MINISTRY OF NATURAL RESOURCES AND TOURISM
FORESTRY AND BEEKEEPING DIVISION

THE ROLE OF NON WOOD FOREST PRODUCTS IN FOOD SECURITY AND INCOME GENERATION

SUPPORT TO FORMULATION OF NATIONAL FOREST PROGRAMME – TANZANIA

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PREFACE

The study on Non Wood Forest Products [NWFP], emanates from The National Orientation workshop on Forest Based Industry and products in Tanzania and Vision for the Future, which was organised by the Division of Forestry and Beekeeping through the National Forest Programme [NFP] Formulation in Tanzania. The workshop was held at New Africa hotel, between 28th to 29th march, 2000.

The proceedings of The National orientation workshop on Forest based industry and products, encompassing a detailed activities framework, thematic papers, the status report, the plenary presentation and plenary sessions' comments has been the inspiration of this special study report.

This special study based on literature review, participatory and consultative process, fills the gap observed during the proceedings of the orientation workshop, focused on Non Wood Forest Products [NWFP] and their contribution to income generation and food security, it puts forwards Conclusions and Recommendations for NFP Strategies and Action plan.

LIST OF ACRONYMS AND ABBREVIATIONS

CBOs	Community Based Organisation
DFOB	Director of Forest and Beekeeping
FAO	Food and Agricultural Organisation
FBD	Forest and Beekeeping Division
g	gram
IRA	Institute of Resource Assessments
IPC	Investment Promotion Centre
JFM	Joint Forest Management
LFCC	Low Forest Cover Countries
MNRT	Ministry of Natural Resource and Tourism
NEMC	National Environment Management Council
NGOs	Non Governmental Organisations
NEAP	National Environment Action Plan
NFP	National Forest Programme
UNCED	United Nations Conference on Environment and Development
NTSP	National Tree Seeds Programme
NWFP	Non Wood Forest Products
SIDO	Small Scale Industries Development Organisation
SUA	Sokoine University of Agriculture
STC	Short Term Consultant
TFC	Task Force Coordinator
TShs.	Tanzanian Shillings
US$	United States Dollar (1 US$ = TShs. 806)

LIST OF FIGURES AND TABLES

EXECUTIVE SUMMARY

Background information

This special study report on Non Wood Forest Products (NWFP) is part of the Forest Based Industry and Products (FBIP) focused studies in Tanzania, it forms a part of the assignment of the Forest Based Industry and Products Task Force, under the National Forest Program (NFP).

The report has been developed through a comprehensive literature review and a consultative and participatory process between the Forest Based Industry and Products task force co-ordinator, the short term local consultant and various relevant stake holders in the policy area of forest based industry and products (Terms of reference for the special study report are attached (Appendix 1).

The major objective of this special focused study on NWFP in Tanzania, was to produce a concise report where the contribution of NWFP to food security and income generation is analysed and then documented, so as to form the basis for the action plan in NFP formulation process.

The study reviews has covered in detail specific NWFP and their respective contribution to income generation and food security in Tanzania. Vision for the future is focused to the revised Forest policy endorsed by the Government in 1998, whose statements 8 to 14, highlights the area of Forest Based Industry and Products, with the relevant associated directions. To enhance the NWFP sectoral vision for the future, The National Forest policy and its respective policy objectives, areas, statements and directions, respectively; and the forest legislation, have all been taken into consideration with respect to NWFP vision for the future.

In each case of the specific NWFP the contribution to food security and income generation status was analysed, constrains and opportunities outlined, and the action plan put forward at a holistic approach. Vision for the future presents highlights and discusses the future of the NWFP and the environment for investment in major NWFP i.e. honey and beeswax in Tanzania. Moreover, the role of the community involvement in generating income from NWFP and getting food security based on NWFP has also been appraised. The challenges in NWFP activities, have also been reviewed in details and documented. Various relevant trends, activities, problems or constrains, research results and appropriate technology carried under the area are also put forward.

Investment opportunities have been categorically put forward, where avenues for future investment under the NWFP are put forward. Recommendations, which form part of the vision for the future for the NFP action plan are; the establishment of a sustainable NWFP forestry raw material resource base, through forest resource assessment and inventories; reappraisal of the investment opportunities, to give way for new investors in the sector; harmonisation of the conflicting cross-sectoral issues affecting the area and updating of forest management plans to accommodate NWFP.

The Non Wood Forest Products(NWFP) scope and rationale

Non Wood Forest Products are goods of biological origin derived from forests, wooded lands and trees outside forests. The modern scope of forestry is being reported to have expanded, reflecting the fact of the importance of many non-wood forest products which has increased, leading to new interfaces with related disciplines (Tanzania country report :In FAO, 2000).

Non wood forest products (NWFP) play a crucial role in the daily life and welfare of people all over the world. They cover a wide range of; food, fodder, fibre, fertiliser, organic construction materials, non-wood ligno-cellulosic products, natural dyes, tannins, gums, resins, latex and other exudates, waxes, essential oils, spices, edible oils, medicinal extracts, phyto-chemicals, aroma-chemicals, decorative articles, horns, bones, pelts, plumes, hides and skins

In Tanzania the most important NWFP are fodder (e.g. *Acacia spp., Prosopis spp.*), medicinal plants (e.g. *Faidherbia albida, Acacia melifera, Bredelia micraffa, Cinchona sp., Prunus African, Jateorhiza palmate*), as well as honey and beeswax. Other NWFP exploited in Tanzania are bamboo (*Arundinaria alpina*), fibres *(e.g. Adansonia digitata*), resins (*e.g. Acacia mearnsii*), essential oils (*e.g. juniperus procera, Acaia fernesiana*), and food products including fruits (*Acacia nilotica, Adansonia digitata*), spices and edible oils (Adansonia digitata), colourants, gums (e.g. Acacia senegal), and mushrooms (*Amanita sp*), (Tanzania country report :In FAO, 2000).

This study was focused to NWFP in Tanzania, which as briefly elucidated above are comprised of different product groups involving different specific technologies, approaches, regulations and controls in the different aspects of their development. NWFP-related activities are presented and analysed in their respective picture of considerable complexity with respect to: NWFP contribution to food security; NWFP contribution to income generation and peoples welfare and gender based involvement in NWFP related activities.

TABLE OF CONTENTS

CHAPTER ONE:

1.0 The Non Wood Forest Products scope and rationale

1.1. Background

Based on the National orientation workshop under the task force of Forest based industry and products(held on 28th and 29th March, 2000), issues were identified as regard to NWFP, these issues put forward the need for a detailed study on NWFP.

Non wood forest products are goods of biological origin derived from forests, wooded lands and trees outside forests. The modern scope of forestry is being reported to have expanded, reflecting the fact of the importance of many non-wood forest products which has increased, leading to new interfaces with related disciplines (LFCC, 1999).

Non wood forest products (NWFP) play a crucial role in the daily life and welfare of people all over the world. They cover a wide range of; food, fodder, fibre, fertiliser, organic construction materials, non-wood ligno-cellulosic products, natural dyes, tannins, gums, resins, latex and other exudates, waxes, essential oils, spices, edible oils, medicinal extracts, phyto-chemicals, aroma-chemicals, decorative articles, horns, bones, pelts, plumes, hides and skins. These products are derived from a variety of sources- plants (palms, grasses, herbs, shrubs, trees) and animals (insects, birds, reptiles, large animals). Different parts of a plant or animal often provide different products, simultaneously and/or at different times.

Non wood forest products exhibit considerable variation in their use. Some are consumed immediately on harvest (e.g. fruits, fodder, wild meat) or after primary processing (e.g. edible nuts, bamboo products). Some others go through a series of downstream processing or refinements to meet the market specification or standards, adding value to the product all along the way, as for example phyto-chemicals, food additives and flavouring. A large number of NWFP appears as ingredients of varying medicines, perfumes, suntans lotions, nails polish, mouth wash, hair butter, breakfast cereals, golf balls, paints, corrosions inhibitors, insecticides, fungicides, and a host of others.

As plants and animals show regional and sub regional and local variations due to differences in habitats conditions, so the nature and utility of the NWFP varies. Thus the NWFP which are important in a specific locality are usually restricted in number. Inspite of this, however, the range of activities related to their production, management, processing and marketing is highly complex requiring adequate technology, support infrastructure, research facilities and skilled manpower. The technology currently in use in the area of NWFP varies between countries, ranging from crude to appropriate and sophisticated.

This study is focused to NWFP in Tanzania, which as briefly elucidated above are comprised of different products groups involving different specific technologies, approaches, regulations and controls in the different aspects of their development. NWFP-related activities are presented and analysed in their respective picture of considerable complexity with respect to: NWFP contribution to food security; NWFP contribution to income generation and peoples welfare and gender based involvement in NWFP related activities.

1.2 Problem statement and justification for the Study

Non Wood Forest Products (NWFP), suffer from the declining cover of forest vegetation, inadequate information on location and types of products, and non-existence of effective local processing information to produce value added products. Either the marketing side is not in order, in terms of organised marketing channels and availability of market information. At general level, there is poor awareness as regards to the income generation potential of NWFP and its contribution to food security, income generation and welfare of the people.The potential of NWFP as an income generating activity, and its role in contributing to food security still need to be assessed and then well documented in prospects and retrospect.

1.3 The objective of the study

The objective of the study is to produce a concise report where the general overview status for the NWFP is documented and analysed with respect to its contribution to food security and income generation in Tanzania, and issues for NFP action plan are sketched in terms of prospects and retrospect. The proceedings of The National Orientation Workshops and the new forest policy are used as the basis and starting point in this analysis

1.4 The scope and methodology of the study

This is a desk work study that synthesizes information on the actual and potential use of the NWFP for food security and income generation in Tanzania. However the literature cited is drawn from Tanzania and elsewhere, to effectively illustrate some points of examples relevant to the NWFP scenarios to be elucidated, encompassing: The most important Non Wood Forest Products in Tanzania; Non Wood Forest Products and their contribution to welfare and income generation; The gender based knowledge in use of Non Wood Forest products; Main constraints facing Non wood Forest Products development; Opportunities for the development of the Non-Wood Forest Products; and issues and strategies for action plan in NFP formulation process.

The study is based on literature review and a consultative and participatory process with relevant experts and/ or publications on NWFP. The study is restricted to NWFP, because wood products traditionally have been conceived as the only important products from the forest, and the management has always been geared towards the production of only such products. This tendency has undermined the role of NWFP in the livelihood systems of rural people. The study restricts itself to the role of NWFP in household food security and its contribution to the welfare and income generation for the rural citizens of Tanzania, particularly rural women and youth.

CHAPTER TWO:

2.0 Conceptual framework

The pertinent issues discussed under this chapter embraces; NWFP and their contribution to household food security; NWFP and their contribution to the welfare of the people and income generation; The gender based knowledge in the use of NWFP and The main issues facing the sector of NWFP development, which need attention for NFP action plan.

2.1 The most important Non Wood Forest Products in Tanzania

In Tanzania the most important NWFP of plants origin are fodder (e.g *Acacia spp., Prosopis spp.*), medicinal plants (e.g. *Faidherbia albida, Acacia melifera, Bredelia micraffa, Cinchona sp., Prunus African, Jateorhiza palmate*), as well as honey and beeswax. Other NWFP exploited in Tanzania are bamboo (*Arundinaria alpina*), fibres *(e.g. Adansonia digitata*), resins (*e.g. Acacia mearnsii*), essential oils (*e.g.Juniperus procera, Acaia fernesiana*), and food products including fruits (*Acacia nilotica, Adansonia digitata*), spices and edible oils (*Adansonia digitata*), colourants (LFCC, 1999), gums (*e.g. Acacia senegal*), and mushrooms (*Amanita sp*). (FAO, 2000).

The NWFP of animal origin include bushmeat, live animals (especially birds), insects (termites) and trophies (e.g. elephant and gazzele).

NWFP are used for subsistence as well as for trade at the national and International levels. The value of NWFP in Tanzania lies not so much in the indicative figures in trade and transactions at large, but in the people at rural areas for their daily livelihood and subsistence economies at grassroots. According to Kamwenda and Mkeya (2000), NWFP have generally been underestimated in relation to local economy and food security. Forest based small scale enterprises are not encouraged to utilize this potential as part of the mult-purpose management of Tanzanian forest resources.

