

Project GCP/RAF/479/AFB

Enhancing the Contribution of Non-Wood Forest Products to Food Security
in Central Africa



NATIONAL STRATEGY AND ACTION PLAN FOR THE NON-TIMBER FOREST PRODUCTS SECTOR IN RWANDA



Food and Agriculture
Organization of the
United Nations



Novembre 2015

Project GCP/RAF/479/AFB

"Enhancing the Contribution of Non-Wood Forest Products to Food Security
in Central Africa"

**REPUBLIC OF RWANDA
MINISTRY OF NATURAL RESOURCES**

**NATIONAL STRATEGY AND ACTION PLAN FOR THE
NON-TIMBER FOREST PRODUCTS SECTOR
IN RWANDA**

FINAL REPORT

By:

Prof. Jean Nduwamungu¹

In collaboration with:

**Mr Felix Rurangwa², Mr Athanase Matata³,
Mr Alphonse Sebazungu⁴, Soter Serubibi⁵, and Armand Asseng Zé⁶.**

Under supervision of:

Ousseynou Ndoye⁷,

November 2015

Project funded by:



¹ Consultant Principal in charge of the elaboration of the national strategy and action plan

² Consultant in charge of sustainable management of non-timber forest resources

³ Consultant in charge of socio- economic aspects of non-timber resources

⁴ Legal consultant

⁵ National Project Coordinator GCP/RAF/479/AFB

⁶ Specialist in Natural Resources Management, GCP/RAF479/AFB

⁷ Regional Project Coordinator, GCP/RAF/479/AFB

This document is part of the documentation of the project GCP/RAF/479/AFB on "Enhancing the Contribution of Non-Wood Forest Products to Food Security in Central Africa"

It was produced with financial assistance from the African Development Bank (AfDB) through the Fund for Forests of the Congo Basin (CBFF). The contents of this document are the sole responsibility of the FAO and can in no way be taken to reflect the views of the ADB / CBFF.

The designations employed in this product information and presentation of material do not imply on the part of the United Nations Food and Agriculture Organization (FAO) of any opinion concerning the legal status or the stage of development of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not patented, does not entail, on the part of FAO, any endorsement or recommended in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of / author (s) and do not necessarily reflect the views or policies of FAO.

© FAO 2015

FAO encourages the use, reproduction and dissemination of the information in this information product. Unless otherwise stated, content may be copied, downloaded and printed for the purposes of private study, research or teaching, and for use in non-commercial products or services, provided that FAO is properly identified as the source and holders of copyright and provided it is understood in any way as FAO endorse opinions, products or services users.

Any requests for translation or adaptation rights, for resale or other commercial use rights must be submitted using the online form available at www.fao.org/contact-us/licence-request or sent by e-mail to copyright@fao.org.

FAO's information products are available on the FAO website (www.fao.org/publications) and can be purchased by email to

publications-sales@fao.org

Graphics and formatting by Justin Claver Fotsing IT / Consultant.

TABLE OF CONTENTS

TABLE OF CONTENTS	v
LIST OF tables	viii
LIST OF figures	viii
LIST OF ACRONYMS AND ABBREVIATIONS	ix
PREFACE	x
1. Concepts, importance and sustainability of NTFPs	1
1.1. Definition and classification of NTFPs	1
1.1.1. Definition of NTFPs	1
1.1.2. Classification of NTFPs.....	2
1.2. Forest resource base in Rwanda.....	4
1.2.1. Forest extent and distribution	4
1.2.2. Drivers of deforestation and forest degradation	5
1.2.2.1. Direct factors of deforestation and forest degradation	5
1.2.2.2. Indirect drivers of deforestation and forest degradation	6
1.3. Importance of NTFPs resources.....	6
1.3.1. Contribution to livelihoods of people and livestock	6
1.3.1.1. Employment and income generation	6
1.3.1.2. Food security	7
1.3.1.3. Health security	7
1.3.1.4. Forage and pasture.....	8
1.3.2. Contribution to cultural values	8
1.3.3. Contribution to ecological management and conservation.....	9
1.3.3.1. Biodiversity conservation.....	9
1.3.3.2. Sustainable forest management.....	9
1.4. Sustainable management of NTFPs.....	9
1.4.1. Availability and supply	9
1.4.2. Harvesting and post-harvest handling	10
1.4.3. Processing and value addition.....	10
1.4.4. Standardization and certification	10
2. Foundation for the development of NTFPs IN RWANDA	12
2.1. Legal, policy and institutional framework of NTFPs	12
2.1.1. International frameworks	12
2.1.2. Regional frameworks.....	13
2.1.3. National frameworks	13
2.1.3.1. Legal frameworks.....	14
2.1.3.2. Political framework	14
2.1.3.3. Institutional framework	17

2.2.	Status of major NTFPs in Rwanda	18
2.2.1.	Extractive products.....	18
2.2.2.	Edible products and related materials	18
2.2.3.	Medicinal and pharmaceutical products	18
2.2.4.	Bee products.....	19
2.2.5.	Other animal based products	21
2.2.6.	Carvings and handicrafts.....	22
2.2.7.	Biofuels	23
2.2.8.	Fibers.....	23
2.3.	Supply chain of NTFPs.....	24
2.3.1.	Collection and production of NTFPS	24
2.3.1.1.	2.3.1.1 Collection from forests.....	24
2.3.1.2.	Domestication	25
2.3.2.	Transportation.....	25
2.3.3.	Processing, packaging and storage.....	25
2.2.1	Commercialization.....	27
2.4.	Major actors in the NTFPs sector and their activities	28
2.5.	Challenges and opportunities in the NTFPs sector	31
2.5.1.	Strengths, weaknesses, opportunities and threats (SWOT) analysis.....	31
2.5.2.	Major issues in the NTFPs sector and justification of the national strategy	32
2.5.2.1.	Organizational and institutional set-up.....	32
2.5.2.2.	Access to harvesting sites.....	32
2.5.2.3.	Production, processing/transformation, storage and technological issues	33
2.5.2.4.	Transportation of NTFPs.....	33
2.5.2.5.	Marketing and commercialization of NTFPs	33
2.5.2.6.	Research on NTFPs.....	33
2.5.2.7.	Use and management of NTFPs resources.....	34
2.6.	Gender dimension in the NTFPs Sector	34
3.	National strategy for the development of NTFP in Rwanda	36
3.1.	Vision	36
3.2.	Guiding principles.....	36
3.3.	Strategic Objectives	38
3.3.1.	Global objective.....	38
3.3.2.	Specific objectives.....	38
3.3.3.	Expected results.....	38
3.4.	Strategic axes	38

4.	Action plan for the implementation of the national strategy.....	39
4.1.	ACTION 1: Establishment of an adequate political, institutional and legal framework for the management and utilization of NTFPs	39
4.2.	ACTION 2: Promotion of sustainable management of NTFPs resources.....	39
4.3.	ACTION 3: Mobilization of actors in the NTFPs sector and human, technological and scientific capacity building	40
4.4.	ACTION 4: Development of better utilization, marketing and commercialization of NTFPs	43
4.5.	ACTION 5: Promotion and support of Small and Medium NTFPs enterprises and industries	43
5.	Implementation plan of the NSAP/NTFPs	45
5.1.	Monitoring and evaluation plan.....	45
5.2.	Communication plan for the NSAP/NTFPs	45
5.3.	Funding mechanisms	45
6.	References.....	47
7.	Annexes	49
7.1.	List of some relevant actors in the NTFPs Sector	49
7.2.	List of some indigenous medicinal plants for human medicine identified in Rwanda	53
7.3.	List of some indigenous medicinal plants for Veterinary Medicine	55

LIST OF TABLES

Table 1: Major categories of non-wood forest products	2
Table 2: Annual honey production in Rwanda	21
Table 3: NTFPs collected or related activities in NNP from 2011 to 2013.....	22
Table 4: Some of major actors in the NTFPs sector in Rwanda (2014).....	29
Table 5: SWOT analysis of the NTFPs Sector in Rwanda (2014)	31
Table 6: Activities, performance indicators and chronology for action 1	39
Table 7: Activities, performance indicators and chronology for action 2.....	39
Table 8: Activities, performance indicators and chronology for action 3.....	40
Table 9: Activities, performance indicators and chronology for action 4.....	43
Table 10: Activities, performance indicators and chronology for action 5.....	43
Table 11: Funding sources for the NSAP/NTFPs.....	46

