- ♦ An improved organizational/institutional arrangement for handling the marketing of medicinal plants.

In Sudan, the Forestry Research Centre and the Gum Arabic Research Program both belong to the Agricultural Research Corporation under the Ministry of Agriculture and Kenya Forestry Research Institute have active ongoing research on gums and resins that will serve to inform both policy and investment decisions in future. In case of gum/resin, the research is focused on ensuring stable and sustainable production of good quality gum arabic while enhancing the environment and promoting other gum/resin producing species and upgrading producers' management skills through research on silvicultural management, tree Improvement, agroforestry, anatomy and research on other gums.

Research in the IGAD region has also shown that there are good prospects for the wild harvesting of indigenous essential oil plants such as the Basil (*Ocimum spp.*), *Lippia spp.*, and many others found all over the ASALs. The indigenous essential oils can be sold to the national and regional buyers for the manufacturing of healthcare or bodycare products. It is important that IGAD spearheads a region initiative to develop national and regional standards and certification procedures to regulate and guide the production, post harvest handling and processing of herbal medicines and essential oils if the member states are to gain foothold in the international markets. Essential oil business are emerging already in Ethiopia, Kenya and Sudan, but mostly for humid land species as well as for cultivated plants.

The market chain for medicinal plants, gums and resins and essential oils are essentially undeveloped and often the traditional healers and rural consumers are the collectors and deliverers of the services/products directly to the users. Indeed, there is no observable chain events in the marketing of medicinal plants. It is important that each of the chains are studied in detail to determine the interventions required to improve performance and quality of products.

10.0 Constraints to optimal utilization of NWFPs in the IGAD region

Considering the issue of sustainable production of NWFPs, there are a number of challenges that need to be addressed including:

10.1 Production and over exploitation of NWFPs and other forest resources

- i. The disappearing of forest cover, inequitable market access of marginalized population and monopolization of high value NTFP by logging and poaching illegal groups.
- ii. There are few cases of domestication of NWFPs and where such domestication is carried out those local people who most depend on the products are often not properly incorporated.
- iii. High variability in volume and quality including the amount of active ingredient and/or oil content across ecological range, seasons and both within and between populations. Many NWFPs, such as mushrooms and nuts, are seasonal and depend on natural growth and regeneration, which makes their productivity unpredictable. Markets expect a more commercial and professional looking product with high quality standards. This is the corner stone for increasing consumer demand. Importers are sensitive to quality of raw material supplied with implications on prices offered. Therefore, the quality of NWFPs is a cornerstone for stimulating and increasing consumers' demand.

10.2 Processing, value addition and marketing

- i. The local communities in the IGAD region do not have the capacity to promote sustainable value addition and marketing to a point where financial benefits to local can served as incentives for forest conservation.
- ii. There is no information available to producers on best practices concerning production and quality control and limited access to knowledge on national and global markets.
- iii. Low value of NWFPs due to the limited processing and value addition initiatives in Africa despite the region being a major producer of raw materials.
- iv. Since NWFPs are often sold in informal markets, information about prices, product flow and marketing options is less well known than for major crops or for timber. Foresters whose training is largely technical and oriented to production issues may know little about the economics and marketing of NWFPs. However, the absence of formal marketing channels can also be an advantage, since it is easier for small producers to gain access to these markets, and regulations are often less onerous than in government-regulated markets.
- v. The profitability of enterprises based on NWFPs is often low. Some of the reasons that individual producers receive such a small percentage of the total profit on NWFPs are: trading is done individually; producers are not well organized and are dispersed; individuals lack the necessary marketing skills and information to gain leverage in the market; and individuals lack related business assets such as storage and transport.

10.3 Inappropriate policy and legal framework and producer and marketing groups

- i. Historical neglect by governments. To address this constraint
 - *Review and appraise existing policies impacting on NWFPs based value chains;*
 - *Engage and dialogue with policy makers on relevant value chains NWFPs which require specific policy support;*
 - *Develop and publish participatory policy briefs on specific value chains, and,*
 - *Facilitate stakeholders' workshop to validate policy briefs for various NWFPs-based value chains and make recommendations for policy improvements.*