According to Mbuya et. al.,(1994), about 233 trees and shrubs have been identified as being used for the following: food and medines (178 species); fodder (160 species); and various other uses (e.g. fibres, resins, tannins, oils-123 species).

NWFP in Tanzania are generally abundantly collected from natural forests (especially miombo forests) under an open access property right regime. Some exported NWFP such as *Cinchona* spp. Are mainly cultivated in more intensive production systems outside forests. The under exploited NWFP are wildlife based forest products, tannins, honey, beeswax and gum Arabic.

The NWFP in this study are categorically put forward as shown below:-

i) Food

A number of various edible indigenous fruits (83 species), Edible wild vegetables (21 species), Commonly edible wild mushrooms (16 species & varieties) and 5 species of commonly edible wild insects have been reported in Tanzania, under various studies (Makonda, 1997; Woodcock, 2000; Kamwenda, 1999; Kamwenda and Mkeya, 2000; Harkonen et al., 1995; and Mbuya et al. 1994).

ii) Fodder

Forest forage is an important supplementary diet for livestock and wildlife which contains essential proteins (in its pods, buds and leaves). Especially in dry season, browsing of fodder remains an essential activity for the survival of the animals (both wild & domesticated). In general, cattle and wild animals in Tanzania browse in natural stands of wooded grasslands particularly miombo woodlands. Fodder tree are used at community levels, in most parts of municipalities and townships, commercialisation of fodder is very common (Kamwenda, 1999; Kamwenda and Mkeya , 2000).

iii) Medicines

Medicinal plants are used in traditional medicines and are traded on the local and world markets. About 80% of Tanzanians rely on traditional medicines based on plants mainly derived from wild sources, the documentation of utilization of a number of medicinal plants is reported by Makonda, 1997.

About 100 medicinal plants are reported to be traded in the local markets (Kamwenda, 2000). Most of these species are collected in natural forests, the most known domesticated medicinal plants are *Azadirachta indica* (muarubaini) and *Cinchona species*(quinine), the former is popular grown everywhere in Tanzania, whereas the later is associated with commercial tree estates in the southern highlands, whose barks is used to extract alkaloids (e.g. quinine, quinidine), which are necessary for the production of anti malaria drugs.

Studies in Dar es salaam show that in urban centres traditional medicines is practiced intensively (Likonda, Kamwenda and Kway, personal communication. 2000). The Tanzanian government seem to have recognised the importance of traditional practitioners by establishing the traditional research unit at Muhimbili medical centre, and legalising trading of traditional medicines at all market places, in the country such as Kariakoo market in Dar se saalam city.

iv) Utensils, handcrafts & construction materials

Fibres are important NWFP used as utensils and construction materials. They are the most potential material but least developed NWFP in Tanzania. Important tree species providing NWFP raw materials for the construction of beehives include *Acacia species, Brachstegia species and Cumbretum species.*

v) Exudates

Gum Arabic is taped from wild Acacia woodlands in Singida, Arusha, Sinyanga and Tabora regions. Latex in Tanzania is obtained from rubber tree *Hevea brasilinecis,* mostly cultivated in Zanzibar. Pine plantations of *Pinus eliotii*(5,215 ha) and *Pinus caribaea* (8,090 ha) are considered as potential areas for resins production in Tanzania (Kamwenda and Mketa, 2000).

vi) Wild animals, bushmeat, tourism and cultural purposes

Tanzania is considered to be one of the Africa's major source of wild birds sold to the International market. Bushmeat is an important resource at local level in most rural areas of Tanzania. In some parts of Tanzania cropping of termites colonies of the winged reproductive termites to be sold on local markets is a common practice (Makonda, 1997), Some insects (senene) are reported to be an important delicaly in Kagera region (Mujwahuzi, personal communication,2000).

Tourism (game hunting, game viewing, photography) is one of the most important forest service. It is often related with other wildlife based activities such as bushmeat consumption, as well as trade in animal trophies and live animals. Tourism might be the biggest revenue earner in the forestry sector based on wildlife management, eco-tourism and game hunting.

Forests are also used for cultural purposes. In Babati district for example, local communities have established traditional forest reserves, used for male circumcision ceremonies, as meeting place for male elders, burial grounds, natural springs, private reserves, rain making ceremonies, place for teaching young women, etc.

vii) Honey and beeswax

Honey and beeswax are two of the most important NWFP in Tanzania. Honey is important as a sweetener and as a source of raw material for alcoholic beverages and medicinal industry. Beewax is used locally in a wide range of applications.

Honey and beeswax are collected in miombo woodlands, as well as outside the forests in agricultural land in western, central and southern Tanzania. Collection is done with traditional methods without using chemicals and consequently, negative ecological effects are caused by the use of fire and the felling of trees. Most of the honey is consumed locally, but a substantial amount is also being exported, earning the country a substantial amount of income. Significant importers of honey are Japan and European union and Arab countries.

2.1 Non Wood Forest Products and their contribution to household food Security

Food security has been given different definitions and received varying interest in the past. The Committee on World Food Security defined food security as an economic and physical access to food for all people at all times . The World Bank defined food security as the access by all people at all times to enough food for health and active life. Conventionally, food security is defined as the balance of food supply (mainly cereals supply) and effective demand for food (FAO, 1989a; Maxwell Frankenberger, 1992 In: Kajembe et. al, 2000).

Furthermore, the World Bank definition of food security is "access by all people at all times to enough food for an active and healthy life accepted. This definition encompasses two elements:

a) Food supplies

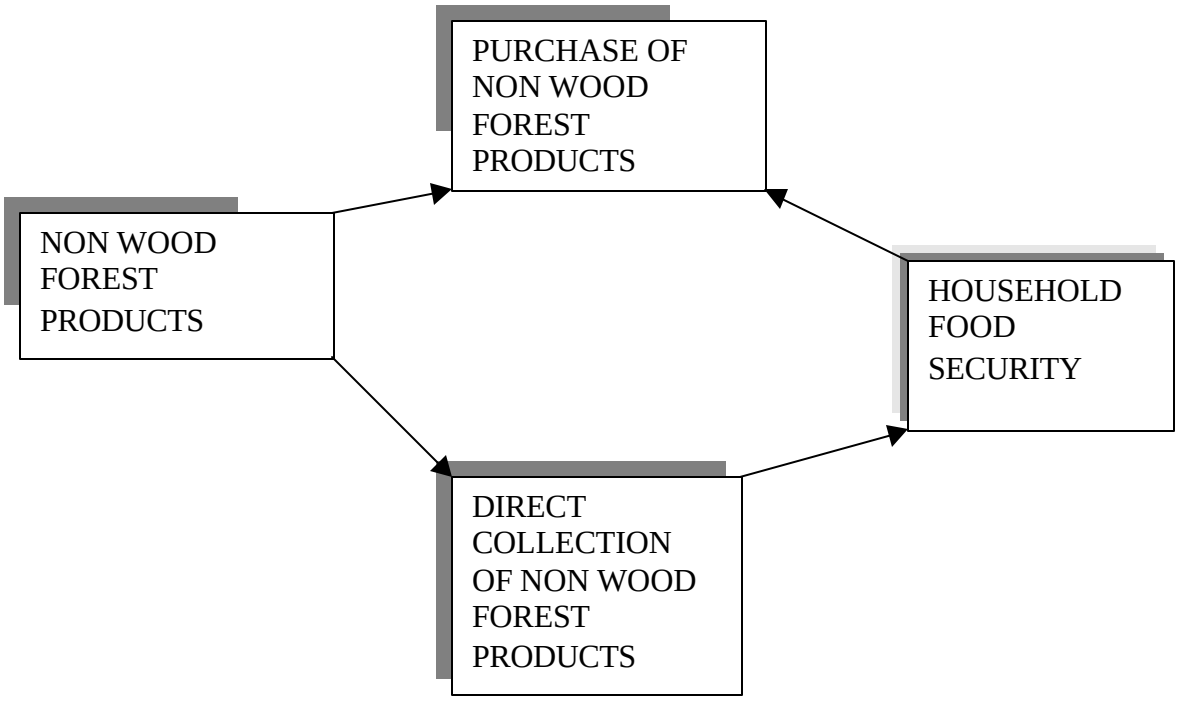
b) The access or ability of a household to acquire food, either through their own production or purchase

Access to food security concerns the microeconomics of the household. In particular it describes the use of food in the household, access to it by various members in the household, household survival strategies and the role of gender. In addition to household decisions concerning the use of resources, output and cash income are some of the important critical variable in the overall household food security analysis (FAO, 1989a; Maxwell Frankenberger, 1992 In: Kajembe et. al, 2000).

Therefore the household is said to be food unsecured when it fails to meet its dietary food intake in terms of quantity and quality. There is evidence to suggest that household food insecurity is widespread and chronic in some areas of Tanzania, since there seems to be certain degree of food deficit at one time or another during the year (FAO, 1989a; Maxwell Frankenberger, 1992 In: Kajembe et. al, 2000).

In general terms, there exist differences in gender roles with respect to NWFP collection for food security. Difference in gender roles in the use of NWFP for household food security is based on the way in which a particular product contributes to household food security. Products which contributes through direct consumptions, are under the control of women while products, which have indirect contribution through income generation, are taken by men. Below (figure. 1), is the relationship between NWFP and household food security.

Figure 1. The relationship between NWFP and household food security in Tanzania



The indigenous flora and fauna found in the forests and bush lands contribute to the local food security systems in two ways. Non wood forest products (NWFP) may be collected from the forest direct for consumptions or households may purchase the NWFP from the market places for their domestic consumption.

Tables 1,2 and 3 below; present a number of NWFP from various flora and fauna that contribute to rural household food security in Tanzania.

It has been reported that over 75,000 plants species in Tanzania are edible, out of which 12,000 have been used for food, but only 2000 have been domesticated (Walters and Hamilton, 1993 In: Kajembe et. al, 2000). NWFP used for food include both plants and animals products.

Table 1: Wild edible NWFP of plants origin

Habitat	Species	Vernacular name*
Forest	*Asystasia gangetica*	tikini
Forest	*Rourea orientalis*	kisogo
Forest	*Dioscoreophyllum volkensii*	msangani
Forest	*Solanum nigrum*	mnavu
Riparian Forest	*Alternanthera sessilis*	mkoswe
Riparian Forest	*Bassela alba*	nderema
Riparian Forest	*Ipomoea aquatica*	tarata/talata
Field and Bushlands	*Amaranthus spinosa*	bwache
Field and Bushlands	*Gynandropis gynandra*	mgangani
Field and Bushlands	*Bidens pilosa*	kisamanguo
Field and Bushlands	*Launea conuta*	mchunga
Field and Bushlands	*Ipomeae batatas*	matembele
Field and Bushlands	*Cucurbita maxima*	n'koko
Field and Bushlands	*Erythrococa kirkii*	mnyeumbeue
Field and Bushlands	*Manihot grahamii*	kisamvu
Field and Bushlands	*Platostoma africanum*	kisungu
Field and Bushlands	*Solanum gilo*	nyanya chungu
Field and Bushlands	*Nicandra physalodes*	kibwabwa
Field and Bushlands	*Corchorus spp.*	Mlenda
Field and Bushlands	*Vigna unguiculata*	shafa

*Vernacular language East Usambara

(Source: Woodcock, 2000: adopted and modified)