LIST OF FIGURES

Figure 1: Rwanda forest cover map (CGIS-NUR/PAREF NL/RNRA, 2012)	4
Figure 2: Extent of forest types in Rwanda (CGIS-NUR/PAREF NL/RNRA, 2012)	5
Figure 3: Counts of animal carcasses encountered in NNP (NNP rangers report, 2013)	21
Figure 4: NTFPs supply chain and challenges.....	28

LIST OF ACRONYMS AND ABBREVIATIONS

ANP	:	Akagera National Park
COMIFAC	:	Commission des Forêts d'Afrique Centrale
CURPHAMETRA	:	Centre for Research in Phytomedicines and Life Sciences
DDG	:	Deputy Director General
DFNC	:	Department of Forestry and Nature Conservation
EAC	:	East African Community
EDPRS	:	Economic Development and Poverty Reduction Strategy
FAO	:	Food and Agriculture Organisation of the United Nations
ICRAF	:	World Agroforestry Center
IRST	:	Institut de Recherche Scientifique et Technologique
IUCN	:	International Union for Conservation of Nature
MINAGRI	:	Ministry of Agriculture and Animal Resources
MINICOM	:	Ministry of Trade and Industry
MINIRENA	:	Ministry of Natural Resources
NAEB	:	National Agricultural Export Board
NGO	:	Non-Governmental Organization
NIRDA	:	National Industrial Research and Development Authority
NISR	:	National Institute of Statistics of Rwanda
NNP	:	Nyungwe National Park
NSAP/NTFPs	:	National Strategy and Action Plan for the Non-Timber Forest Products Sector in Rwanda
NTFP	:	Non-Timber Forest Products
NTFPs	:	Non-Wood Forest Products
PAREF	:	Programme d'Appui à la Reforestation
PSF	:	Private Sector Federation
RAB	:	Rwanda Agriculture Board
RDB	:	Rwanda Development Board
REMA	:	Rwanda Environment Management Authority
RNRA	:	Rwanda Natural Resources Authority
ROR	:	Republic of Rwanda
SMEs	:	Small and Medium Enterprises
UNEP	:	United Nations Environment Program
UNFCCC	:	United Nations Framework Convention on Climate Change
VNP	:	Volcanoes National Park
WCS	:	Wildlife Conservation Society

PREFACE

1. Concepts, importance and sustainability of NTFPs

1.1. Definition and classification of NTFPs

1.1.1. Definition of NTFPs

The term Non-Timber Forest Products (NTFPs) also commonly referred to as Non-Wood Forest Products (NWFPs) has been variously defined by scholars all over the world depending on their interests or the message they want to pass to their audience. In meetings where NTFPs are discussed there is always some discussion about the terminology and about what should be included and what should not be included in the definition. Hence many alternate terms have evolved that are used more or less as synonyms. These include terms such as “Non-wood forest products; non-wood goods and services; non-wood goods and benefits; non-timber resources and values; special forest products; minor forest products; miscellaneous forest products; other forest products; secondary forest products; forest by-products; forest biological resources; other economic forest products; non-wood forest benefits; forest garden products; wild products; natural products; non-timber forest and grassland products; veld products and by-products of forests; wild products and hidden forest harvest” (Agustino et al., 2011; Ahenkan and Boon, 2011; Belcher, 2003). For the sake of consistency, the term “*Non-Wood Forest Products*” (NTFPs) which has been also adopted by FAO will be used throughout this document of the National Strategy and Action Plan for the development of the NTFPs sector (NSAP/NTFPs) in Rwanda.

De Beer and McDermott (1989) defined NTFPs as all biological materials other than timber, which are extracted from forests for human use. For Chandresekharan (1995), Non-wood forest products include all goods of biological origin, as well as services, derived from forest or any land under similar use, and exclude wood in all its forms. Ros-Tonen et al. (1998) defined NTFPs as all tangible animal and plant forest products other than industrial wood, coming from natural forests, including managed secondary forests and enriched forests. For Mathur and Shiva (1996), all products obtained from plants of forest origin and host plant species yielding products in association with insects and animals or their parts and items of mineral origin except timber may be defined as Minor Forest Products (MFP) or Non-Wood Forest Products (NWFP) or Non-Timber Forest Products (NTFP). Shiva (1998) included all usufruct/utility products of plant, animal and mineral origins except timber obtainable from forests or afforested/ domesticated land areas as NTFPs. As for Wong (2000), NTFPs are all products derived from biological resources found on forest land but not including timber, fuelwood, or medicinal plants harvested as whole plants.

In order to guide the forest resource assessment exercise carried out every five years FAO also defined NTFPs. FAO (2010) defined NTFPs as “*goods derived from forests that are tangible and physical objects of biological origin other than wood*”. They generally include non-wood plant and animal products collected from a forest and specifically include gum arabic, rubber/latex and resin; Christmas trees, cork, bamboo and rattan regardless of whether from natural forests or plantations. For FAO, NTFPs generally exclude collected in tree stands in agricultural production systems, such as fruit tree plantations, oil palm plantations and agroforestry systems when crops are grown under tree cover. FAO specifically excludes the following from NTFPs: woody raw materials and products, such as chips, charcoal, fuelwood and wood used for tools, household equipment and carvings; grazing in the forest; fish and shellfish (Ibid.).

In the context of Rwanda, the term NTFPs (instead of NWFPs) has been adopted in order to be more inclusive and comprehensive (Stakeholders workshop held at Musanze from 3 to 5 December, 2014). During this workshop, NTFPs were defined as “*All goods derived from forests that are tangible and physical objects of biological origin other than timber*”. They include plant products such as gum arabic, rubber/latex and resin; Christmas trees, cork; wood used for tools, household equipment and carvings; bamboo and rattan regardless of whether from natural forests or plantations; and animal products such as beeproducts and edible insects; fish; bush meat and hides. They generally exclude firewood, charcoal and products collected in tree stands, in agricultural production systems, such as fruit tree plantations, oil palm plantations and agroforestry systems when crops are grown under tree cover.

1.1.2. Classification of NTFPs

There is no globally applicable standard classification system for NTFPs (Shiva and Verma, 2002). Due their diversity, NTFPs can be classified in many different ways: according to end use (e.g. medicine, food, drink, etc), by the part used (e.g. roots, leaves, barks, etc.); or in accordance with major international classification systems such as the (i) Harmonized Community Description and Coding System; (ii) International Standard Industrial Classification of all Economic Activities (ISIC); (iii) Standard International Trade Classification (SITC); (iv) Provisional Central Product Classification (CPC); and (v) System of National Accounts (SNA) (Chandrasekharan, 1995). However, for ease of discussion and comprehension, the Africa Forest Forum (AFF) classification system (Agustino et al., 2011) has been used and NTFPs has been classified into eight major categories as shown in Table 1.

Table 1: Major categories of non-wood forest products

N°.	NTFP categories	Description and examples
1	Extractive products	Substances released from plants by exudation such as gums (water soluble), resins and oleoresins (water insoluble), latex (milky or clear juice), tannins, dyes, oils and fats, essential oils, etc.
2	Edible products and related materials	Include wild fruits, nuts (food, edible oils, spices, condiments or beverages), vegetables (leaves, roots and shoots), forage (animal feed, fodder), plant based sweeteners, forest fungi (mushrooms), edible insects (e.g. caterpillars).
3	Medicinal and pharmaceutical plant products	Medicinal plants (e.g. leaves, bark, roots, fruits, seeds) used mainly in traditional medicine and/or by pharmaceutical companies
4	Bee products	Honey, beeswax, propolis, royal jelly, pollen
5	Other animal based products	Bush meat (e.g. meat of small mammals such as bucks, genets, field mice, rock rabbits, porcupines, bush pigs and hares), birds, insects, snails; hides and skins.
6	Carvings and handcrafts	Heterogeneous group of products including bamboo products, rattan and various household utensils and ornaments
7	Biofuels	vegetable oils or animal fats converted to biodiesel; bio-ethanol; bio-methanol and dimethylether (DME); bio-oil produced from the pyrolysis of biomass materials
8	Fibers	Bamboo, rattan, wrapping leaves, etc. used for making papers, cloths, baskets, mats, cordage, furniture and in house construction

Source: Agustino et al. (2011), Ahenkan and Boon (2011), Shiva and Verma, (2002)

1.2. Forest resource base in Rwanda

1.2.1. Forest extent and distribution

The ever increasing demographic pressure on natural resources has led to the loss of almost two thirds of natural forests since independence in 1962. Nevertheless, a recent forest mapping (Figure 1) established that Rwanda has about 673,517 ha of forest (block size ≥ 0.25 ha each) which is about 28% of the country (CGIS-NUR/PAREF NL/RNRA, 2012). The national strategic target is to reach 30% forest cover by 2020.