10.4 Research and documentation

- i. Little research has been carried out to improve the availability of NWFP statistics;
- ii. Statistical data only cover a limited number of NWFP and aspects (e.g. on trade, self-consumption, exploitation). Especially information on the resource and on products used for subsistence purposes is lacking. Furthermore, existing information is often based on case studies, which cannot be extrapolated on the national level;
- iii. Available information is often unclear, inconsistent and contradictory, e.g. regarding the state of the described product (raw material, processed, semi-processed, graded, among others.), production figures (different units used) and export values;
- iv. Appropriate methodologies to collect and analyze viable key information on NWFP do not exist.
- v. Most of the statistical data on NWFP is not yet stored and analyzed in specific electronic databases;
- vi. There are gaps in understanding the range of products used from forests, their taxonomic classification, socioeconomic values, technical packages and the policy contexts for their sustainable use.
- vii. There are generally no systematic efforts to conserve or sustainably manage resources for NWFPs and only a few cases of domestication of NWFPs exist.
- viii. There are no appropriate methods and tools to promote sustainable use of NWFPs and successfully regulate trade and the form policy development i.e. policy development is still largely disconnected from field experiences.

10.5 Training, information exchange, awareness raising and extension services

- i. The existing expertise and knowledge is not well documented or is inaccessible, which essentially means that many are duplicated while many important issues remain neglected. To compound the situation foresters who are trained in timber management frequently lack training and experience with NWFPs.
- ii. The existing expertise and knowledge is not well documented or is inaccessible, which essentially means that many are duplicated while many important issues remain neglected. To compound the situation foresters who are trained in timber management frequently lack training and experience with NWFPs.

10.6 Institutional issues and considerations

- i. *Insufficient collaboration and networking:* Institutions involved in NWFP statistics collection and analysis do not collaborate sufficiently. Therefore, data remain fragmented and sometimes duplicated;
- ii. *Lack of lead institutions on NWFP statistics:* In most countries, various institutions (e.g. 11 ministries and institutions in Rwanda⁹) are involved in data collection and analysis. An official national focal point on NWFP statistics does not exist;
- iii. *Weak capacities:* Most institutions involved in data collection have limited human and financial resources available;

10.7 Stakeholder involvement

- i. *Poor stakeholder involvement:* Statistical data are mainly gathered by national organizations. The industry and local communities are not involved in data collection and analysis, although they may possess relevant information;

11.0 Conclusions

NWFPs have tremendous economic potentials for income generation and poverty alleviation at the local level, where other sources of income are less apparent. These potentials can be realized following from improved institutional arrangements and implementation of supportive policies and legal frameworks, elaboration of venture capital and mentoring schemes, adopting improved technologies and transport infrastructure for processing, value addition and marketing, improved information flows and the capture of green premiums from international markets. Added to this is the positive outlook for the economic viability of NWFPs production and trade, associated with increasing interest in natural ingredients for the treatment of diseases. Overall, the expectations from a value-added processing strategy for NWFPs in Africa should reduce post-harvest losses through better storage, reduction in the weight and volume of raw products through consistent drying, increase standardization 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. More research adapted to local production systems and capacities would be needed to foster the possibility of ensuring sustainable supply of uniform grades of raw materials to industries.

12.0 Recommendations and suggested way forward

For convenience recommendations from the available literature and discussions with key stakeholders in NGARA and RCMRD, were grouped as indicated below in the past:

12.1 Production and harvesting of NWFPs in the IGAD region

12.1.1 Over exploitation of NWFPs: There is need to carry out more biometrically sound inventories to accurately determine / assess the true status of the much touted increasing pressure on NWFPs, as evidence of over-harvesting is rare for most NWFPs.

12.1.2 Community involvement: Community involvement in management of forest resources is essential for sustainable forestry. It is important that those in spearheading policy, research,

community empowerment and development agenda understand and appreciate local knowledge on some forest resources and incorporating them in forest

12.1.3 Joint forest management: Joint and/or participatory forest management has been demonstrated as a useful approach to sustainable forest management. It is recommended that such opportunities be explored and be fully incorporated in areas where they exist, e.g. through eco-tourism.

12.1.4 Domestication of selected valuable NWFPs: Domestication through agroforestry of valuable/important NWFPs may be practical approach to improving quality and increasing the quantity of the commodity especially for indigenous fruits/foods and medicines which are either slow growing and/or are quite variable in nature.