Table 2: Some common edible mushrooms and their nutritional values in Tanzania*

	Protein g/100g	Lipids g/100g	Ash g/100g	Carbo-hydrate g/100g	Energy value g/100g	Pottasium g/100g	Magnesium g/100g
Termitomyces microcarpus	49.0	10.5	10.9	29.5	1740	3.5	0.17
Termitomyces Species	41.5	5.6	6.2	46.4	1710	1.9	0.13
*Termitomyces Species**	39.2	8.35	14.1	38.5	1640	2.6	0.17
Termitomyces Microcarpus	34.8	5.8	22.6	36.8	1440	1.6	0.16
Termitomyces Eurrhizus	33.5	2.9	5.6	57.6	1440	1.6	0.16
Lactarius sp. Aff. Phlebophyllus	30.2	8.9	9.4	51.5	1730	2.9	0.86
Termitomyces latestui	30.1	3.6	7.8	58.5	1640	3.3	0.11
Termitomyces latestui	28.5	3.2	6.9	61.4	1650	2.9	0.90
Amanita zambiana	27.3	15.7	10.7	46.2	1850	3.9	0.11
Agaricus bisporus	27.0	8.0	8.0	57.0	1460	3.2	0.12
Cantharelus species	25.3	6.0	19.2	49.4	1450	2.4	0.07
Lactarius sp aff. Pseudo volemus	24.9	8.6	9.1	57.5	1730	4.6	0.09
*Cantharelus species **	24.6	6.7	13.3	55.4	1610	5.0	0.15
*Cantharelus species ***	22.8	15.3	10.4	51.4	1840	4.4	0.16
Ramarioid fungus	21.1	7.4	18.7	52.9	1540	4.6	0.06
Polyporus moluccnsis	20.2	3.0	2.2	74.5	1730	0.8	0.06

*Analysed by The State's Technical Research Centre in Finland

(Source: Harkönen et al., 1995: adopted and modified)

Table 3: Non wood Forest products of fruits, flowers and roots origin found in forests and bushland, used for food

Species	NWFP used
Aframamum angnotifolium	*Fruits*
Annona senelegalensis	*Fruits*
Azanza garckeana	*Fruits*
Balanites aegyptiaca	*Fruits*
Borasus aethiopum	*Fruits*
Canthium burtii	*Fruits*
Capsicum frutescens	*Fruits*
Cissus spp	*Fruits*
Flacourtia indica	*Fruits*
Friesodielsia obovata	*Fruits*
Grewia bicolour	*Fruits*
Grewia fallx	*Fruits*
Hoslundia opposita	*Fruits*
Lannea fulva	*Fruits*
Lantana camara	*Fruits*
Leucas mollis	*Flowers*
Lannea humilis	*Roots*
Manilkara mochisia	*Fruits*
Ziziphus mucronata	*fruits*
Ximenia caffra	*Fruits*
Vitex mombasae	*Fruits*
Vitex fischeri	*Fruits*
Vangueria infausta	*Fruits*
Multidentia crassa	*Fruits*
Opuntia vulgaris	*Fruits*
Parinari curatellifolia	*Fruits*
Phyllanthus englerii	*Fruits*
Rhus natalensis	*Fruits*
Sclerocarya birrea	*Fruits*

(Source: Makonda, 1997: adopted and modified)

The most important NWFP of plants origin include; shoot tubers, roots leaves, flowers, fruits, nuts, oil seeds, condiments, spices and mushrooms among others.

Animal derived NWFP include honey, bush meat, fish shells, edible bird eggs and insects. These NWFP in relation to household food security are discussed below.

The consumption of wild foods as NWFP provides essential vitamins and minerals for the diet, because of their richness in vitamins and variety of minerals. NWFP such as fruits, stems tubers, roots, leaves, honey and small game meat can make a significant contribution to resolving specific nutrional deficiencies common in Tanzania. Insects, caterpillars and wild rodents constitutes amazing delicacies which are sources of protein, whereas some wild fruits (e.g. baobabs) are reliable sources for rural supplements of proteins (FAO, 1989a In: Kajembe et al. 2000; Kamwenda, 1999; Makonda, 1997).

2.2.1 Wild fruits

Many forest fruits are valued as food for children and are collected by children in the forests. In many cases adults eat these fruits when carrying out other activities in the forests. Mbuya et al. 1994, identified more than 50 species of fruit bearing forest species. This handbook details botanical and vernacular nomenclature description, ecology, distribution, multiple uses, period of fruit collections, nutritional values, propagation, cultivation economics and local marketing potential for the species. The most common edible wild fruits are shown in table 3, above.

2.2.2 Wild vegetable

Wild vegetables are regarded as easily obtainable and palatable and their good taste is widely appreciated, Woodcock, 2000 reports a number of wild edible plants in East Usambara and their habitat, family and nomenclature (both botanical and vernacular), table 1 above.

Women and children mostly collect wild vegetables, occasionally also young boys may collect them. They are mostly picked in home gardens and farm lands. Where they grow as weeds. The most commonly used species are available in many parts of Tanzania all the year around and therefore long collection trips are not necessary.

Wild vegetables are used as spinach and eaten in the form of sauce(mboga), which is served as a side dish with staple food most commonly maize stiff porridge (ugali). In this way the leafy vegetables contribute to the household food security (Kajembe et. al, 2000).

2.2.3 Edible mushrooms

A survey of edible mushrooms in Tanzania has shown that wild mushrooms are a delicacy, contributing immensely to rural household food security. This comprehensive study of edible wild mushrooms in Tanzania described thirty-one commonest and tasting edible mushroom species (table 2). This indicates the wide spread uses of forest mushrooms in Tanzania. It is revealed that the best mushroom yields occur in miombo woodlands, where at the beginning of the rain season a rich variety of fungal fruit bodies appear (Harkönen, et al., 1995 In: Kajembe, 2000).

Most people in Tanzania collect mushrooms from the forests, in the rain season most families in tha rural areas do eat mshrooms. According to Harkönen, et al. reported in Kajembe et al., 2000; the largest diversity of edible mushrooms exists in the southern and western part of Tanzania, the longest lists of edible mushrooms of about 20 – 28 species are obtainable among the Bena, Hehe, Makonde, Nyamwezi, Sumbwa, and Yao ethnic groups (Harkönen, et al., 1995). Table 2 is a comprehensive short list of common edible mushrooms of Tanzania, with analysis on nutrients contents and their calorific values.

2.2.4 Wild roots, tubers and grains

Misano et al. as reported in Kajembe et al., 2000; point out that, wild roots are being widely eaten by the rural people i.e. in Mtwara rural and Lindi regions people are reported to eat tubers popular known as ming'oko. Apart from wild roots, tubers and vegetables, some wild bamboo grains are also consumed in most tropical countries. Wild grains known as mbuga are reported to be consumed, usually associated with poor crop harvest leading to food shortage. Harvesting and consumption of wild bamboo grains in many rural areas of Tanzania has not been sufficiently explored though it is said that many tribes in Tanzania consume wild grains available during food shortages.

2.2.5 Wild animals

Wild animals are another group of important NWFP that provide household food security through direct consumption. The range of products consumed include birds and their eggs, insects, rodents and other larger animals. For people living in close proximity to forests, wild animals offer an important part of their diet, in some cases they supply the only source of animal proteins

In southern parts of Tanzania, particularly in Mtwara and Lindi regions, consumptions of some species of rodents as a delicacy is very popular, while in places such as Kagera region where the Haya ethnic are dominant, high rate of prestigious consumption of insects*(Senene)* is reported, elsewhere in Tanzania a number of tribes have been famous in consuming caterpillars (Kamwenda, personal communication, 2000).

Thus small animals (e.g. rodents, birds and insects) are the most important due to their natural abundance, thus serving as a popular source of protein for subsistence consumption in most rural areas of Tanzania and Africa at large.

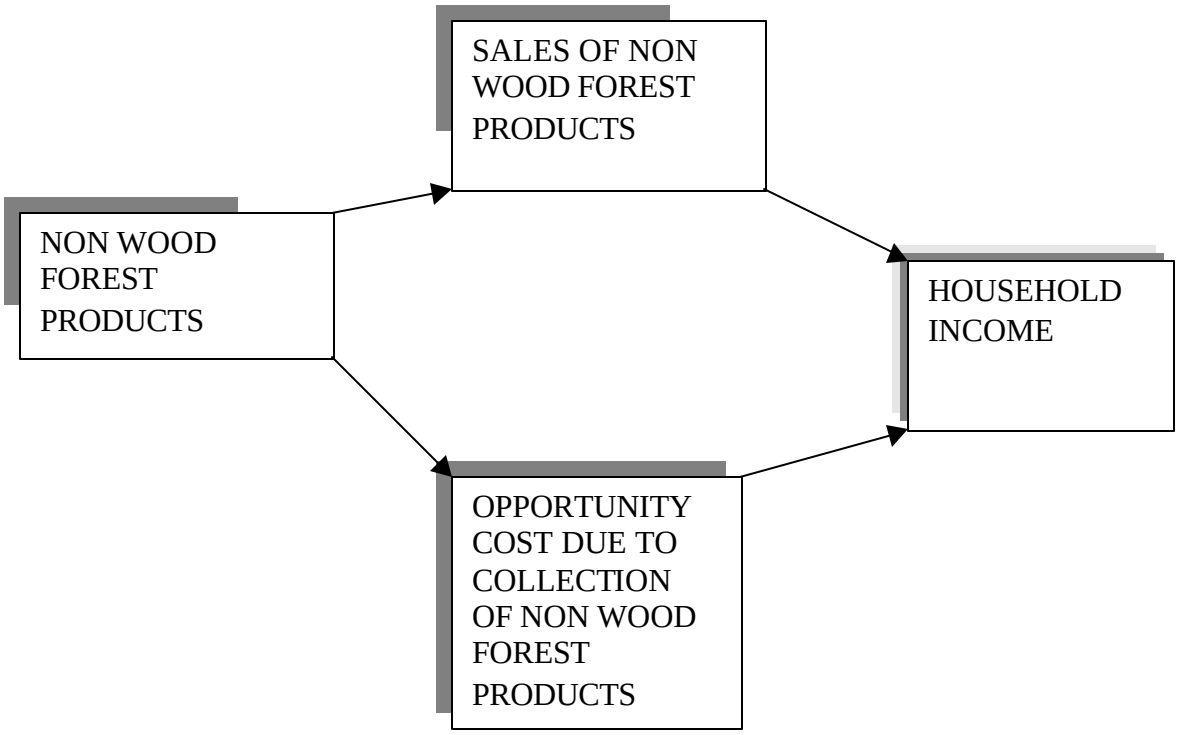
2.2.6 Honey

Honey is another non wood forest product around the world, in Tanzania it is reported that honey is a very important food for many tribes. Honey provides nutritionally important source of non-proteins animal based food products. Honey is nutritionally very valuable especially due to the energy it provides. Honey is normally consumed as side dish with the Min dish ugali, and as a jam. In many parts of Tanzania honey is used to prepare a local brew popularly known as *"Wanzuki"*. In Tanzania more than 99% of the population eat honey direct or indirectly

2.3 Non Wood Forest Products and their contribution to welfare and income generation

Figure 2, below is the relationship between NWFP and household income generation.

Figure 2: The relation between NWFP and household income generation in Tanzania



The NWFP contribution to income generation mainly refers to the practice of selling NWFP to the market for the purpose of accruing income. This analysis is restricted to the sales of NWFP that is in the focus of this report. It refers to income obtained from the areas indicated below, either through direct sales or through opportunity costs of using the NWFP as alternative goods and service, these are:-

- Bees products: honey, beeswax, propolis and pollination services
- Medicinal and pharmaceutical products
- Extractive products
- Gums, resins, oleo-resins, latex tannins, dyes and oils

- Fodder, fibres and thatch grass

- Animal and animal products other than food; birds, insects, horns, tusks, bones and feathers

Commercialisation of the NWFP, has also a gender dimension. While most of the beekeepers are men, the majority of the mats and baskets makers are women, whereas observations show that most wood carvers and hunters are men. Table 4 below is an indicative table of the sales of NWFP at market place, principle sellers, pricing and seasonality:

Table 4: NWFP-Food products sold at market

Product	**Price(Tshs.)**	**Seasonality**	**Gender**
Syzgium cuminii	10/10fruits	Dec-March	Women
Vitex fischeri	5-10/ 4fruits	Jan-April	Women
Vitex doniana	5-10/ 4fruits	Jan - April	Women
Aframamum angnotifolium	100/ 20fruits	Dec-April	Men
Bush pig meat	400/ kg	Jan - Dec	Men
Guinea fowl eggs	100/ egg	Jan - Dec	Children (boys & girls)
Mushrooms	100/ 5 stems	Dec - April	Women
White ants	20/tablespoon	Feb - May	Children
Mingóko	20/10 root tubers	Jan_Dec	Women

(Source:Makonda,1997:Mustalahti,2000:Personal communication)

2.3.1 Bee products

Apart from its central role of providing food for the households, honey can be indirectly used for commercial purposes for income earning. Beekeeping generates income for the people through sales of honey, beeswax and propolis. Annex 3 summarises the income generation statistics through exports of honey and beeswax, earned in Tanzania for the last 10 years (1988/99 to 1998/99), showing both the quantities exported (for honey and beeswax), the values earned in US$ and TShs during the period.