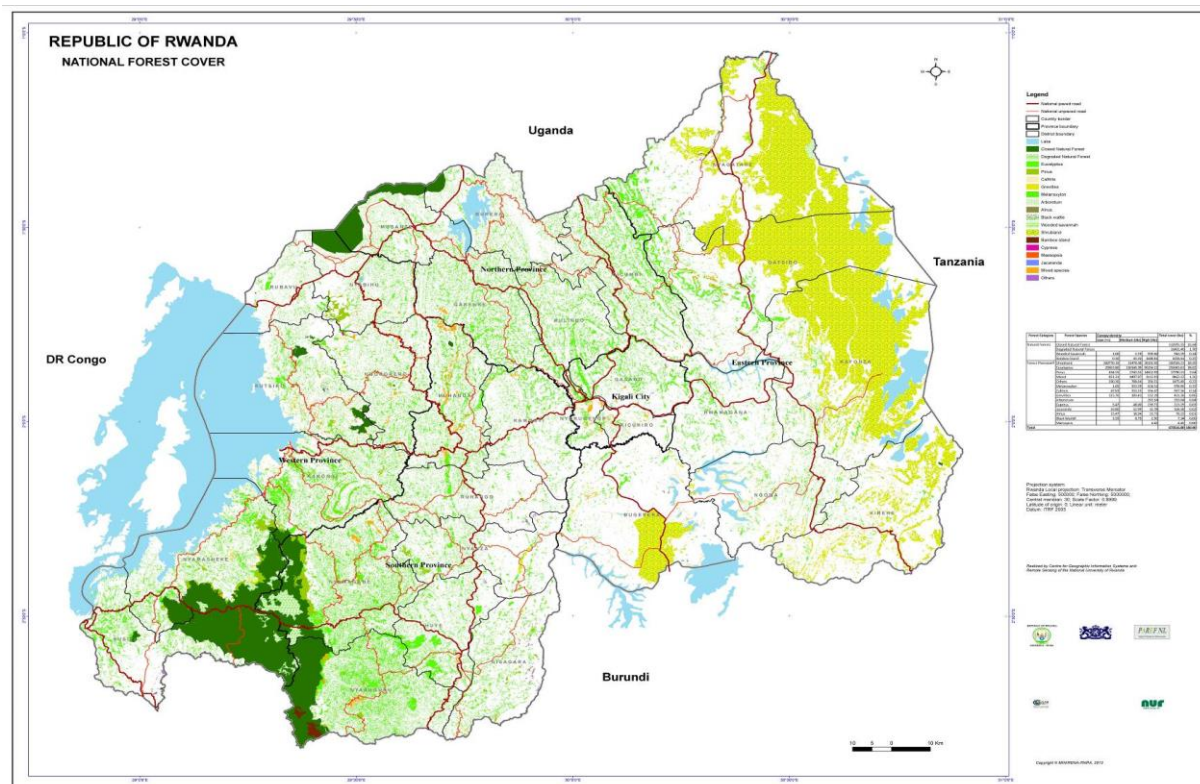


Figure 1: Rwanda forest cover map (CGIS-NUR/PAREF NL/RNRA, 2012)

Natural forest ecosystems (make up about 57% of total forest cover) are primarily contained within Akagera National Park, Nyungwe National Park, Volcanoes National Park, Gishwati Forest Reserve, Mukura Forest Reserve and few small remnants of natural vegetation throughout the country. The remaining forest ecosystems, about 43% of total forest cover in Rwanda, are basically planted forests dominated by Eucalyptus sp. at about 89% (CGIS-NUR/PAREF NL/RNRA, 2012). The western and southern provinces have the highest forest cover compared to other provinces. However, the eastern province holds the largest shrubland areas (Figure 2). It should be noted however that the extent of Bamboo stands has been underestimated because bamboo forests in the Volcanoes National Parks were not mapped due to low resolution of images used in that part of the country (satellite images were used instead of digital aerial photographs).

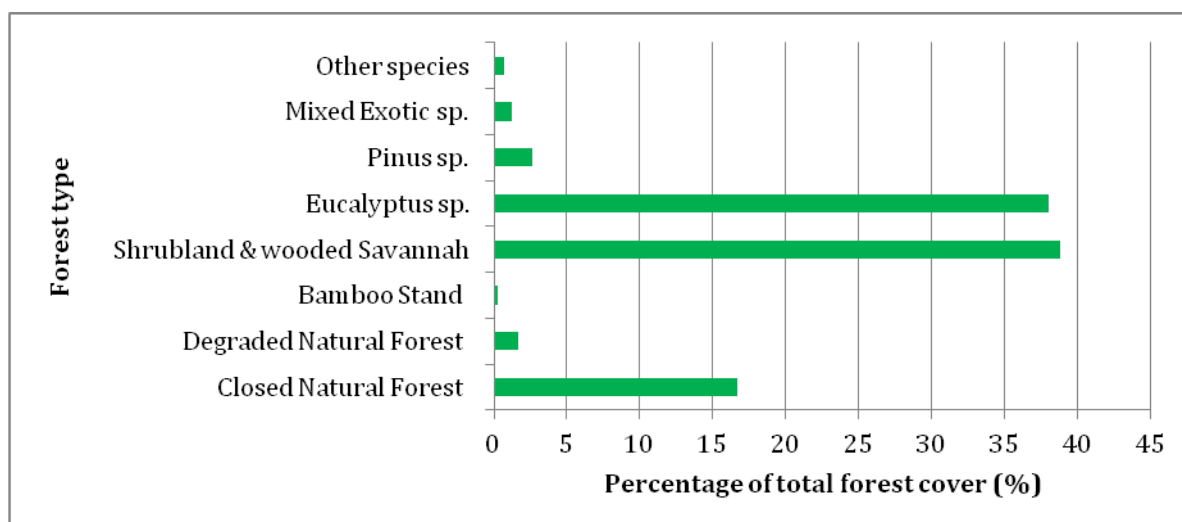


Figure 2: Extent of forest types in Rwanda (CGIS-NUR/PAREF NL/RNRA, 2012)

1.2.2. Drivers of deforestation and forest degradation

Major drivers of deforestation and forest degradation can be categorized as direct and indirect drivers. Direct drivers include those activities that act directly on the forest either through clear-cutting or simply selective tree cutting. They include agriculture, infrastructure, mining, and grouped settlements, bush fires and forest pests and diseases. Indirect drivers of deforestation and forest degradation in Rwanda include population growth, poverty and wood fuel demand.

1.2.2.1. Direct factors of deforestation and forest degradation

- (a) Agriculture:** Demand for more agricultural land has led to deforestation of greatest portion of natural vegetation in Rwanda. Almost two thirds of forests have been lost since independence in 1962 mainly due to agricultural expansion. For example, the areas of Nyungwe National Park and the Volcanoes National Park reduced respectively by 15% and 54% (ROR, 2004). Major types of crops include mainly: beans, cereals (maize, rice, wheat and sorghum), bananas, tubers (irish and sweet potatoes), vegetables, fruits, groundnuts, sugar cane, pyrethrum, coffee and tea.
- (b) Infrastructure:** roads, schools, markets, churches and settlement buildings contribute to deforestation through clearing of all existing vegetation including forests. In recent years, several public forests were cleared in favor of “imidugudu” settlements, schools and markets construction in different Districts.
- (c) Mining (legal and illegal):** Mining requires clearing forests to clear way to exploiting underground minerals. Several examples of illegal mining have been observed in natural (e.g. Mukura Natural Forest) and manmade forests leading to deforestation and/or forest degradation.
- (d) Grouped settlements (Imidugudu) and Urbanization:** in recent years, some grouped settlements (imidugudu) and new urban estates were installed after clearing forest plantations.
- (e) Resettlement of refugees:** The resettlement of returnees and old refugees after the 1994 Genocide of Tutsi, led to the de-gazettment of a large portion of the Akagera National Park. Subsequently, the area of the park was reduced from 255,000 ha to 90,000 ha (a reduction of 65%). For the same reason, the Gishwati forest reserve was reduced from 16,000 ha to 600 ha, that is a reduction of 96% (ROR, 2004).