12.1.5 Harvesting of NWFPs by the marginalized: The harvest of NWFPs by marginalized forest-dependent peoples enables them to capture income, provide social benefits and gives them the opportunity to continue to contribute to the conservation of natural forests. Taking this seriously implies that, developing and formalizing the NWFP sector could help meet the often contradictory goals of development and conservation. Therefore, as a local sustainable livelihood strategy, forest communities could be assisted to develop their NWFP resources through training in business and legal issues, consultations on small and medium scale enterprise development and support on sustainability clearly specify community non-timber forest products (NWFPs) harvesting rules, access rights and tenure, domestication of key NWFPs in order to improve marketing and create incentives for sustainable use through increased incomes from forests;

12.2 Post harvest storage,

- i. **Post harvesting handling:** It is recommended that proper best practices are developed for NWFPs of commerce and initiatives to add value in producer countries explored as most NWFPs lose value because of poor post-harvest practices. The situation is compounded by inadequate value addition which results in poor market prices that affect marketing and hence long term viability.

12.3 Processing, value addition and marketing

- i. **Improvement of market access:** Efforts should focus on strengthening local, national and regional markets where they exist before moving to international markets given that a number of indigenous fruits and food plants are generally popular in more than one country within a given region, such markets should be explored and properly developed as a strategy to improving rural livelihood and support to development of sustainable forestry.
- ii. **Guaranteeing supplies and quality:** Regularity of supply which cannot always be guaranteed with increased demand is a real concern which has been demonstrated from studies made in Central Africa on some fruit and food plants with “thin markets”. Poor supplies can only be resolved by putting in place effective conservation strategies where off-take levels are properly understood and producers are trained on sound harvesting procedures and post harvest technologies. An alternative and more effective approach is to undertake domestication programmes which has several advantages. Domestication may also help to address the issue of variation in the quality from a given botanical source as has again been shown from the different fruit plants of commerce.
- iii. **Exploiting seasonal fluctuations:** It has been demonstrated that many NWFPs, such as mushrooms and nuts, are seasonal and depend on natural growth and regeneration,

which makes their productivity unpredictable. Prices may vary over the course of the year in reaction to seasonal changes and will also vary between years depending on nature's bounty. The income of collectors and processors tends to be similarly variable. The seasonality of these products can also be an advantage. Many NWFPs are available during the non-agricultural season. Exploitation of these products can complement farming activities and fill gaps in the household income flow.

- iv. **Holistic approach to development of NWFPs:** It has been proposed that instead of focusing 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 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 (CP-Wild, 2004). For example, by turning marula nuts into oil, the Batanai Group in Zimbabwe has tremendously increased their income. Therefore, value addition and improved marketing strategy can improve the revenue of producers.

12.4 Appropriate policy and legal framework and producer and marketing groups

- i. **Supportive policy and legal frameworks:** Implementation of supportive policy and legal frameworks on gums and resins and honey and bees wax in some IGAD member states have shown the importance of putting in place strong policies/legal framework and institutions for successful development of NWFPs enterprises and sound forestry. IGAD member states need to develop and implement supportive market oriented policy and legal frameworks as a means to sustainable forestry management.
- i. **Local and regional organizations:** Supporting the development of accountable and effective local organizations (production, processing and marketing groups) based NWFPs through sustainably strengthening the current institutional arrangements and the revision of legal instruments governing NWFPs production and marketing by rural people. Such efforts should be able to strengthen, scale-up or multiply the impacts of existing local organizations;
- ii. **State intervention in pricing of NWFPs:** It has been suggested that the IGAD member countries need to create or open up of regional and international market channels with introduction of policies that guarantee minimum producer prices and the purchase of surpluses to provide an incentive for increased production;

12.5 Research, documentation and training

- i. **Funding:** Funding for forest resources research, documentation and training in most IGAD member states is inadequate at best. It is recommended that fund research in poorly understood social, economic and biological/environmental aspects important NWFPs be enhanced in the region and in individual member states;
- ii. **Development of appropriate tools and methods:** The challenge for coming years is to develop proper tools and methods for sustainable extraction of NTFP and regulation of its trade. This can be achieved in IGAD member states by all key actors efficiently using the existing knowledge and experience of facilitators, entrepreneurs and researchers in the region.
- iii. **Research in multiple use strategies:** Multiple use management is a concept towards

sustainable forestry. It entails managing forestry resources for more than one use and fits in quite well with the management of forests for both wood and non-wood products and services.

- iv. **Politics and marketing of NWFPs:** Investing in the development of market development strategies that can be used to change of attitude by developed countries to accept high standard of quality processed products from Africa. 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 resins in Djibouti, Ethiopia, Kenya and Somalia. The processing companies are located in developed economies but exercise reluctance to cede processing technologies to raw material producing countries. Despite international recognition to transfer these technologies, many companies in developed countries 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 industrialized countries will not give the developing countries the technology that will upgrade local processing of gum.