About 99% of the beekeeping industry in Tanzania is carried by forest based small scale beekeepers in rural areas (NFP-beekeeping Task Force, 2000).

Tables 5A & 5B below, indicate the amount of income generated and accrued through sales of bee products i.e. honey and beeswax for the last 10 year, both in local currency and foreign exchange earnings.

Table 5A: Income generated through export sales of beeswax for the last 10 years

YEAR	COUNTRY INCOME BY EXPORT SALES OF BEESWAX PERIOD OF 1988-1999	
	VALUE –US$	VALUE-TShs
1988/89	324,070.00	-
1989/90	328,353.00	-
1990/91	378,495.00	-
1991/92	2,088,000.00	835,200,000.00
1992/93	1,522,739.00	685,232,550.00
1993/94	237,883.00	119,892,528.00
1994/95	371,635.00	197,338,185.00
1995/96	782,662.00	477,424,113.00
1996/97	1,359,843.60	836,303,796.00
1997/98	1,532,544.00	996,153,837.00
1998/to June1999.	1,440,678.0	1,014,211,975.00

(Source:NFP, 2000)

Table 5B: Income generated through export sales of honey for the last 10 years

YEAR	COUNTRY INCOME BY EXPORT SALES OF HONEY PERIOD OF 1988-1999	
	VALUE –US$	VALUE-TShs
1988/89	14,272.00	-
1989/90	20,487.00	-
1990/91	23,591.00	-
1991/92	221,400.00	88,560,000.00
1992/93	31,216.00	14,047,200.00
1993/94	71,540.00	36,056,160.00
1994/95	25,837.00	13,719,447.00
1995/96	-	-
1996/97	370,094.20	227,607,933.00
1997/98	237,175.00	154,163,826.00
1998/to June1999.	35,533.0	24,184,518.00

(Source: NFP, 2000)

Apart from direct selling of honey and its products for income generation, bee pollination is another indirect contribution of bees to household income generation. Bee pollinators increases crops yield, Tanzania has not adequately harnessed this mutual relation between honey bees and agricultural crops.

The average income generation (per capita for individual actively involved in beekeeping), according to feasibility study by Kihwele et. al (1999) In: Status report for beekeeping in Tanzania is given as an average ranging from minimum of TShs. 22,500/ per year to TShs. 15,000,000/= per year. This is a very substantial amount of money accrued from dealing in trade in NWFP.

Table 6 below, indicates the income generation of some selected individual villagers from Idodi and Pagawa division, Iringa region, Tanzania.

Table 6:Selected beekeepers from Idodi and Pawaga divisions – Iringa regions, Tanzania

Name of beekeeper and village	No & Type of hives	Average Annual Production(kg)		Average annual income
		Honey	Beeswax	
1.Venance Tengeneza of Makifu village.	1,200 log hives	18,000	1,200	Price kept at conservative level, and assuming all bee products will be sold. Total annual income anticipated is TShs. 19,000,000/=
2.Kawawa Mwapili of Makifu village.	1,000 log hives	1,200	1,000	Total annual income TShs. 16,500,000/=
3.Joseph Chibago of Mapogolo village	40 log hives	600	40	Total annual income TShs. 16,000,000/=
4.Athumani Mpembele of Luganga village.	35 log hives	525	35	Total annual income TShs.577,500/=
5.Galagwisa Mpwepwa of Mahuringa village	30 log hives	450	30	Total annual income TShs.495,000/=
6.Pascal Funzila of Mahuringa village	25 log hives	375	25	Total annual income TShs.412,000/=
7.Lazaro Mhagama of Mlowa village	22 log hives	330	22	Total annual income TShs.363,000/=
8. Beatus Ndimwa of Mapogoro village	20 log hives	300	20	Total annual income TShs.330,000/=
9.Julius Kalinga of Mafuruto village	20 log hives	300	20	Total annual income TShs.330,000/=
10.Gabriel Maketa of Mafuruto village	15 log hives	225	15	Total annual income TShs.247,000/=
11.Samwel Kahise of Malinzanga village	13 log hives & Box hive	210	14	Total annual income TShs. 231,000/=

(Source:Kihwele et al., In: NFP, 2000, adopted and modified).

2.3.2 Medicinal and pharmaceutical products

According to Kajembe et al. 2000; In Africa, reliance on traditional medicines is partly owing to the high costs of conventional medicines and the inaccessibility of the modern health care facilities, but also because traditional medicines is often deemed a more appropriate method of treatment. People of different culture and social positions turn to different types of treatments when faced with illness or misfortune.

Annex 2 and 4 present a review of some of the ethnic traditional medicines, as presented by the Maasai women herbalists (at Kariakoo, Dar es salaam), and from literature review. Cultural background has an important influence on the aspects of peoples' lives including beliefs, behaviour, perceptions and attitude towards illness and pain. The skill of traditional medicines practices are acquired primarily through long term apprentice and observations. Most of the knowledge is passed from one generation to another. The power of trees, NWFP and shrubs cannot be denied (Kamwenda and Kway, 2000:Personal communication).

Table 7 below, is an indicative example of the average market prices for medicinal NWFP, which could also be an indicative contribution of the NWFP to income generation for the respective relevant stakeholders of medicinal products at Geita, district, Mwanza region, Tanzania.

Table 7: Average market prices of NWFP medicinal plants in Geita district, Mwanza region, Tanzania.

Bonical/Local names	Price (TShs./unit NWFP)
Mihunge	100/pieces of bark
Turrea nilotica	50/ bunch of roots
Acacia macrothyrsa	20/bunch roots
Ntagwiikengo	50/cup of leaves
Idembe	20/bunch of roots
Nkulungu	100/cup of crushed leaves
Azadirachta indica	50/ piece of root
Mayanzali	100/bunch of roots
Kasela	50/bunch of roots
Rhus vulgaris	200/bunch of roots
Securidaca longipendunculata	200/bunch of roots
Kasuku	50/piece root
Acacia sieberiana	200/bunch of roots
Parinari curatefolia	20/piece of root
Droppings of python	50/teaspoon
Zanha africana	20/piece of root

(Sources:Makonda, 1997).

In Dar es salaam, vendors of traditional medicines surveyed in Kariakoo and Kinondoni markets, mostly Maasai women were reporting to be selling powdered NWFP plant materials packed into small bottles, selling at an average prices of between Tshs. 2,000/= to 8,000/= per 5 ml. bottle and a maximum of up to Tsh. 30,000/= per 5 ml.bottle. Annex 4 is a comprehensive list of NWFP medicinal products sold by Maasai women, the average income per day/ month could not be revealed, but it justified their stay in town of Dar es salaam, with a minimum leaving cost of TShs 30,000/= per month (Government minimum wage). It is reported that the prices from sources in the rural areas of Tanzania are relatively lower. In most cases the contribution of medicinal trade to household income generation is worth a note. Moreover, the reliance of traditional medicines in Tanzania is significant, and there is no reasons that it will decrease.

2.3.3 Extractive products

Tannins, dyes, latex and gums are the main extractive products. They provide employment and income opportunities for local people, they improve profitability of primary forest activities

by co-production of NWFP, enable foreign exchange savings through import substitution and generate foreign exchange through exports. However, the actual demands and supplies for these products are not known. Inventory are needed to acquire enough data.

Tannins is mostly extracted from an exotic acacia tree (*Acacia mearnsii)*. It is an important product for export. Dyes of various shades can be obtained from many of the indigenous trees in Tanzania. The dyes can be obtained from leaves, barks and roots. It is however said that the knowledge about processing of the dyes is not wide spread (Makonda, 1997). Some potential indigenous trees that have the potential for providing dyes have been earmarked, they include; *Bridellia micrantha, Milicia excelsa, Pterocarpus angolensis, Sycygium cordata and Encka divinatum.* The dyes find applications in fabrics, fibres craft and make-up. Some important uses of the gum Arabic include; lithographic links, office glue, emulsion glue prints, cosmetics, flocculating agents for certain minerals, pan coating, sizing agent in textiles and paper, and as a carrier in tablets (FAO, 1989 In: Kajembe et al., 2000). Species which yield gums and oils have economic and dietary importance. Among the important gum producing species reported are *Acacia Senegal* and *Sterculia mhosya* among others, and the oil species are *Securida longipedunculata* and *Ximenia Americana sp.*, these produce edible oils (Makonda, 1997).

2.3.4 Fodder, fibres and thatch grass

Fodder from trees and shrubs are particularly important during dry seasons when availability of grasses is markedly reduced. Feeding livestock inside forest therefore takes place during this season when resources within public lands have been exhausted. In this way forest contribute to household income by sustaining the livestock which are turn dependent upon for direct food provision and income generation (Kamwenda, 1999).

Miombo woodland is fairly rich in browsing species. It has been observed that up to 11 tree species found in miombo woodlands are browsable. The livetstock prefers mostly new regrowths, which has been shown to contain high proteins and other nutrient contents(Kamwenda, 1999). The importance of dry grass for thatching cannot be overstated. Most houses in rural areas of Tanzania are of grass thatch. Dry grass is used for thatching buildings and making fences around compounds.

Plant fibres are important both for domestic use and for sale. It has been reported for example that in Kondoa district, bark fibres of *Adansonia digitata* are used for making filters, brooms and ropes. Another example is from East Usambara where it is reported that widespread use of ropes by the rural artisans is very common to produce a wide range of woven baskets and mats. These are made from palms, grass, bamboo or climbers. They are used for harvesting, drying, winnowing, grinding and storing agricultural produce. Basketry techniques and plant materials are also used to weave granaries, fish traps stools and tables (Makonda, 1997; Kamwenda, 1999).

2.3.5 Tree seeds as Non Wood Forest Products

Information from National Tree Seeds Programme centre (NTSP), reports the potential contribution of tree seeds to income generation to individual and the Nation at large. Table 8 below indicate the current market prices for top twenty tree seeds sold in the country (at local and I nternational markets).

Table 8 :Market prices for the top twenty NWFP tree seeds per kilogram

Species botanical Name	Provenance (Source)	Domestic price (TShs)	International price (US $)
Tectona grandis	Mtibwa	5,500.00	30.00
Gravilea robusta	Rombo	40,320.00	100.00
Pinus patula	Ihefu	18,000.00	80.00
Khaya authotheca	Kondoa	17,280.00	175.00
Pinus caribaea	Masingini	72,000.00	180.00
Pinus teclumanii	Nicaragua	800,000.00	180.00
Cedrela ordorata	Mtibwa	22,800.00	35.00
P. dulee	Morogoro	3,500.00	110.00
Hakea saligna	Ifwangi	43,200.00	35.00
Croton megalocarpus	Shume	12,900.00	28.00
Afzelia quanzensis	Kigwe	6,000.00	35.00
Terminalia catapa	Longuza	12,000.00	60.00
A.fraxinifolius	Soni	14,400.00	75.00
Melia azederatchta	Ismani	10,080.00	45.00
Albizia labeck	Morogoro	8,500.00	40.00
Azaderatchta indica	Dodoma	7,920.00	45.00
Eucalyptus grandis	Lushoto	23,040.00	120.00
Senna siamea	Morogoro	7,200.00	35.00
Dovyalis caffra	Iringa	20,000.00	75.00
Acacia mearnsii	Lushoto	7,800.00	40.00

(Field survey, 2000).

2.3.6 Species of ritual values

Some species in parts of Tanzania have been reported or opted to have ritual values, for example *Phoenix reclinata* leaves are used to commemorate the date Sunday and ash Wednesday. There are also a number of reported species of importance in traditional worshipping and myths. According to a study by Makonda (1997), a number of spiritual associated species are shown in table 9 below.