- (f) **Forest fires:** Voluntary or involuntary, forest fires contribute to forest degradation. Voluntary forest fires are often caused by people searching for pastoral and agricultural land. Involuntary fires are generally caused by beekeepers, charcoal makers and smokers. Bush fires general occur during the dry season and protected areas such as parks and forest reserves are the most affected (ROR, 2004).
- (g) **Forest pests and diseases:** Forest pests and diseases cause forest degradation. In 1980s, the *Cinara cupressii* pest severely degraded the majority areas of *Cupressus* plantations in the country. Following this, some affected forests were converted into tea plantations (around Nyungwe natural forest) while others were converted into agricultural land.

1.2.2.2. Indirect drivers of deforestation and forest degradation

- (a) **High population growth:** The average population density has raised from 183 inhabitants in 1978, 272 in 1991, 321 in 2002 to 415 inhabitants per km² (NISR, 2012). The average annual growth rate between 2002 and 2012 was of 2.6% (NISR, 2012). Demographic pressure on limited natural resources has been reported as one of the major environmental challenges in Rwanda (ROR, 2004, 2010; UNEP/REMA, 2011). The majority of population mainly relies on traditional subsistence farming. Consequently, farming land per household is ever decreasing and soils are exhausted and degraded. At the current population growth rate, the pressure on forests will continue.
- (b) **Poverty:** 45% of Rwandan population is living under poverty line (NISR, 2012). Poverty is an indirect driver of deforestation as forests are targeted by poor people as potential source of income. Almost all illegal cuttings reported in public forests are a result of poverty pushing people to survive at all cost.
- (c) **Wood fuel demand:** approximately 86% of primary energy in Rwanda comes from biomass (ROR, 2010). In addition to household consumption needs and big institutions such as schools and prison, there are also industrial uses of woodfuels including tea and sugar factories.

As other forest products, the management of NTFPs is greatly affected by these drivers of deforestation and forest degradation and therefore should be altogether controlled in order to ensure sustainable management of NTFPs.

1.3. Importance of NTFPs resources

1.3.1. Contribution to livelihoods of people and livestock

1.3.1.1. Employment and income generation

Many farmers supplement their incomes through gathering and trading products such as forest foods and medicinal plants and fuel wood. Small-scale manufacturing of items such as furniture, baskets, mats, and craft goods constitute substantial informal sector industries in developing countries. Income from these activities tends to be particularly important during seasonal shortfalls in food and cash crop income and in periods of drought or other emergencies (FAO, 1996). Cash income from the sale of non-wood forest products is however highly variable. Incomes tend to be higher where there is an external market for products. Generally, returns to labour are higher than for agricultural production (Agustino et al., 2011).

NTFPs provide employment for a number of people, especially in the collection, processing, and marketing of NFPs either as seasonal or permanent jobs in Rwanda. The number of people involved in such activities is not known due to their informal nature. However, it is believed that thousands of people are engaged in beekeeping, basket weaving, bamboo products, as suppliers or sellers, both for local and export market. These activities are mostly done in an informal way and statistics are not available. Many people surrounding Nyungwe National Park (NNP) and Volcanoes National Park (VNP) depend on NTFP trade of artisanal products (mainly made up of NTFPs) for income generation.

Honey, essential oils and handicraft (basket weaves, bamboo furniture, and mats) are among the 20 top Small and Medium Enterprises (SMEs) products clusters identified by the Ministry of Trade and Industry (MINICOM). The objective for MINICOM is to prioritize and provide targeted support such that SMEs can undertake business activity within the most viable and promising sectors. SMEs, including formal and informal businesses, make up 98% of the businesses in Rwanda and 41% of all private sector employment (MINICOM, 2012).

1.3.1.2. Food security

NTFPs contribute to household food security and family nutrition by directly or indirectly supplementing family diets. For example, many forest foods and medicinal plants are used to improve health through the prevention and treatment of diseases. Foods from the forest include fruits, leaves, seeds and nuts, tubers and roots, honey, fungi (mushrooms), gum and sap. In some forest communities, bamboo shoots are used as fresh or preserved vegetables. Income from NTFPs can also help poorer households supplement their little income to meet their basic food needs. In some cases, income from NTFPs can also be invested in agricultural assets such as livestock, land, or agricultural equipment thereby improving household food security.

Although forests may provide food resources for most of the seasons, it is when there are shortfalls of the cultivated food varieties such as during droughts and emergency periods, where forests may be the only source of food and most appreciated. For example, in Kenya in the Kathama area, wild fruits have long been valued as buffer food resources in famines and in times of food shortages. Gathering and processing of forest products provide an emergency means of cash earning during emergencies which can be used to purchase food (Agustino et al. 2011).

NTFPs can also play an indirect role in food security by enriching the nutrient content of the soil and the retention of moisture. Trees also provide shade and windbreaks to food crops and help control soil erosion. They also provide medicine for livestock and are used as plant-based insecticides, such as the *Azadirachta indica* (neem) tree. They also provide stakes for climbing plants such as tomatoes and beans and for construction of storage facilities and fences (Hostettmann et al., 2000).

1.3.1.3. Health security

Wild plants constitute the main medicinal source in most traditional societies and in many rural poor communities today. They are used in the prevention and treatment of diseases and therefore contribute to the effective biological utilisation of food by the individual. Many animal diseases are also treated with herbal medicines. Besides the direct contribution to health security, medicinal plants can be bartered or sold and generate income in kind or cash which can then be used to access western medicine.

African forests and woodlands are greatly rich in medicinal plants. An example of a medicinal shrub found almost everywhere in Africa called *Securidaca longepedunculata*. In Tanzania the dried bark and root are used as a purgative for nervous system disorders. Throughout most of East Africa, the plant's dried leaves are used for wounds and sores, coughs, venereal diseases, and snakebites. The leaves are used for wounds, coughs, bilharzias, venereal diseases, and snakebites in Malawi while the dried leaves are used to cure headaches. Dried leaves of *S. longepedunculata* are also reported to be used against skin diseases in Nigeria (Agustino et al., 2011).

Another example is *Prunus africana*, an evergreen hardwood tree that grows in the mountain forests of West Africa, Central Africa, East Africa, Southern Africa and Madagascar. It is commonly found in the afro-montane forests of Burundi, Cameroon, Democratic Republic of Congo, Rwanda, Kenya and Madagascar. It is a multiple-use tree species with local and international economic and medicinal value (Agustino et al., 2011). Traditionally it has been used to treat malaria, stomach pains, fever, urinary problems, sexually transmitted diseases, wounds, chest pains and heartburn. The bark, the leaves and fruits have been traditionally used in witchcraft and as arrow poison (Ibid.). It is also recognized as main ingredient for medicine to treat prostate cancer.

1.3.1.4. Forage and pasture

Forests provide forage for both domestic and wild animals. Fodder trees have been used in the past mostly as browse by livestock in open forest areas, that is, communally owned land, and in pastures on farmland. Fruits, leaves, and at times bark, have been browsed by most domestic and wild animals as fodder since long time. Cattle, sheep, equines, wildebeest, most antelopes, gazelles, white rhino and hippo are mainly grazers, but during the dry season they balance their diet by browsing. Other species, such as goats, camels, eland, impala, kudu, elephant, giraffe, black rhino and a number of antelopes are mainly browsers (Ibrahim, 1975 in Agustino et al., 2011).

1.3.2. Contribution to cultural values

The role and use, of individual NTFPs can be subject to cultural and mystic values that reflect a people's history, religion, art, and other aspects of its functioning as a society. Sacred groves or forests in particular areas are for example often maintained whereby harvesting of produce is banned or closely controlled. In such cases, individual species, both animal and plant, have spiritual or other cultural significance and therefore cannot be used or are reserved for particular uses. In some cases, control of the use of particular trees is exercised because they provide products of special value locally. Certain foods are reserved for celebration of harvests and weddings. For example, some forest foods also feature in many cultural ceremonies in West Africa such as in marriages, funerals, initiations, installation of chiefs, and birth celebrations.