12.6 Linking research to development (R and D)

The success of industries based on essential oils, dyes and medicinal plant products are highly associated with R and D on components from naturally occurring plant species. Investments in research and development (R and D) are, therefore, key to tapping the full potential of NWFPs. The results of such investments are that the cheaper and reliable natural raw materials can be priced such that they are more competitive than their synthetic substitutes. Even then, synthetic substitutes remain a major threat to marketing natural NWFPs. Research should, for example, help provide potential investors with information on resource status, business opportunities and risks, how to add value at the local level, the technology to be adopted and how to facilitate local communities to better organize themselves as well as to develop entrepreneurship skills. The future for IGAD member states to increase investment for R and D on NWFPs is promising as the global trend of increasing interest in natural products will open up markets for NWFPs from domestic, regional and international arenas. Another opportunity for R and D in IGAD Member states lies in strong collaboration within member states through transparent joint venture projects especially for products available on both sides of their common borders. There is also a need to strengthen links between research, producer associations, processors and traders.

12.7 Politics and marketing of NWFPs

A change of attitude by developed countries to accept high standard of quality processed products from Africa. This is a prerequisite for the development of the NWFP sector in the IGAD region 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 but exercise reluctance to cede processing technologies to raw material producing countries. Despite international recognition to transfer these technologies, many companies in developed countries still prefer to buy the raw material and process it themselves. It is apparent that the processing issue is more political than economic because the industrialized countries will not give the developing countries the technology that will upgrade local processing of gum.

12.8 Training and capacity building

There is need to strengthening curriculum at universities and tertiary levels to adequately incorporate NWFPs in the diverse programme and provision of support to post graduate training in NWFPs in the various sectors. It is also critical to scale up and document best bet technologies and practices. Other important issues include;

- i. Support strengthening of curricula in tertiary institutions
- ii. Support of training and post graduate programmes in NWFPs and establishment of centres of excellence in universities and research institutions.

12.9 Social economic studies

The low consideration given the NWFPs in most member states is partly due to fact that there are few credible social economic study on the social and economic importance of NWFPs at producer and community levels and the potential of NWFPs in diversifying rural income base, provide employment while creating alternative wealth creation avenue. Targeted social-economic studies of the various NWFPs need to be undertaken urgently to better inform the policy and decision makers. Such information will justify increase in public sector resource allocation while serving to attract private sector investment, increased emphasis on NWFPs in training curricular and research and coordinated conservation efforts.

12.10 Mapping the market chains

The numbers of actual beneficiaries of the NWFP sub-sector is at best informed estimates. It is important that the various NWFP market chains are appropriately mapped to determine the key actors and the constraints that need to be addressed to enhance NWFPs production and productivity, processing and marketing. Information of the key actors can be enriched by socio-economic studies on the feasibility and environmental sustainability of proposed interventions.

12.11 Low level of awareness

There are three levels of poor awareness on the importance of NWFPs – at producer level, public level and policy/political level. It is therefore important that awareness on the importance of NWFPs is created at all three levels, if NWFPs are to be sustainably utilized in member states. Such a campaign can be informed by socio-economic and agro-ecological studies of the most important and endangered NWFPs.

12.12 Regional and national standards – raw materials and NWFPs

One of the biggest constraints to improved production, processing and marketing of NWFPs is the lack of regional and national standards of raw materials and NWFPs. For raw and processed NWFPs to be traded with confidence and some form of guarantee it is important the credible regional and national standards and inspection and certification system (rules, procedures and practices) are developed and implemented in all member states.

12.13 Marketing within the region – cross border trade

There needs to be a concerted campaign in the region to promote local and regional marketing of NWFPs. Such an initiative needs to be supported by a regional (and national) raw material and finished NWFPs. This will in a small way cushion producers, processors and traders against sudden price changes on the international markets.

12.14 Other pertinent issues

These include promoting and facilitating venture capital, establishment of business incubation centres for mentoring product development and scaling up of best practices within a regional network with focal points in member states; mainstreaming of NWFPs to climate change, conflict mitigation, cross border trade, individual and community intellectual property rights, equity and bio-rights as well as standardisation and certification.