Table 9: Species of ritual/spiritual value in Geita district, Mwanza, Tanzania

Species	Rank
Canarium Schweifurthii	1.0
Ficus sp	2.5
Jatropha curcas	2.5
Lannea fulva	3.0
Phoenix reclinata	4.0
Euphobia candelabrum	5.0
Dombeya sp	6.5
Rhoicissus tridentate	6.5
Combretum molle	7.3
Caturanegam spinosa	7.3

(Makonda, 1997: Adopted and modified)

2.4 The gender based knowledge in use of non wood forest products

Studies have revealed that NWFP collection at household level entails a set of gender roles played by both men and women. Collection of NWFP of vegetables nature is mainly done by women.

Women and men generations, adaptation and use of knowledge and technology are shaped by the economic, social, cultural, political and geographical contexts in which the two sexes live, but each gender experiences a different way. It is reported by Sindiga In: Kajembe et al. 2000; that, in Tanzania among the Maasai communities, traditionally boys are assigned to pick up the knowledge of herbal medicines used in homes when they are looking after small stock (stock & goats) around homesteads. Girls receive their knowledge of herbal medicines used in the home from their mothers and grand mothers.

In fact in Tanzania, it is the women who are the real experts on the collection, processing and preservation of NWFP for the household foods. Peasant women know the nutritional needs of their families as well as the nutritive contents of the wild NWFP they collect from the bush, since they are responsible for sustaining the livelihood of the family. The food security of local communities is based on the availability, access to and control of NWFP from the nearest forests.

However, the local knowledge of men and women on wild food is declining, as a result of formal schooling and emigration, while women not only retain a high and widely shared level of generation of knowledge about wild NWFP, crafts and medicinal plants, but also acquire new-men's roles as duties change (Chiguru, 2000: Personal communication).

Katani, 2000 In: Kajembe et al., 2000; in the study on the role of gender based indigenous knowledge in developing countries coping strategies against deforestation carried in Mwanza district, reveal that fuelwood, fruits and vegetables collection from the forest are done by women. On the other hand, men are responsible for the collection of fodder for livestock and hence they are knowledgeable with different fodder plants for different animals. It was observed that gender based division of labour, gender access to NWFP and control over resources are the main factors contributing to the differences in local knowledge held by men and women about the management of forest resources.

2.5 Main constraints facing non wood forest products development

Despite their contribution and importance for local economies and for the people, NWFP are still largely neglected in policies, programmes and decision making processes of natural resource management and strategies towards poverty alleviation. The main constrains facing NWFP development, according to the National Orientation Workshop on forest based industry and products are; deforestation and lack of proper forest management regimes.

2.5.1 Deforestation

Non Wood Forest Products (NWFP) are available in the Forest or wilderness as the name suggests. The problem of availability

of the NWFP is therefore directly related along to the problems of disappearance of forests. This is so because as trees disappear the integrity of the ecosystem gets reduced and there is loss of biodiversity. The amount of NWFP all over Tanzania get reduced along with deforestation and associated biodiversity loss. Deforestation is mainly due to tree cutting, uncontrolled grazing, forest fires, and shifting cultivation (Otieno, 2000).

Despite the importance of agricultural biodiversity, the diversity of crop and livestock species currently in use worldwide is rapidly dwindling. Although people consume approximately 7,000 species of plants, only 150 species are commercially domesticated. Just over 100 species account for 90% of the world's food crops (Thrupp, 1998 In: Kajembe et al., 2000). Further studies are needed to be conducted in the country, to reveal the present situation of potential agricultural biodiversity.

Accurate data on the rate of deforestation in Tanzania is lacking, which is reflected in the estimates of deforestation rate reported, but according to the Forest policy (MNRT 1998), the deforestation rate is estimated at 300,000 to 400,000 ha. per year. In Tanzania and elsewhere in Sub Saharan Africa, growing but impoverished peasantry is forced to depend on the dwindling forests for NWFP. It is therefore clear that most of NWFP in Tanzania come from secondary forests. A secondary forest is a term describing a forest that has regenerated following disturbances and primary forest describes an undisturbed, old growth forest (Kajembe, et. al. 2000).

2.5.2 Lack of proper forest management regimes

Closely related to the first problem of deforestation is the problem of forest management regimes. It is becoming increasingly clear that the management of natural forests by the government alone has been ineffective (Wily 1996;Kajembe and Monela 1999 In: Kajembe et al., 2000). Unplanned utilization of forest resources inside and outside forest reserves has increased drastically thus; signalling both inability of the Forestry and Beekeeping Division alone to control the use of resources and depletion of forests, and thus leading to destruction of this resource base.

One of the main reason advanced for the ineffective management of the forests especially in the vast areas of

miombo woodlands is that the government alienated local people living close and dependent on forest resources by withdrawing from them or denying them ownership in both physical and psychological senses. In physical sense the government gazetted natural forests as forests reserves and in so doing evicted many people from these forest reserves. Thereafter entry to these reserves was extremely restricted especially for the local dwellers proximate to the forest reserves. Yet distant dwellers from elsewhere always found their way into the forest resources. This gave an impression to the local people that natural forests belonged to the government and therefore it was not their responsibility to conserve. In fact as a reactionary move, at times local people have also been accomplices to the illegal harvesting of forest products. The forests outside forest reserve areas suffered most in the beginning. As pressure mounted as a result of increase in population among other things, even forest reserves were not spared. The government assumed the role of the manager and owner of natural forests, in the belief that it would be able to control and direct the use of resources so that social benefits would be maximised while conserving the resource base. The government was thought to be having the necessary machinery to control the behaviour of the public in the use of resources, ensure equity on benefits accrued from the forest products and take a deterrent measures against those who do not comply with the laid down rules and procedures.

Over the years the role of the state alone as the manager and owner of the forests on behalf of the public at large has been tested and found very wanting. Many difficulties have risen out of having to make surveillance and police the vast areas of forests. Surveillance and policing require resources in terms of funds, personnel and equipment all that have not been available to the responsible government departments in the required quantities. This has resulted to a very minimal surveillance and policing to a greater extent the ineffectiveness of the government department as a sole manager and owner. The poor government performance in the management of natural forests has prompted a search for alternative management regimes. Recently proposed management regimes includes: Joint Forest Management (JFM), implying the possibility for local people to manage the forests reserves jointly with the government and common property forest management regime implying local people owning the forests and managing forestry resources. In the latter case villages have been urged to set aside woodlands and manage them under common property regimes.

2.6 Opportunities for the development of the Non-Wood Forest Products

According to observations made during this study, the trading in NWFP in Tanzania operates on an informal market structure, hence complicating the estimation of costs and benefits of trade in NWFP. This reveals that, in Tanzania NWFP has no simple pricing trend, because the said trends in pricing and costing elements are spontaneous, thus forming a complex pricing structure even from the same NWFP at the same site (Kamwenda and Kway,2000: Personal communication).

A number of threats also exists as given under part 2.5. However, despite the threats faced by the NWFP, still there are some lines of actions which can provide opportunity for sustainable use of forest resources to improve household food security, these are as put forward below.

2.6.1 Diversification of forest management to incorporate locally valued NWFP

Forest management needs to focus on improving existing forest resources especially those of local origin. New skills will be needed which focus on management for multiple products and forest uses. Techniques which combine local knowledge and new skills to achieve supply of products which are important to use for local people is needed. Products needed by the local people include bushmeat, rattan, bamboo, firewood, traditional medicines, fruits, honey and beeswax among other NWFP. Thus while agroforestry offer exciting opportunities for improving rural livelihood and enhancing food security, they have to be firmly grounded in local realities and be tested under local conditions. Growing of trees on farms and fallow lands could improve household food security in different ways; by providing food and animal fodder directly, by improving the conditions for crop growing and livestock rearing and supplying products that can be eaten or sold for cash.

2.6.2 Provision of market support and added values for the local NWFP

For those who can earn cash from sales of NWFP the benefits they obtain are directly linked to markets. In many cases local processing receive very little for the products they sell. Instead most of the benefits are captured by middlemen and urban traders operating further along the market chains.

To assist local people in marketing of NWFP we need to strengthen the processing technologies for added values of NWFP, the bargaining power of producers with market information, transport and storage facilities, mount promotion activities and campaigns to encourage consumers to buy indigenous NWFP instead of imported alternatives. The existing agricultural and forest extension networks in Tanzania offers an opportunity for providing market information.

2.6.3 Supporting the small scale forest based enterprising focused on NWFP

Huge numbers of people already depend on collecting and processing NWFP as source of income and food. These encompass products grown on farms and those obtained on forests (off-farms). By supporting those activities and helping to make them more profitable and sustainable, the livelihood of those concerned can be improved and their food security enhanced. This is of particular relevance for the rural people and other disadvantaged groups, as these are the people who generally depend on these activities the most. Women specifically stand to benefit. There is thus, a need to re-apprise the investment opportunities and strategies.

2.7 Issues and strategies as proposed by the new forest policy and the national Orientation Workshop

In March 1998 the government of the United Republic of Tanzania (Mainland) approved The National Forest Policy and Beekeeping policy. Moreover, an Orientation Workshop at the national level, organised under the NFP process, solicited comments and feed back as a baseline in the development of strategies for the Forest Based Industry and Products [FBIP] policy area. In this workshop principal issues affecting NWFP were summarised, strategies proposed and stakeholders' gaps in knowledge, which need further studies identified.

2.7.1 Issues and strategies proposed by the national forest policy

The forests and woodlands provide NWFP such as game meat, fruits, nuts, mushrooms, honey, beeswax, fibres and medicinal products. These products play a significant role in the economy and livelihood of local communities in the country and contribute to about 5% of GDP (together with woodfuel). The potential of these NWFP are currently not known, and hence their contribution to the national economy is not appreciated.

The national forest policy puts forward the following strategies:

- Resource assessment of NWFP to be incorporated in forest inventories and resource assessments for forest management planning.

- Private sector investments to be promoted in order to utilise the full potential as well as to domesticate and commercialise products with high demand.

- Research, training and product development programmes to be strengthened in the existing forest research and training institutions.

- Information on potential markets to be produced and efficient marketing channels developed.

- Awareness raising on the products and markets intensified.

The platform to achieve the national forest policy strategies is the National Forest Programme [NFP] and the Forest sector legal framework i.e. the Forest Act/legislation.

2.7.2 Issues and strategies as proposed by the National Orientation Workshop

Table 10: Summary of issues and strategies on NWFP proposed by the Orientation workshop.

No.	Issues	Strategy
1.	Lack of statistics and information on prioritisation of products according to direct and indirect contribution to social economic development	Undertake resource assessment on potential and supply statistics
2.	Narrow and declining forest cover and resource base	• Promote agroforestry • Development of commercial farming of NWFP • Promotion of Joint Forest Management • Training of professional staff
3	Lack of processing facilities	Promote and attract foreign investors
4	Low level of awareness	• Awareness raising among local communities to form associations, and improve productions, processing and marketing • Extension services to local communities • Promote vocational training on NWFP as income generation activity • Team work extension services
5	Inadequate transfer of knowledge from generation to generation and lack of indigenous knowledge assessments	Assessment and recording of indigenous knowledge
6	Lack of credit facility and inadequate promotion of NWFP	Micro-credit financing mechanisms and training
7	NWFP not recognised as a food security item	Promote NWFP
8	Inadequate promotion strategy and incentives for more women participation in NWFP	Establish special programme for women involvement in NWFP
9	Inadequate processing facilities & market information	Improve database for NWFP and attract more foreign investors
10	NWFP not adequately addressed in the forest policy (except in beekeeping policy)	• Need for specific strategies for NWFP after gathering up to date information • Need for new post of NWFP in FBD

Source: Kamwenda, G.J. and Mkeya, F.M. (2000)

CHAPTER THREE

3.0 Investment opportunities in NWFP

The diversity of natural forests in Tanzania offer a wide range of NWFP, in line with this, a number of investment opportunities exists.