Ceremonial clothing and costumes are also often made from specific forest products. For example, the bark and stem of *Lannea barteri* are used for dyeing the funeral cloth "kuntunkun" while the bark of *Bridelia ferruginea* is used for dyeing "Adinkra" cloth which is important at other ceremonial occasions among the Ashante in Ghana. In Rwanda, *Erythrina abyssinica* (umuko) leaves were used during ritual ceremonies of "Imandwa".

1.3.3. Contribution to ecological management and conservation

1.3.3.1. Biodiversity conservation

The biotic and abiotic factors in a forest ecosystem are generally linked in an intricate relationship, supporting and enriching each other. In fact, biotic components such as plants, insects, mammals, and birds, are interconnected in the cycles of energy, nutrients, water, and material. Many other cycles also link biotic factors with abiotic factors such as water and soil. NTFPs resources play an important role in these relationships. In areas where there is pressure for forest land to be converted for other uses, the intensification of NTFPs use in forest fringes, buffer zones of protected areas and nature reserves, and provision of essential infrastructure can reduce pressure on the forest (van Rijsoort, 2000). The additional income realised from the exploitation of NTFPs can act as an incentive to prevent more forest being cleared and in order to continue enjoying NTFPs benefits.

1.3.3.2. Sustainable forest management

The practice of extracting economically valuable non-wood forest products while leaving forests structurally and functionally intact is an ancient one in many parts of the world. Commercialisation of NTFPs can create incentives for the conservation of individually valuable species and the environment in which they grow. In fact, it is likely that demand for products from a forest environment will translate effectively into demand for forests and hence encourage sustainable forest management practices.

The roles of NTFPs in the forest ecosystem include nutrient supply for other living organisms in the forests, regeneration of the forest itself and the maintenance of forest habitat quality. Non-wood forest products can be incorporated into multi-purpose systems of natural forest management in which harvesting is carefully planned for both timber and NTFPs (Tieguhong and Ndoye, 2007).

1.4. Sustainable management of NTFPs

The concept of sustainable forest management comprises three fundamental standards namely that forest management is socially acceptable and equitable; the impact is ecologically friendly and that the economic impact on local communities is positive (Chamberlain et al., 1998). In the same manner, sustainable management for non-wood forest products requires consideration of three types of issues related to ecological, economic and social matters. These issues are generally influenced by the following factors: availability and supply, harvesting and post-harvest handling, processing and value addition and, Standardization and certification of NTFPs.

1.4.1. Availability and supply

The availability and supply of NTFPs depends on the quantity of the resources in the wild. Under natural conditions, NTFPs can be managed along with wood for timber and allied products in an integrated manner, thus increasing overall forest productivity and value. NTFPs can also be grown as pure or mixed crops under agroforestry and woodlots. However, some of the plants can only thrive within natural habitats and do not lend themselves to domestication of any sort. Moreover, even those species that can be grown in plantations, or as pure or mixed crops, are heavily dependent on regular infusion of germplasm from wild gene reservoirs. Therefore, in addition to domestication, there is need for continued existence of species variability in the wild.

1.4.2. Harvesting and post-harvest handling

Harvesting links resource management and resource utilisation and thus influences resource sustainability. Harvesting of NTFPs from both wild and cultivated sources is different from wood harvest in terms of the use of tools and equipment, technology, pre-harvest preparations, post-harvest treatment and requirement of intermediate processing. Harvesting often does not involve a whole tree or plant, but only parts thereof. It varies from collection of nuts and leaves to tapping of latex, harvesting of palm hearts, extraction of medicinal plants and plant materials, honey hunting, extraction of wax and collection of decorative plant materials. The cycle of harvesting also may vary from a few weeks (e.g. for tender shoots), to longer periods, as in the case of mature fruits or rhizomes (FAO, 1995).

The harvesting techniques, including pre-harvest and post-harvest treatment, for the various NTFPs vary considerably for both wild and cultivated sources. They may range from destructive to non-destructive techniques and are of fundamental importance in guaranteeing the sustainability of the resource. For example, in harvesting some medicinal plants, techniques such as root digging, debarking and collection of aerial parts while ensuring that some reproductive materials are left in the ground (depending on how conscious the collector is), slicing, sun drying, grinding and packing are employed. Poor or careless harvesting of such NTFPs can result to a lot of wastes and damages to trees and forests.

1.4.3. Processing and value addition

Processing of NTFPs adds value to the product, provides local employment and helps to increase the retention value in the country of origin. There is a range of variation in the level of processing of NTFPs. In most cases processing of non-wood products for local use is done in very small family units, employing persons without any training, often working on part-time basis. They are low-return activities and survivability is low, as they tend to be abandoned as wages rise and alternative opportunities grow (Chandrasekharan, 1995).

Development through value-addition on NTFPs requires appropriate process technology capable of producing marketable goods. An appropriate processing technology can improve the socio-economic status of local people, generate employment and ensure better value for the material collected, thus helping to alleviate poverty. However, this should be based on stable supply of suitable non-wood forest products and analysis of economic, gender and market factors. In fact, installation of more efficient modern technology can cause more economic harm if tied to inconsistent supply of NTFPs.

1.4.4. Standardization and certification

The International Organization for Standardization define "*certification*" as a procedure by which written assurance is given that a product, process or service is in conformity with certain standards (ISO/IEC, 1996). Forest certification is a market-based instrument that aims to encourage sustainable forest management for the multiple values of the forest, beyond timber to include non-timber forest products and services, social and cultural values and future options. Certification schemes relevant for the use of and trade in NTFPs not only focus on forest management certification, but also include product quality and certification schemes used in the agricultural sector such as social (fair and ethical trade) and organic certification. Depending on their basic concepts, these certification schemes focus on different areas such as production, processing, manufacturing as well as trade and marketing. According to Shanley *et al.* (2005), certification standards for about forty-six commercial NTFPs have been approved and there are ongoing evaluations of other original products from new countries and forest types.

The basic requirements by consumer markets of NTFPs include sustainable and continuous product availability; reliable and predictable supply; and stable quality of products. Recognizing these and distinguishing the differences among geographic aspects of markets, whether local or international, are key to successful marketing of NTFPs. The NTFPs producers can benefit from trade certification schemes if well organized and implemented and this can promote sustainable management of these products.

Fair trade markets and organic products offer major advantages to NTFP producers because of the smaller quantities needed to supply international trade and because preferential prices can be offered to producers. In addition, fair trade food markets and foods labeled as organic are among the fastest growing market sectors in the food distribution sector. Several NTFPs ideally fit such niches, particularly those that have a high per unit value, a long shelf life, and are easy to process, store and handle such as essential oils, honey, bamboo, medicinal products and nuts. Several types of certification schemes covering a range of products in agriculture, fishing and forestry, already exist but NTFPs are only marginally involved in these schemes.

2. Foundation for the development of NTFPs IN RWANDA

2.1. Legal, policy and institutional framework of NTFPs

2.1.1. *International frameworks*

Several international declarations and conventions justify the development of the NTFPs sector and promotion of sustainable management of NTFPs. Some of such declarations and conventions include:

- (1) **United Nations Universal Declaration on Human Rights** (adopted by UN on 10 December 1948): Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control (art. 25). NTFPs largely contribute to meeting such human life necessities.
- (2) **International Covenant on Economic, Social and Cultural Rights (ICESCR)** adopted by UN on 16 December 1966 (Rwanda ratified the covenant by decree n°8/75 of 16/04/1975), requires parties to work toward the granting of economic, social and cultural rights to individuals, including labour rights and the right to health, the right to education, and the right to an adequate standard of living. NTFPs can contribute to achieving those rights.
- (3) **CITES** (Convention on International Trade of Endangered Species of Wild Fauna and Flora) also called Washington Convention was adopted on 3 March 1973 at Washington to prevent over-exploitation of wild species of Fauna and Flora. Rwanda ratified the convention by presidential decree n°211 of 25 June 1980). The convention protects NTFPs against extinction.
- (4) **UNESCO convention on World Cultural Heritage**, adopted on 16 November 1972 protects and promotes sustainable conservation of world cultural and environmental heritage.
- (5) **Convention on Biological Diversity (Biodiversity) (CBD)** was launched on 5 June 1992 at the United Nations Conference on Environment and Development (the Rio "Earth Summit"). Rwanda ratified the CBD on 28/02/2011. The convention aims at conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of benefits arising from the use of genetic resources.
- (6) **Nagoya Protocol** engaging parties to the CBD on access to genetic resources and fair and equitable sharing of profits from their utilization. The protocol was adopted at Nagoya, Japan on 29 October 2010 and was ratified by Rwanda on 20 March 2012.
- (7) **Millenium Development Goals (MDGs)**: Among the eight goals, the first goal concerns reduction of poverty by half by 2015 while the seventh is to ensure environmental sustainability. Sustainable utilization and management of NTFPs can contribute to successful achievement of both goals.
- (8) **United Nations Declaration on the Rights of Indigenous Peoples** was adopted on 13 September 2007, grants to indigenous peoples the right to access and benefit from forest products including traditional medicine, spiritual and cultural needs.