References

1. **Food and Agricultural Organization of the United Nations FAO (1990):** The Major Significance of “Minor Forest Product. The Local Use and Value of Forest in the West. African Humid Forest Zone. Community Forestry Note 6 Rome.
2. **Brown. T.C. (1984):** The Concept of Value in Resource Allocation. Land Economic. Pp 231-46.
3. **Food and Agricultural Organization of the United Nation FAO (1995):** Valuing Forest: Context, Issues and Guidelines, by Gregersen H.M.
4. FAO, 2003. Forestry outlook study for Africa: regional report for opportunities and challenges towards 2020. *FAO Forestry Paper 141*. FAO, Rome.
5. Chikamai B. and Casadei E (2005). Production and marketing of gums and resins: Frankincense, Myrrh and Opoponax: <http://www.ngara.org/Production%20and%20Marketing%20of%20Gum%20Resins.pdf>
6. FAO – NTFPs Sub-regional synthesis: Eastern Africa - <http://www.fao.org/docrep/003/y1515b/y1515b08.htm>
7. Chupezi J.T, Ndoye O., Tchatat, M and Chikamai B (2009) Processing and Marketing of Non-wood Forest Products: Potential Impacts and Challenges in Africa *Discov. Innov.*, 2009; 21 (SFM Special Edition No. 1)
8. Wynberg, R. 2004. Achieving a fair and sustainable trade in devil’s claw (*Harpogophytum* spp.). In: Sunderland,
9. *Fisher, 2001* - Fisher, R.J., 2000/01. Creating incentives for conservation: NWFPs and poverty alleviation. *ETFRN Newsletter no. 32*. Wagennigen, The Netherlands.
10. *Ndoye et al, 2001* - Ndoye, O., M. Ruiz-Perez and A. Eyebe, 2000/01. NTFP markets and potential degradation of forest resources in Cameroon: The case of *Garcinia lucida*. *ETFRN Newsletter no. 32*. Wagennigen, the Netherlands.
11. *Taylor, 1999* - Taylor, D.A., 1999. Requisites for thriving rural non-wood forest product enterprises. *Unasyva 198: 3-8*.
12. *Wilkie et al, 2001* - Wilkie, D.S., L. Clark and R. Godoy, 2000/01. NWFPs: economic and conservation potential in Central Africa. *ETFRN Newsletter no. 32*. Wagennigen, the Netherlands.
13. Jelle M.A.A.S. (2000). The role of research in NTFP management: <http://www.fao.org/docrep/005/y4496e/Y4496E41.htm>
14. El-Tahir B. A., Gebauer J. (2004) Non-timber Forest Products -- Opportunities and

Constraints for Poverty Reduction in the Nuba Mountains, South Kordofan, Sudan:
<http://www.tropentag.de/2004/proceedings/node396.html>

15. Investing in Uganda's forests (2003). <http://www.ugandainvest.com/forestry.pdf>
16. Non timber products – Exchange in South and South East Asia http://www.ntfp.org/index.php?go=ntfp_db
17. FAO Technical Papers (1995): Non-Wood Forest Products Series An excellent 12 volume series on non-wood forest products (NWFPs) and their role in integrated forestry, agroforestry, and conservation. <<http://www.fao.org/forestry/FOP/FOPW/NWFP/pubser-e.stm>>Flavours and Fragrances of Plant Origin, 1995 (E)

Some of the topics include:

- a) Gum Naval Stores - Turpentine and Rosin from Pine Resin, 1995 (E)
 - b) Report of the International Expert Consultation on Non-Wood Forest Products (Yogyakarta, Indonesia, January 1995), 1995 (E)
 - c) Natural Colourants and dyestuffs, 1995 (E)
 - d) Edible Nuts, 1995 (E)
 - e) Gums, Resins and Latexes of Plant Origin, 1995 (E)
 - f) Non-Wood Forest Products for Rural Income and Sustainable Forestry, 1995 (E)
 - g) Trade restrictions affecting international trade in non-wood forest products, 1995 (E)
 - h) NTFP entrepreneur (E)
18. Srivastava V.K. and Anitha D. (2010). Mapping of non-timber forest products using remote sensing and GIS *Tropical Ecology* 51(1): 107-116 - http://www.tropecol.com/pdf/open/PDF_51_1/Jour.12.pdf
 19. FAO, 2003a. The State of World Forests. FAO, Rome.
 20. FAO, 2003b. Forestry outlook study for Africa: regional report for opportunities and challenges towards 2020. *FAO Forestry Paper 141*. FAO, Rome.

(Endnotes)

- 1 FAO 1995



**IGAD Centre for Pastoral Areas and Livestock Development
(ICPALD)**

Ngong Lane, Off Ngong Road

Jadala Place, 1st Floor

P.O. Box 47824-00100 GPO

Nairobi, Kenya

Web: www.icpald.org