3.1 Investment in beekeeping and bee products

(i) Potential and strength of the beekeeping industry in Tanzania

It is estimated that the production potential of bee products in the country is about 138,000 tones of honey and 9,200 tones of beeswax per annum from an estimated 9.2 million honeybee colonies. The current national honey and beeswax productions are estimated to be 4,860 tons of honey and 324 tones of beeswax per year. This is about 3.5% of the production potential (NFP, 2000).

(ii) Justification for investing in beekeeping industry in Tanzania

Investors are invited and encouraged to invest in Tanzania because of the following:

- Tanzanian honey is appreciated in the world market because of its flavor and the fact that it is "Organic" (free from chemical pollution).

- There are strong local and export markets for bee products (honey, beeswax, propolis, etc).

- Beekeeping is highly sustainable because honeybees are a natural part of the ecosystem and they do not compete for resources with other land uses.
- Beekeeping is relatively profitable.

- With appropriate management of bees and bee fodder one could produce honey and other bee products throughout the year (because there is no winter, like in temperate countries whereby colonies of honeybees have to be kept warm throughout the winter season).

- Tanzania has both stinging and stingless honeybees, which include: *Apis mellifera scutellata* found throughout the country; *A.m. monticolar* found on the slopes of Kilimanjaro and Meru Mountains and *A.m. litorea* found along coastal areas. Stingless honeybees include Meliponula and Trigona species found throughout the country, especially in natural forests. These stingless honey bees can easily be domesticated.

(iii) Areas for Investments in beekeeping sector in Tanzania

The new National Beekeeping Policy encourages private ownership of apiaries and bee reserves, and since Beekeeping Legislation is under formulation (expected to be ready late in the year 2001), which will support the implementation of the policy, investors are invited and encouraged to make investment in the following areas shown below:-

(iv) Establishment and sustainable management of bee reserves

Tanzania has a large potential for the establishment of sustainable management of the bee reserves, this encompass:

- **Natural bee fodder or bee forage**

Natural plants: More than 50% of natural plants which include trees, shrubs and herbs, form abundant bee forage in public (unreserved) lands, forest reserves, game reserves and national parks. Since honeybees are natural components of the ecosystem they freely go across boundaries of reserves to collect nectar and pollen from the various bee plants (bee fodder). Thus beekeepers can establish apiaries in a wide range of vegetation ecosystems.

- **Cultivars (cultivated plants)**

Cultivars: A number of cultivars exist for sustainable bee industry. Over 90% of the cultivated plants are suitable for beekeeping. They include: sunflower, legumes, citrus fruits trees, sisal, coffee, banana and maize among others.

(e) Beekeeping industry in cross-sectoral areas

- **Beekeeping in public land:**

The capacity of establishing and managing apiaries in unreserved land is still very low in the country. Honey is common in unreserved land. A number of strategies exist, that can make beekeeping in un-reserved areas attractive and sustainable, these include among others: Enrichment planting with melliferous (bee forage) plant species which produce nectar and pollen for bees; Use of bee smokers and bee protectives during honey harvesting in order to prevent setting of bush fires; protection of bee colonies against sabotage and granting title deeds for land under apiaries.

- **Beekeeping in agricultural land**

Apiary management in agricultural land may be practiced using for example, "tree apiaries" which is the common feature in coffee farms, Bee colonies can be established for renting for commercial pollination of horticultural crops.

- **Establishment and management of apiaries in Forest Reserves, forest plantations, Game Reserves and Farmland areas.**

Apiary management has recently been permitted in some game reserves under special agreement between wildlife administration and beekeepers, as a strategy for sustainable conservation of wildlife through peoples' participation in the management and utilization of the natural resources.

Apiaries in forest reserves and plantations is prohibited. However, with special permit from the director of forestry & beekeeping, beekeeping can be practiced in special areas. With the introduction of the new concept of forest management which encourages joint forest management approach, whereby tangible benefits for people living in vicinity of the forest are considered and incorporated in the joint forest management, it is expected that more beekeeping activities will be carried out in forest reserves and plantations.

(f) Establishment of Beekeeping - Based Industries and Products businesses

A number of avenues and opportunities exist for the beekeeping sectoral investment, these include:-

- Manufacturing beekeeping equipment e.g. beehives, bee protective, honey presses and honey extractors.
- Bees wax-based industries and products:- for manufacturing beeswax candles, shoe polishes, wood polishes, lubricants and pharmaceutical products.
- Honey Based Industries and Products:- Manufacture of honey beer, honey wine, and use of honey in confectioneries and establishment of honey packing plants.
- Bee pollination-based industries such as:- renting of bee colonies for special pollination programmes; harvesting pollen (as a product) from colonies of bees.
- Promotion of eco-tourism in apiaries and in bee reserves.
- Promotion of lesser known bee products such as propolis and royal jelly, which have good market in Japan and other developed countries.

While Tanzania encourages private investment from outside the country, Tanzania is committed to sustainable development of the beekeeping resources which are free from bee diseases, bee parasites and pests. Unfortunately "European honey bees" which are found in the American and European continent and adjacent Islands have many diseases such as European Foul Brood, American Foul Brood, and parasites such as *Acarapis woodei* and *Varroa mites.* For these reasons Tanzania does not allow importation of honey bees and used beekeeping equipment. All investors should focus on utilising indigenous honey bee species: *Apis mellifora scutellata*, *A.M. litorea*, *A.M. monticola* and stingless honey bee (*Melipona* or *Mlipenura* and *Trigona* species) which are found abundantly in most natural forests and woodlands and are suitable for domestication.

3.2 Investment opportunities in some other NWFP

Investment in other NWFP are encouraged for such products as gums, resins, barks, tannins, aromatics, natural dyes, fruits and nuts, fibres, spices, naval stores and medicinal plants.

Small and medium scale industries for the purpose of increasing industrial outputs, employment and income generation generation, and rural industrial development can be developed inline with these other NWFP.

The diverse forest types available in the country offer the potential for investment in NWFP, as the forests offer a wide raw material resource base for NWFP mostly obtainable in the forests (Table 10, below).

Table 10: Forest area and distribution by types and legal status

Forest type	Area, 000 ha	Proportion, %
Forests (Other than mangroves)	**1,141**	**3.4**
Mangrove forests	**115**	**0.3**
Woodlands	**32,299**	**96.3**
Total	33,555	100.0
	Use of Forest Land	
Production forest area	**23,810**	**71.0**
Protection area	**9,745**	**29.0**
Total	33,555	100.0
	Legal status	
Forest reserves	**12,517**	**37.3**
Forest/Woodlands within national parks etc.	**2,000**	**6.0**
Non-reserve forests	**19,038**	**56.7**
Total	33,555	100.0

Source: Adapted and modified from MNRT (1998).

3.2.1 Small scale industries development

At national level, Small Scale Industries Development Organisation [SIDO], offer opportunities for planning, co-ordinating, promoting and offering technical, economic and management services to small scale industries.

Technical training facilities cover such areas as; fruit preservation, weaving and processing of oil seeds to mention some.

3.2.2 Women and youths projects and small scale industries

Women and youth groups can receive concessionaire treatment as a result of a special availability of funds set aside in SIDO to promote women and youth entrepreneurship. On approval of a clearly substantiated project . The handcraft technology include:

- Wood mosaic and wood ware
- Textiles tie and dye
- Fibre based items i.e. bamboo products, straw mats, bags and decorative materials
- Horn products
- Leather products and artistic utilities
- Soft stone ware
- Hand made paper

SIDO extends consultancy services in the field of technical, economic, management, marketing production and quality control, know how and technology transfer. SIDO can offer consultancy on this area as regard to appropriate technology and investment on NWFP.

CHAPTER FOUR

4.0 Issues and strategies for NFP action plan

Some Important issues to be addressed in the NFP action plan are; Issues related to NWFP investment opportunities for contribution to food security and income generation; Issues related to policy and institutional levels; Resource management and best practices; the role of donors and international development assistance agencies; research themes; and lastly, the roles of international organisation.

4.1 Strategies for investment in NWFP for food security and income generation

With adequate policy support, research, and investment, NWFP can contribute to household economies and food security, to national economies, and to environmental objectives (such as the conservation of biological diversity). Successfully enterprises which improve the income generation of women can represent a means to empower this social group, which is central to resource management, and contribute to equity in the country.

NWFP should be given appropriate importance in the economic, industrial and trade policies and programmes of the government. These lines of action should be identified be followed by the government to develop full potential of NWFP.

4.2 Strategies related to policy and institutional levels

Government should undertake formulation, review and/ or revision of policies having direct impact on NWFP, with clear orientation towards sustainable management of resources by:-

- Properly identifying and accounting the contribution of NWFP in the system of national accounts;
- Enhancing the investment and budgetary provision for development of NWFP;
- Introduction of appropriate pricing mechanisms;
- Granting local organisations (e.g. cooperatives, user groups) and the private sector a greater voice in management of the resource;

- Recognising the socio-cultural importance/ significance of the resource base;

- Establishing strategies by clearly identifying priorities.

It will also be useful to collaborate with and learn about the experiences of other countries. Policies and programmes related to NWFP should consider the following:

- Broader policy environment and compatibility among related policies (poverty alleviation, rural development, environment, agriculture, industry etc.);

- Identification of particular cultural groups requiring specific resource allocation and policy attention;

- Appropriate measures to facilitate the participation of local communities in designing and implementing strategies for NWFP development, and in managing NWFP resources;

- Decentralisation of forest resource management;

- Revision of existing rules and regulation having adverse impact on NWFP;

- Giving clear identity to NWFP and incorporating them in the public forest administration system;

- Support to the strengthening of research institutions having the capability to conduct research on the different aspect of NWFP, including new products development;

- Ensuring institutional mechanisms to support technology transfer, education, training and extension, investment, credit and marketing;

- Establishment of information systems covering resource inventories, production, processing, marketing;

- Development of national standards for NWFP (including quality control, and certification procedures according to market requirements);

- Strategies to locally added values, so that, considering the importance of NWFP in local economies, bias against small-scale enterprises should be avoided;

- More transparent transactions along the NWFP market chains;

- Processing and market development of NWFP, which should not deprive the rights of local communities to goods and services such as forest food, fodder for grazing, medicinal plants, and construction materials;

- Promotion of service-oriented, income generation opportunities like eco-tourism which must be environmentally sound;

- Increasing the local uses of NWFP (for example, with the establishment of NWFP user industries such as cosmetics, paints, etc.).

4.3 Strategies for resource management and best practices

At resource management level the following should be embraced:

- Identification of critical ecosystems (such as dry lands, mangroves, wetlands and upland watersheds) for policy attention;

- Protecting and profitably using the local traditional knowledge(best practices) about the NWFP resources;

- Initiatives for prospecting biological diversity in forests for their chemical and biological values so as to derive legitimate benefits for the country and the people; Experiences of countries where such development are taking place should be shared with other countries;

- Domestication of NWFP species and their integration into agroforestry systems;

- Environmental impact assessment of projects related to the use of NWFP resources.

4.4 Strategies for the role of donors and development assistance agencies

Donors and development assistance agencies should consider raising the priority for funding NWFP and support adequate flow of investment capital into the sub-sector. Increasing attention should be accorded to the socio-economic issues relating to the NWFP and their support to facilitation efforts should be directed accordingly. The following lines of action could be explored:

- Facilitate transfers of technology/ know how between developed and developing countries, as well as among developing countries;

- Donor supported programmes for improved processing and marketing of NWFP should carefully assess the risk to small producers compared to other alternative. Where the risk is high, it is necessary to establish mechanism to avoid or share that risk;

- Support product development, market research and improvement of processing and marketing capabilities of producer groups;

- Programmes on industrial use of NWFP supported by donors and development assistance agencies should incorporate research on development of new NWFP with economic potential;

- Industrialised donor countries should assemble and share their experiences in the management of NWFP resources and their utilisation;

- NWFP programmes of national and international research institutions should be given special consideration for such activities as skill development, data base management and dissemination of information.

- Foster and facilitate South-South and North-South cooperation in aspects of common interests through mechanisms such as collaborative research, seminars, consultation and joint ventures.