Some of the international organizations involved in the management and utilization of NTFPs include FAO which has a division dealing solely with NTFPs, International Model Forest Network (IMFN) which promotes sustainable forest management and International Union for

Conservation of Nature (IUCN), International Network for Bamboo and Rattan (INBAR), an intergovernmental organization established in 1997 to develop and promote innovative solutions to poverty and environmental sustainability using bamboo and rattan, the Organisation for Economic Co-operation and Development (OECD) (French: *Organisation de coopération et de développement économiques*, OCDE) which is involved in the certification of tree seeds for commercial purpose, the Center for International Forestry Research (CIFOR), etc.

2.1.2. Regional frameworks

There are several conventions, institutions and programs which deal or have impact on NTFPs management and utilization in the region particularly in the Congo basin countries. These include:

- (1) T
The African charter on Human and Peoples' rights adopted on 27 June 1981 at Nairobi which was ratified by Rwanda on 15 July 1983;
- (2) T
The African convention on conservation of Nature and Natural Resources adopted at Algiers on 15 September 1968 which targets conservation and rational utilization of natural resources including soil, water, flora and fauna;
- (3) T
The African Model Forest Network (AMFN) established in 2009 with support from the Government of Canada to facilitate the development of a pan-African network of Model Forests representative of the continent's wealth and diversity; Central Africa Regional Program for the Environment (CARPE) funded by USAID aims at promoting sustainable natural resource management in the Congo Basin;
- (4) T
The COMIFAC (*Commission des Forêts d'Afrique Centrale*) treaty which aims at conservation and sustainable management of forest ecosystems in Central African region. The treaty was signed on 5th February 2005 at Brazzaville. It was ratified by Rwanda by the Presidential decree n° 69/01 of 12/03/2014. Some instruments designed to guide in achieving the mission of COMIFAC include the agreement on monitoring forest products flow in Central African countries (adopted on 26 October 2008); the Guidelines adopted by COMIFAC at Brazzaville in October 2008 to promote NTFPs at legal, political and institutional level in Central African Countries; the COMIFAC Convergence Plan and the Yaoundé declaration;
- (5) T
The Conference on Tropical Moist Forest Ecosystems of Central Africa (CEFDHAC) and related networks such as the *Réseau d'Institutions de Formation Forestière et Environnementale d'Afrique Centrale* (RIFFEAC), the *Réseau des Aires Protégées d'Afrique Centrale* (RAPAC), the *Réseau Femmes Africaines pour le Développement Durable* (REFADD), etc.;
- (6) T
The Network of Indigenous and local communities for the conservation of forest ecosystems in Central Africa and the Partnership for Congo Basin Forests (PFBC);
- (7) F
AO project GCP/RAF/441/GER "*Enhancing food security in Central African Countries through sustainable management of Non-wood forest products*" which produced a Toolbox for the integration of food security in the development of the NTFPs sector in Central African countries.

2.1.3. National frameworks

2.1.3.1. Legal frameworks

The government of Rwanda has set up several legal instruments which, even without mentioning specifically NTFPs, are related or may have impact on the NTFPs sector. Such laws include:

- (1) **Constitution of the Republic of Rwanda**, particularly in its article 49 stipulates that each person has the right to a healthy and satisfying environment. Each person is responsible to protect, conserve and promote the environment; C
- (2) **Environment law** n°04/2005 of 08/04/2005, particularly in its article 24 instructs that import and export of NTFPs should conform to CBD and CITES guidelines; E
- (3) **Rwanda Forest Law**: The new forest law in Rwanda (Law no.47bis/2013) was enacted on 28/06/2013 aiming at reinforcing the management and utilization of forests resources. The law provides guidelines for the wood business while at the same time ensuring sustainable management of resources and protection of the environment. The law also establishes permits (license fees) and taxes for tree cutting, charcoal making, and transportation of wood products. This law further stipulates the requirement of a management plan prior to any commercial forestry activity, and provides rules for state, private and community Forestry (ROR, 2013). R

Under this law, NTFPs are listed among forest products and therefore concerned by it. According to this forest law, forest products include trees, timber, firewood, planks, charcoal, sawdust, bark, sticky sap, oil, leaves, flowers, fruits, seeds, fiber, ash, litter, honey, mushrooms, herbs and other biotic things or their derived products, soil, stones, gravel, clay, sand or other abiotic materials from the forest. In this regard, commercial harvesting of edible forest products is to be permitted based upon resource availability and approved management plan. The management plan should provide information such as, description of areas, their resources, uses, role of biological diversity of Rwanda, management regimes required for protection and sustainable utilization of the resources, and an assessment of the environmental and socio-economic impact of the proposed regime.

In order, to achieve sustainable production and management, the present law establishes the penalties for illegal harvesting and inefficient charcoal making. In its Article 11, the law recommends woodlots owners of 2 ha or above to elaborate forest management plans and Rwanda Natural Resources (RNRA), Department of Forestry and Nature Conservation (DFNC) provides guidelines on content of forest management plans. In addition to other staff, RNRA has recently appointed a permanent staff in charge of non-wood forest products in order to ensure efficient management of NTFPs resources.

Other laws that have some influence on management and utilisation of NTFPs include the Mining law (n° 13/2014 of 20/05/2014); the Land law (n°43/2013 of 16/06/2013) and the Beekeeping law (n° 25/2013 of 10/05/2013, which unfortunately doesn't consider honey as a forest product but as a livestock product).

2.1.3.2. Political framework

The government of Rwanda has elaborated and adopted a number of policies which have bearing on the management and utilisation of NTFPs. Some of such policies include:

1. National forestry policy

The National Forestry Policy was launched in 2010 with the aim of making the forestry sector, one of the bedrocks for sustainable economic development. This policy stresses reforestation of every available land in order to reduce risks of desertification, erosion,

climate change and degradation of water resources. It was awarded the best future policy prize of the year in 2011. The policy outlines strategies for sustainable development of the forestry sector in the country. In fact, the fourth specific objective of the policy is *“To promote farm forestry to produce timber, wood fuel and to supply wood and non-wood forest products”*. The policy also states that a joint strategy with the Ministry of Agriculture and Animal Resources (MINAGRI) will be developed to promote agroforestry for non-wood uses including medicinal plants, honey production, wild foods, and handicraft production (ROR, 2010).

The national forestry policy is also keen to promote regional and international cooperation. One of the guiding principles of this policy stipulates that all strategies and actions in the forest sector shall internalize forest-related current and future international conventions, agreements and protocols. In fact Rwanda is party to several international and regional conventions and treaties related in one way or another to NTFPs sector development such as the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change (UNFCCC), the “*Commission des Forêts d’Afrique Centrale*” (COMIFAC), the East African Community (EAC) and others. In this regard, the policy provides for collaboration with neighboring countries in protecting trans-boundary forest ecosystems.

2. National bamboo policy

The national bamboo policy was launched in 2011. The policy framework is designed to create strong linkages to markets which provide financial incentives for Rwandan population to grow bamboo. Such a market-based approach also complements the national forestry policy which aims to encourage private sector investment in forestry. The bamboo policy and action plan was essentially prepared as a business plan for investment (ROR, 2011).

The bamboo policy outlines the preferred options for the development of bamboo resources in the country. Such preferred options include: (1) Promotion of bamboo as source of energy: bamboo will be introduced as source of firewood. (2) Soil erosion mitigation: plantation of bamboo along borders of existing terraces and new terraces to protect against soil erosion. (3) Promote use of bamboo in construction sector including housing, buildings, bridges and fences. Preservation units will be set up in order to ensure long life. Tourists and social housing, school buildings, as well as, doors, windows, trusses, frames, roofing, fences and small bridges can be built using bamboos. (4) Diversifying Bamboo products: Volume products such as matchsticks, pencils, incense sticks, slat-flooring, packaging and glue and stress laminated panel boards are easy to produce locally. Quality craft products such as bamboo baskets, mats and other articles will be enhanced.

The implementation plan of the bamboo policy describes the different structures and institutions to be set up in order to warrant effective implementation. These include the (1) Bamboo resource production network; (2) Bamboo resource supply chain cooperatives; (3) Bamboo Processing and Treatment Centre (BPTC) in districts; (4) Bamboo Enterprise Park (BEP) in an area around the BPTC campus in independent or condominium-style work sheds; (5) Technology transfer and entrepreneurship training centers; (6) Construction and other support services teams and (7) Institutions at district/sector/village level (e.g. federation of producer cooperatives).

3. Rwanda biodiversity policy

The Rwanda biodiversity policy was also launched in 2011 with the main goal : “To conserve Rwanda’s biological diversity, to sustain the integrity, health and productivity of its ecosystems and ecological processes, whilst providing lasting development benefits to the nation through the ecologically sustainable, socially equitable, and economically efficient use of biological resources” (ROR, 2011b). The Policy provides resource managers with objective perspectives of the relationships between humans, and ecosystems and their interactions on which decisions on conservation and sustaining of environmental goods and services are to be based.

In fact, a large proportion of population in Rwanda are directly dependent upon biological resources for subsistence purposes, including the gathering, harvesting or hunting of animals and plants for food, medicine, shelter, fuel, building materials, and trade. The Biodiversity Policy charts out a new road-map on which the Rwanda’s biodiversity should be developed, managed and used in order to provide more benefits to the population and the economy of

Rwanda. It establishes a coherent and systematic framework for long-term decisions that must be supported by appropriate legislation, which were previously lacking.

The preferred options include (1) Conserve the diversity of landscapes, ecosystems, habitats, communities, populations, species, and genes in Rwanda; (2) Maintain environmentally sound and sustainable development outside Protected Areas; (3) Controlling, Eradicating and Preventing Threats to Biodiversity; (4) Integrating biodiversity considerations in other national and regional initiatives; (5) Using Biological Resources Sustainably and Avoiding or Minimising Adverse Impacts on Biological Diversity; (6) Ensure that Benefits Derived from the use and Development of Rwanda's Genetic Resources Serve Local Community and National Interests; (7) Expand the Human Capacity to Conserve Biodiversity, to Manage its use, and to Address Factors Threatening it; (8) Create Conditions and Incentives that Support the Conservation and Sustainable use of Biodiversity. The implementation of the biodiversity policy and law will contribute to sustainable protection of the resource base for NTFPs in the country (ROR, 2011b).

2.1.3.3. Institutional framework

Due to their diversity, there is no specific institution in charge of NTFPs in Rwanda and NTFPs are managed under several government ministries and agencies including:

- (1) The Ministry of Natural Resources (MINRENA) in charge of all natural resources including Lands, forests, mines and water;
- (2) Ministry of Agriculture and animal resources (MINAGRI) in charge of agricultural and animal products including bee products;
- (3) The Ministry of Health (MINISANTE) is in charge of regulating health sector including provision of license to health clinics for both modern and traditional medicines;
- (4) Ministry of Trade and Industries (MINICOM) in charge of small and medium enterprises which are the main actors of NTFPs sector;
- (5) Rwanda environment Management Authority (REMA), as regulatory agency for the environment sector;
- (6) Rwanda Natural Resources Authority (RNRA) as an executive agency for all natural resources including Lands, forests, mines and water. The RNRA has now a staff dealing with NTFPs in the Department of Forestry and Nature Conservation (DFNC);
- (7) Rwanda Agricultural Board (RAB) in charge of agricultural research and extension including beekeeping and fisheries. RAB has recently supported participation of beekeepers in international trade fair shows such as: API Trade Africa (Ethiopia, Zambia and coming soon Zimbabwe) and API Mondial (in Ukraine);
- (8) National Agricultural Export Board (NAEB) in charge of export of all agricultural products including bee products;
- (9) Rwanda Bureau of Standards (RBS) in charge of setting up product standards and monitoring/insuring quality of products;
- (10) Rwanda Development Board (RDB) in charge of regulating investment in various developmental initiatives including tourism industry in Rwanda. RDB has supported communities adjacent to national parks in order to reduce poaching and encroachment activities. Such support includes social infrastructure and creation of alternative income like handicrafts, cultural shows and beekeeping along the buffer zones.

In addition to government institutions dealing with NTFPs, there are several projects and programs run by international or local non-government organizations that are supporting the NTFPs sector in Rwanda including: FAO Project GCP/RAF/479/AFB “Enhancing the contribution of non-wood forest products to food security in Central Africa” (*Renforcement de la contribution des produits forestiers non ligneux à la sécurité alimentaire en Afrique centrale*) which is supporting the elaboration of the national strategy and action plan for the NTFPs sector; and other projects supporting the sector that are implemented by NGOs such as SNV, CARE, DUHAMIC ADRI, World Vision, ACNR, ARECO Rwanda Nziza, etc.

2.2. Status of major NTFPs in Rwanda

2.2.1. Extractive products

In Rwanda, extractive products are not well known but some of those that were traditionally used include resins, latex, tannins, dyes and essential oils. For example resins and latex from a number of indigenous tree species such as *Euphorbia sp.* and *Ficus sp.* were used as to cement carvings, handicrafts and household tools. Natural dyes from flowers, sap and leaves of some indigenous tree species have been traditionally used in coloring of handicrafts and clothing.

Over ten varieties of essential oils have been extracted from some indigenous plants (e.g. from *Tetradenia riparia* (umuravumba), *Ocimum canum*, *Ocimum trichodon*, *Capsicum frutescens*, etc.) by Centre for Research in Phytomedicines and Life Sciences (CURPHAMETRA) for the production of drugs, pesticides and cosmetic products (Dunkel et al. 1992). Statistics on quantity and uses of extractive products from forests in Rwanda are not available.

2.2.2. Edible products and related materials

Important edible NTFPs found in Rwanda include wild fruits (e.g. ibyufe, etc.), vegetables (leaves, roots and shoots), forage (animal feed, fodder), forest fungi (mushrooms) and edible insects (e.g. Inseneke). Wild fruits are usually eaten by children while adults consume them only as emergency food occasionally and in times of famine (Mihigo, 1999). Since, most of remaining natural forests are protected wild fruits are rare to find in Rwanda. However, forest vegetables, mushrooms and spices are also utilised for human consumption. Currently, mushroom is also cultivated in urban areas using modern technology with the support of government and NGOs. RAB with the support of Chinese government has established a centre of excellence in mushroom production where several species of mushrooms are being researched on and multiplied.

Forages is an invaluable fodder grazed in the undergrowth of forest plantations mainly during the dry season in which livestock keepers drive their cattle transhumance in natural forests in search for tender grass (Mihigo, 2001). Actually, access to forests is not easy because natural forests are protected and it is also prohibited to graze in a public forest plantation. Statistics about quantities, diversity and potential of food products from forests in Rwanda are scanty or inexistent.

2.2.3. Medicinal and pharmaceutical products

Medicinal plants have been used in traditional human and veterinary medicine and the art of healing has been practiced for a long time in Rwanda. The parts of the plant used include leaves, bark, roots, flowers, fruits and seeds. But even parts of animal products are used as ingredients to some medicines including bones and urines.

During fieldwork, visited traditional medicine practitioners including the Bungabunga Ubuzima Clinic at Bare in Ngoma District and Zirumuze traditional pharmacy in Musanze district were found to play a great role in the healthcare services. The Centre for Traditional Medicine of Bare, Mutenderi sector, District Ngoma which was established in 1982 was very active before 1994 and could attend to more than 80,000 patients annually until 1992 (Mihigo, 1999). The traditional clinic is still operational though in a poor condition and currently receives on average 3 persons daily coming from government health centres.