4.5 Strategies for research themes

Research institutions at all levels should develop mechanisms for involving stakeholders in planning, implementation and monitoring of NWFP, implementation and monitoring of research on NWFP. They should also recognise and adequately reward local know-how and facilitate its refinement. Important research themes and priorities are as follows:

- Document and disseminate fast disappearing local knowledge on the management and use of NWFP, in collaboration with disciplines such as anthropology and ethnobotany where considerable research on and publications of information relevant to NWFP have been carried;

- Improvement of products quality through better harvesting, processing and handling;

- Research on new products and practices for diversifying production and for meeting changing demands;

- Economic and market research, including strategic evaluation of market conditions and opportunities;

- Research and development on processing optimisation, quality improvement & controls and new formulation of NWFP;

- Mechanisms to transfer research findings on new products and processing to the private sector industries;

- Study management systems for NWFP production along with their environmental impact and socio-economic implications;

- Study the ecology and biology of NWFP species, along with their domestication, agronomic practices, and integration in the agroforestry systems;

- The linkage of research and resources management for inventories and bio-diversity prospecting of NWFP resources should be strengthened;

- Research on the impact of policy measures and regulations on the resource management and utilisation of NWFP.

4.6 Strategies for the roles of International organisations

International organisations, including FAO, should provide assistance for implementing programmes for NWFP, also through projects identification and formulation and donor identification. Areas in which the work of international organisations can provide to support NWFP development include:

- Disseminations of information on the uses and markets of NWFP;

- Provide assistance to strengthen research and development institutions to develop additional industrial uses for NWFP;

- Develop programme frameworks for NWFP suitable to be integrated within the overall forest sector policy, in order to serve as a guide and model to be adapted by the country;

- Initiate and facilitate action to collect and publish international statistical information on production, trade and consumption of major NWFP on a regular basis. This could include information on price movements and supply and demand trends gleaned from trade sources;

- Identify regional centres of excellence to serve as focal points for regional networks on NWFP to enable collaborative efforts, information exchange and technology transfer, and identify funding sources for implementation. FAO regional offices can play an important role in this regard;

- Develop a system of classification of NWFP (within the overall system for forest products) that is harmonised with existing international systems.

CHAPTER FIVE

5.0 Conclusions and recommendations for the NFP strategies and action plans

5.1 Conclusion

From the literature available it can be concluded that available information in Tanzania regarding potentials of NWFP is plenty but fragmented. Most of information cited is supported by evidences from inside Tanzania indicating abundance of knowledge in NWFP.

It can further be concluded that NWFP are important for household food security and that they play an important role in coping with food shortages. Thus the importance of wild food should not be underestimated.

Regarding the identification, selection, collection and preparation of all types of wild foods, gender based local knowledge is the main determinant. It is women who mostly know the right species for household consumption. Integration of modern technologies in activities related to wild food has not been widely reported. It is therefore pertinent that efforts should be made to incorporate modern technologies in identification preparation, preservation and storage of wild foods.

NWFP contributes either directly or indirectly to household food security. Directly by providing food for consumption and indirectly by cash income generation, the income can then be used to purchase food (not necessarily wild)from the market. The control of NWFP depends on gender. Production which have direct contribution are normally controlled by women while those related to cash earning are under mens' domains.

The study has revealed that deforestation, lack of proper forest management regime and non existent of national NWFP programmes are the main threats against wild foods and other NWFP, for household security and income generation. Despite threats/ problem against sustainable use of NWFP for household food security, there exists some opportunities for its improvement, these include, diversifying forest management to incorporate locally valued NWFP, encouraging fruit trees growing in farms, providing market supporting small scale forest based enterprises. However, all these interventions

should be done while incorporating gender based local knowledge.

5.2 Recommendations

Gender and local knowledge are central in all activities related to wild foods. Despite the fact that both men and women are involved in collection of these foods, still women are the main actors with men remaining supportive or controlling prestigious activities especially those related to income generation. It is therefore recommended that government, NGOs or individuals committed to improving household food security and poverty alleviations should target women. It is women who are manager of household regarding household food security, while men are managers of cash income which may not be necessarily used for improving household food security and poverty alleviation at household levels.

Regarding local knowledge, it is recommended that detailed studies should be conducted to tap the available local knowledge before the fast modernization processes dilute it. Such knowledge should be documented and used by various authorities to improve household food security.

The nutritive value of wild food is quite commendable. There should be countrywide campaigns to sensitise people on use of wild foods instead of expensive domesticated ones. Wild fruits and vegetable are close substitutes of cultivated species. It is recommended that nutritive value of different wild foods in different localities be investigated and advocated for food and nutrition security.

Studies leading to commercialisation of wild foods will enable a wide consumption of such foods. It has been established that consumption of most wild foods is limited by supply thus commercialisation of selected species is useful for household food security. Furthermore, researches on improving desirable characters of wild foods should be carried out.

It is recommended that forest based micro enterprises be advocated to empower household with income for food purchase. However such project should focus women such that they become controllers of income from such enterprises. Income controlled by women is more likely be used for family welfare, household food security being the major among other.

Establishment of clear marketing channels for NWFP product will provide income to households. Transparency and promotion of NWFP activities may increase demand for the wild foods in general and indirect contribution of NWFP to household food security through income generation.

Most policy makers and programmes formulators have not acknowledged market for NWFP. It is therefore recommended that detailed studies on establishment of good marketing system of all types of wild foods should be done to widen the scope and extent of NWFP contribution to income generation.

It is recommended that; The role of FBD should be to take issues and strategies on NWFP as put forward by stakeholders during National Orientation Workshop [Part 2.7], and put them into action plans for the NFP implementation strategies or programmes.

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ANNEX 1: Some useful nectar producing species for agricultural land and amenity for roadside planting and urban areas

Tree name	Pollen	Fodder	Ornamental
Anacrdium occidentale	(P)	Fd	Or
Azadirachta indica	(P)	Fd	Or
Cenna siamea	(P)	Fd	Or
Ceiba pentandra	(P)	Fd	Or
Gliricidia pesium	(P)	Fd	Or
Prosopis species	(P)	Fd	Or
Tamarindus indica	(P)	Fd	Or
Eucalyptus species	(P)	Fd	Or
Syzygium cuminii	(P)	Fd	Or
Cocus nucifera	(P)	Fd	Or
Gravillea species	(P)	Fd	Or
Malus species	(P)		Or
Persea Americana	(P)		Or
Prunus species	(P)		Or
Toona ciliata	(P)	Fd	Or
Terminalia arjuna	(P)		Or
Schinus terebinthifolius	(P)	Fd	Or

(P)=pollen; Fd=fodder; Or=ornamental

(Source: Börje Svensson, 1991: Adopted and modified)

ANNEX 2 : Some statistics of NWFP, species, uses, part foraged and ethnicity from various tribes of Tanzania.

NWFP – roots based

BOTANICAL NAME	LOCAL NAME BY TRIBE	MEDICINAL USES/TREATMENT
Cussonia arborea	Mtindi (Sambaa)	Gonorrhoea General antidote
Commiphora zirmmermanii	Mutunguu(Meru)	Constipation
Colotropis procera	Mpamba mwitu (Swahili)	Snake bite Hookworms
Ceropegia lugardiae	Gonyera (Sukuma)	Snake bite
Ceropegia stenantha	Nongolo (Sandawi)	Stomach diseases in children
Pentarrhinum abyssinicum	Mkonamko (Zigua)	Stomach
Secamone parvifolia	Limuaga(Sukuma) Meramera(Nyamwezi)	Abdominal pain Stomach disorders Snakebite
Stapelia semota	Kawala (Kamba)	Wounds & ulcers
Impatiens digitata	Awowa (Iraq)	Gastric disturbances in babies
Impatiens wallerana	Sunguala (chagga)	Abartifacient
Crassocephalum mannii	Mdaa(Pare; Makonde)	An antihelmintic Pugative, dysentry
Markamia obtusifolia	Mkawa(Haya) Mpapa(Zinza) Mpugupugu(Zaramo)	Steam baths,Inhalant Convulsion in children, Snake bite Stomach trouble
Cordia quarensis	Cesege(Maasai)	Secure arbortion
Cordia cinensis	Mudawe(Gogo)	Malaria Conjactivitis in cattle
Helioptrium indicum	Humbangara (Ngoni)	Yaws

(Source: Field consultative process, 2000 & Triangulations)

NWFP – Leaves based

BOTANICAL NAME	LOCAL NAME BY TRIBE	MEDICINAL USES/TREATMENT
Crassocephalum bojeri	Yamundekelelwa (Chagga)	Rheumatism
Conyzia pyrrhopappa	Mhasu (Zigua)	Inluenza, Indigestion & malaria
Conyza newii	Kisegeyo (Sambaa)	Laxative in babies
Cumbretum exalatum	Mtalate (Pare)	Rheumatism
Chenopodium schraderanum	Akaita (Haya)	Cure colds
Chenopodium procera	Hangazimu (Bondei & Sambaa)	Headache
Bidens pilosa	Munyugunyugu (Meru)	Conjuctivitis remedy
Artimisia afra	Ushemeni (Sukuma)	An emetic
Bidens angustata	Mpange (Nyamwezi)	Cases of sunstroke
Barkheya bipinnatifida	Kipalwi (Hehe)	Alleviate pain
Aspiria pluriseta	Ol-oiyabaje (Maasai)	Skin diseases, cutting the eye rash of trachoma infected patients
Ageratum conyzoides	Kundambara (Zaramo)	Sore eyes & Coughs Stop epitaxis
Cumbretum molle	Gendai (Iraq);	Hookworms, stomach pains, snake bite, leprosy, abortifacient
Cumbretum schumannii	Ngongolo (Digo)	Remedy of neumonia Headache
Gynand ropis	Mbweso za mwitinji (Yao)	Aching ears, falitation of birth, stomache, thread worms
Ehretiacymosa	Murembu (Chagga)	An aphrodiac; Styptic for wound healing

(Source: Field consultative process, 2000& Triangulations)

NWFP – Bark based

BOTANICAL NAME	LOCAL NAME BY TRIBE	MEDICINAL USES/TREATMENT
Cussonia kirkii	Mkalia (Nyamwezi)	Gnorrhoea
Dregea abyssinica	Lamee, Ubombo (Sambaa)	Diarrhoea for children
Beberis holstii	Muraga (Meru)	Treat wounds
Markhamia acuminata	Iama (Sandawi)	For syphilis
Markhamia hildebrandtii	Mtarawanda (Zaramo/Swahili)	Toothache
Stereospermum kunthia num	Mtelela (Sukuma)	Cough medicine, wound washing & ulcers
Cordia sinensis	Mudawe (Gogo)	Conjuctivitis in cattle
Commiphora zimmermannii	Msume (Pare)	Snake bites, some case of fever & constipation
Warbugia stuhlumanii	Mkaa (Zaramo/Swahili)	Toothache Body rheumatism
Warbugia salutaris	Olosogoni (Maasai)	Stomache, constipation & cough and fever
Bosia angustifolia	Omuziba (Haya) Msingesa (Gogo)	Treat malaria Looting cattle
Capparis tomentosa	Iravu (Chagga)	Chest pain
Thyladium africanum	Nguira (Sukuma)	Body pain & snake bite
Lannea schimperii	Mvumvu mkubwa (Zaramo/Swahili)	Toothache, chest pain & colds
Ozora obovata	Mjaika (Mwera)	Dysentry
Sclerocarya caffra	Ngongo (Fipa)	Toothache, constipation, stomach upset
Aconthera longiflora	Ol-morijoi	Syphilis and arrow poison
Diplorhynchus condylocarbon	Itembele (Nyika)	Facilitae birth, snake bite

(Source: Field consultative process, 2000 & Triangulations)

NWFP – Flower and/or fruits

BOTANICAL NAME	LOCAL NAME BY TRIBE	MEDICINAL USES/TREATMENT
Aerva javania	Eleishwa (Maasai)	East coast fever
Celosia hastatu	Muhepe (Digo)	Diarrhoea Assist child birth of pregnant women
Cyathula inciculata	Irimata (Pare); Mtulua (Sukuma)	Abdominal pain
Pupalia atropurpuea	Mnamanta (Zaramo)	Treat wounds
Rhus vulgaris	Msagara (Haya)	Diarrhoea
Annona senegalensis	Mbokwe (Digo)	Diarrhoea
Xylopia aethopica	Mwengele (Zaramo/Swahili)	Headache, neuralgia, coughs, dysentery and bronchitis
Strophanthus eminii	Msungururu (Sukuma)	Arrow poison Snake bite
Kigelia africana	Murantina (Meru)	Cure of measles, headache & malaria
Ehretia amoena	Mbundukidume (Zaramo/Swahili)	Painful menstruation
Commiphora madagascariensis	Getalongo (Iraq)	Cure fever
Maems udulis	Luwaga (Sambaa)	General pains
Crassocephalum vitellinum	Omusheda (Haya)	Eyes infections
Imperat cylinrica	Luswi (Sangu)	Venerial diseases
Fagellaria guinensis	Tokote (Digo)	Sores in the mouth
Commelia benglialensis	Odielo (Jaluo)	

(Source: Field consultative process, 2000 & Triangulations)

ANNEX 3: Some basic statistics of export market prices of NWFP: honey and beeswax for period of 1988/89 – 1998/99

YEAR	BEESWAX		
	Metric-TON	VALUE –US$	VALUE-TShs
1988/89	326.0	324,070.00	-
1989/90	203.0	328,353.00	-
1990/91	234.0	378,495.00	-
1991/92	696.0	2,088,000.00	835,200,000.00
1992/93	569.5	1,522,739.00	685,232,550.00
1993/94	124.0	237,883.00	119,892,528.00
1994/95	120.0	371,635.00	197,338,185.00
1995/96	226.0	782,662.00	477,424,113.00
1996/97	326.0	1,359,843.60	836,303,796.00
1997/98	449.0	1,532,544.00	996,153,837.00
1998/to June1999.	403.0	1,440,678.0	1,014,211,975.00

(Source: NFP, 2000)

YEAR	HONEY		
	Metric-TON	VALUE –US$	VALUE-TShs
1988/89	20.5	14,272.00	-
1989/90	33.3	20,487.00	-
1990/91	38.0	23,591.00	-
1991/92	123.0	221,400.00	88,560,000.00
1992/93	32.0	31,216.00	14,047,200.00
1993/94	78.0	71,540.00	36,056,160.00
1994/95	19.0	25,837.00	13,719,447.00
1995/96	56.0	-	-
1996/97	310.5	370,094.20	227,607,933.00
1997/98	190.0	237,175.00	154,163,826.00
1998/to June1999.	39.0	35,533.0	24,184,518.00

(Source: NFP, 2000)

ANNEX 4:A comprehensive list of NWFP cocktails of roots, barks and leaves and their market prices and respective diseases they treat by local dialect.(1 US$ = TShs 806)

	Local name of treated disease	Price/50 ml of NWFP powder
1.	Kiume kupungua nguvu	TSh. 5,000/=
2.	Ngiri ya ndani	TShs. 4,500/=
3.	Mshipa wa ngiri	TShs.5,000/=
4.	Kisonono cha muda mrefu	TShs.5,000/=
5.	Kaswende ya muda mrefu	TShs.4,000/=
6.	Kichocho	TShs.5,000/=
7.	Muku	TShs.5,000/=
8.	Taambazi	TShs.4,500/=
9.	Kuzidisha damu	TShs.4,500/=
10.	Moyo kwenda mbio	TShs.5,000/=
11.	Homa za muda mrefu	TShs.3,500/=
12.	Meno(jipu kuuma)	TShs.3,000/=
13.	Macho kuona giza	TShs.3,000/=
14.	Kifaduro	TShs.4,000/=
15.	Degedege	TShs.6,000/=
16.	Pumu	TShs.6,000/=
17.	Kifua kubana	TShs.3,500/=
18.	Sikio kuuma	TShs.3,000/=
19.	Vidonda kooni	TShs.3,000/=
20.	Majipu	TShs.3,500/=
21.	Kinga ya mwili	TShs.8,000/=
22.	Kinga ya nyumba	TShs.30,000/=
23.	Kinga ya mifugo	TShs.25,000/=
24.	Zindiko kwa shamba	TShs.15,000/=
25.	Mchango wa ngiri	TShs.7,000/=
26.	Mchango wa kizazi	TShs.5,000/=
27.	Mama kuzidishwa siku	TShs.4,000/=
28.	Kuumwa tumbo	TShs.3,500/=
29.	Mimba	TShs.4,000/=
30.	Mchango wa kujikuna	TShs.4,000/=
31.	Kuwashwa mwili	TShs.3,500/=
32.	Kuhara	TShs.3,000/=
33.	Vidonda miguuni	TShs.4,000/=
34.	Biashara	TShs.5,000/=
35.	Mapenzi	TShs.2,500/=
36.	Kutoa nuksi	TShs.4,000/=
37.	Mtoto kushindwa kutembea	TShs.6,000/=
38.	Kuhara damu	TShs.4,000/=
39.	Kutoa damu puani	TShs.3,500/=
40.	Kipanda uso	TShs.5,000/=
41.	Kiuno	TShs.5,000/=

42.	Mgongo kutoka	TShs.7,000/=
43.	Kifafa	TShs.10,000/=
44.	Dawa ya malaria	TShs.4,000/=
45.	Kichomi mara kwa mara	TShs.5,000/=
46.	Wengu	TShs.3,500/=
47.	Kimeo	TShs.4,000/=
48.	Kukonda	TShs.4,500/=
49.	Kambaku	TShs.4,000/=
50.	Kizunguzungu	TShs.5,000/=
51.	Kutapika mara kwa mara	TShs.4,000/=
52.	Kiumekulegea	TShs.4,000/=
53.	Mwili kutoka jasho	TShs.3,500/=
54.	Kukohoa	TShs.4,000/=
55.	Surua ya watoto	TShs.4,500/=
56.	Meno kutoa damu	TShs.3,000/=
57.	Kambaku	TShs.6,000/=
58.	Tumbo la mimba kuuma	TShs.5,000/=
59.	Fangasi	TShs.3,000/=
60.	Kumwaga maji	TShs.3,000/=
61.	Kupasuka miguu	TShs.3,000/=
62.	Kumwaga ziwa	TShs.4,500/=
63.	Vidonda tumboni	TShs.4,500/=
64.	Ugonjwa wa ngozi	TShs.3,500/=
65.	Kuharisha	TShs.4,000/=
66.	Kuvimba tumbo	TShs.8,000/=
67.	Vidonda mwilini	TShs.4,000/=
68.	Kupooza mwili	TShs.8,000/=
69.	Kuteguka viungo	TShs.10,000/=
70.	Kutoa wadudu tumboni	TShs.4,000/=
71.	Kipapai kwa akina mama	TShs.4,000/=
72.	Mchango wa kawaida	TShs.3,500/=
73.	Mchango wa mtoto	TShs.4,000/=
74.	Ziwa la mama kuharibika	TShs.4,500/=
75.	Kuvimba mapumbu	TShs.7,000/=
76.	Kuwashwa na haja kubwa	TShs.4,500/=
77.	Kuwashwa na haja ndogo	TShs.4,000/=
78.	Dawa ya kuchanganyikiwa	TShs.8,000/=
79.	Kikungu	TShs.4,000/=
80.	Kuchubuka midomo	TShs.3,000/=
81.	Sikio kutoa usaha	TShs.4,000/=
82.	Dawa ya kwikwi	TShs.3,500/=
83.	Dawa ya uzazi	TShs.6,000/=
84.	Kisonono cha muda mrefu	TShs.4,000/=
85.	Vidonda mwilini	TShs.4,000/=
86.	Kutosikia hamu ya kula	TShs.3,000/=
87.	Kichefuchefu mara kwa mara	TShs. 4,000/=

88.	Macho kuuma	TShs. 4,000/=
89.	Kuunguruma tumbo	TShs. 3,500/=
90.	Kufunga kuharisha	TShs. 3,000/=
91.	Safura	TShs. 3,000/=
92.	Minyoo ya tumbo	TShs. 3,000/=
93.	Kiungulia	TShs. 3,500/=
94.	Kuota vibaya	TShs. 10,000/=
95.	Kukosa choo	TShs. 3,000/=
96.	Mandeletele	TShs. 3,000/=
97.	Mshipa wa mguu	TShs. 5,000/=
98.	Homa ya manjano	TShs. 8,000/=
99.	Mwito	TShs. 4,000/=
100.	Upele	TShs. 3,800/=
104.	Chembe ya moyo	TShs. 6,000/=
105.	Kuwashwa liume	TShs. 4,000/=
106.	Kisukari	TShs. 9,000/=
107.	Kulegea mwili	TShs. 8,000/=
108.	Kuchubuka midomo	TShs. 3,000/=
109.	Sikio kutoa usaha	TShs. 4,000/=

NB:

(1) In most cases there is a mismatch between the local names and the scientific names of modern medical practitioners for the treated diseases.
(2) Most cases treated as diseases in traditional medicine are taken as clinical symptoms in modern medicines practices
(3) Some diseases/ cases treated by traditional medicines are either imaginary or psychological.
(4) Prescriptions of traditional medicines are very controversial and the effectiveness of the medicines/the way the medicines acts in treatment processes in most cases is a mystery even to the herbalists themselves.
(5) A good number of Tanzanians are confidential customers of traditional herbalists cocktails.

(Source:Field survey Kariakoo,Dar es salaam,Tanzania 2000)

APPENDIX 1: Terms of reference for the special study on NWFP

SUPPORT TO NATIONAL FOREST PROGRAMME FORMULATION IN TANZANIA

TERMS OF REFERENCE [TOR] FOR A SPECIAL STUDY ON THE ROLE OF NON WOOD FOREST PRODUCTS [NWFP] IN FOOD SECURITY AND INCOME GENERATION IN TANZANIA

1. Purpose

The major purpose of this assignment is to produce a concise report where the present status for the Non Wood Forest Products [NWFP], is documented and analysed, and vision for the future are sketched in terms of prospects and retrospect. The proceedings of the National orientation workshops are used as the basis and starting point in this analysis.

2. Background

The production of NWFP suffers from the decline of forest vegetation cover, inadequate information on location and types of products and non-existence of effective local processing facilities to produce value added products are among other factors.

Either the marketing side is not in order, in terms of lack of organised marketing channels and availability of market information. At general level, there is also poor awareness as regards to the income generation potential of NWFP and its contribution to food security.

The potential of NWFP product as an income generation activity, and its role in contributing to food security still need to be assessed and then well documented as regards to the NWFP prospects and retrospect.

3. Task

3.1 Review of the present situation of NWFP

- Review the status of NWFP i.e. present source by category and locality, and their respective contribution to food security and income generation.
- Review the local market prices for some NWFP and some export prices for some potential NWFP such as beeswax and honey.
- Review the state of processing technology and marketing situation for both export and local markets respectively
- Review the extent of gender, particularly women in the production of NWFP with respect to food security and income generation for rural livelihood.

3.2 Vision for the future

Based on prospects and retrospect for the NWFP, review the goals and objectives of the NWFP for the future, as specified in new forest policy and legislation and other documents, to create visions for the future to answer such questions as given below:-

- What are the best practices for the different NWFP in the long run with respect to food security and income generation ?.

- How should the resource base for the different NWFP be assessed and protected for sustainable development ?

- How is gender involvement with respect to NWFP contribution to income generation and food security ?

4. ORGANISATION OF WORK AND REPORTING

Reporting is based on part 3 above (see task), including a summary and conclusion of maximum 50 to 100 pages plus annexes.

Time schedule

1st to 31st -October, 2000.

A Short Term Consultant (STC) with a strong Forest economics background (Minimum M.Sc. with specialization in Forest economics from a recognised university) and at least two International publication and one consultancy work in the area of forest based industry and products done in Tanzania, will be needed to work with the Task Force Coordinator (TFC) in collaboration, both being in charge of the work.

5. INPUTS

Short term consultancy work input is 1 month weeks, including facilitation towards the writing of the final status report.