The former Institute of Scientific and Technological Research (IRST) (now called National Industrial Research and Development Agency - NIRDA) started research on traditional medicine in Rwanda since 1972 and was formalized in 1982 with the creation of the Centre for Research in Phytomedicines and Life Sciences (formerly known as CURPHAMETRA). The objective of this centre was to work on native plant species and traditional botanical knowledge by promoting Rwandan traditional medicine, investigating the botany and agronomy of the flora traditionally used in Rwandan herbal medicine, developing techniques for producing medicines, pesticides and other products from local plants for commercial sale and developing a national pharmacopoeia for Rwanda. Over ten varieties of essential oils have been extracted from some indigenous plants by CURPHAMETRA for the production of drugs (Dunkel et al. 1992). Currently, CURPHAMETRA has been integrated in NIRDA under the "*Phytomedicine and Life Science Research Division*" which is furthering research on indigenous medicinal plants.

Rwanda abounds with medicinal plants resources. About thirty percent of 100 medicinal plants of Rwanda screened for antimicrobial activity against *Bacillus subtilis*, *Candida albicans*, *Mycobacterium smegmatis*, *Pseudomonas aeruginosa*, *Salmonella gallinarum* and *Staphylococcus aureus* showed activity against one or more microorganisms (Boily and Van, 1986). In fact hundreds of medicinal plants have been identified in Rwanda (Lewis, 1992), but the most utilised for human medicine are 59 and 39 for veterinary (Murekezi, 1999), which can be found in natural and artificial forest, fallow, and some can be cultivated. Some traditional medicine practitioners visited in Ngoma and Musanze districts have successfully domesticated some medicinal species.

Nevertheless, the potentiality of medicinal plants, the quantities of herbal products harvested for medicinal purpose and the number of traditional practitioners in the country are not clearly known. There is need for a comprehensive assessment of medicinal plants resources and for research to domesticate high potential medicinal plants.

2.2.4. Bee products

Bee products include honey, beeswax, propolis, royal jelly and pollen. However, honey is the most popular bee product. Beekeeping plays a critical role in the livelihoods of the rural communities and has been practiced for many years through successive generations and along inherited patterns. The activity has basically been traditional and of subsistence in nature, where honey was used as a food product for home, medicine and for brewing traditional liquor, but actually the trend is changing and community members are increasingly taking up beekeeping as a business enterprise (SNV/IFAD, 2009). Largest consumers of honey are found in urban and honey used as a table food, after processing where is refined and packaged by honey processing plants and resold to urban domestic consumers and commercial outlets. Honey is also used for medicinal purpose and industrial production of local beer due to its high sugar levels and its ability to catalyze fermentation and antioxidant properties, which make it a preservative in foods, including meat, poultry and pastry.

The quantities of honey annually produced vary from district to district but the Apiculture Baseline Study in Rwanda carried out in 2007 by SNV revealed that the largest honey producers in Rwanda are Rusizi, Gicumbi, Ngoma and Gatsibo respectively with on average 25,361; 23,898; 20,917 and 20,007 Kgs of honey annually. The study assess the potential production of honey in 17 districts of Rwanda and estimated annual production to 158,641 kg of honey which could generate 385,607 US\$ (SNV, 2007). During that study, honey producers reported that the production is mainly done in traditional way by using traditional materials like traditional log, grass and bark hives. The study also revealed that despite predominance of traditional beehives, there are currently three different types of beehives used in Rwanda namely traditional hive, Kenya Top Bar hive and Langstroth hive with the seasonal average production of 5kg, 9kg and 20 kg respectively.

Honey production statistics are not fully captured as most of it is consumed locally without passing through normal market. However, some amount provided by NISR from 2007 to 2011 are summarized in Table 2.

Table 2: Annual honey production in Rwanda

Designation	2007	2008	2009	2010	2011
Honey (Tons)	1,084	1,654	2,684	2,921	3,221

Source: NISR (2012)

Statistics about other bee products such as beeswax, propolis, royal jelly and pollen are not available. But these products are widely used in the Rwanda. For example, beeswax are famous in the production of candles used at home and during many religious celebrations in the country.

2.2.5. Other animal based products

In Rwanda, these products include bush meat from small animals such as field mice (Gambian rats *-isiha*), porcupines (*Ibinyogote*), bush pigs (*ingurube?*), duikers and hares; birds and eggs (e.g. *inkware*); fish (in Akagera National Park); hides and skins. There are no statistics especially because all hunting activities are prohibited in Rwanda. However, despite hunting ban, poaching is common in National Parks. For example Innocent Ndikubwamana (staff of RDB, Pers. Communication) informed us that in 2013 park rangers counted 5300 snares for catching animals on an transect of 7,764.8 km in NNP. Figure 3 shows statistics on counts of animal carcasses encountered in NNP. Other illegal activities related to NTFPs monitored in NNP from 2011to 2013 are detailed in Table 3.

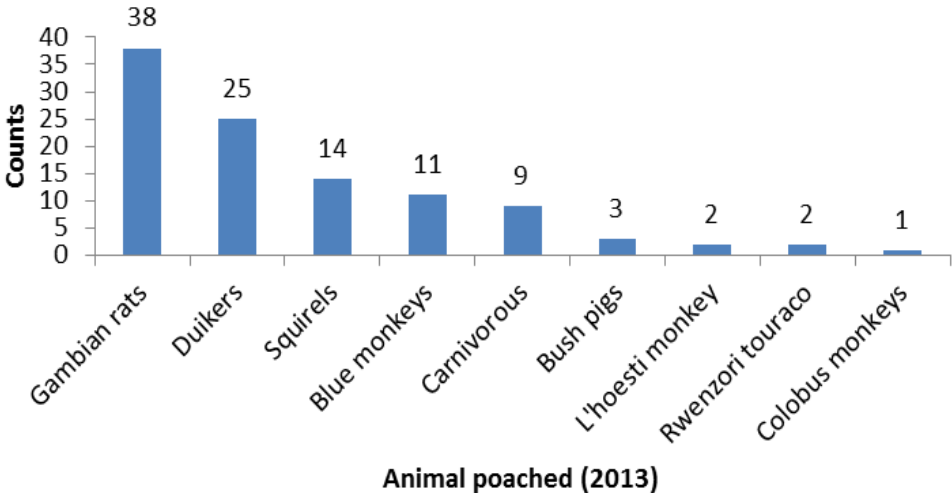


Figure 3: Counts of animal carcasses encountered in NNP (NNP rangers report, 2013)

Table 3: NTFPs collected or related activities in NNP from 2011 to 2013

NTFPs	Year 2011	Year 2012	Year 2013
	Counts on 7,401.8 km	Counts on 5,946.4 km	Counts on 7,764.8 km
Poaching animals by setting snares	4079	3883	5300
Carcasses of animals	62	83	196
Mining minerals	273	364	403
Honey collection	57	62	96
Medicinal plant collection	1	4	3
Agriculture	43	54	46
Livestock grazing	29	22	11
Bamboo cutting	127	642	242
Mushroom collection	0	7	42

Source: NNP rangers report, 2013

2.2.6. Carvings and handicrafts

Most of the traditional household tools and bamboo and rattan products are in this category. They include bamboo baskets and furniture, rattan baskets, carvings, household utensils (Ibiseke, inkoko, isekuru, ingobyi, etc.), traditional chairs and ornaments. The craft industries are an integral part of the culture of each nation and at the same time, they are an important component of the socio-economic life. They generate jobs without expensive investment, and also put producers and users in their cultural identity (MINICOM, 2009). Handcraft is a traditional activity with rationalized skills, as main activity or practiced half time mainly in the rural area and supporting the sector could be an opportunity to improve rural income and diversify the export sector. Raw materials for handicrafts are from wild animal such as beads, bone, horns, feathers, teeth, skin (hides) and plants such as bamboo and sisal.

Basketry and mats are the most popular craft products in Rwanda. Basket weaving has been Rwanda's greatest craft, and a critical community activity, for hundreds of years. Until today the activity involves several hundred thousand of women in rural areas (Rwamasirabo, 2008). Women cooperatives involved in the Basket weaving have succeeded and turned into small export oriented enterprises. Baskets are exported through the interaction with the local trading companies and women weavers. The price of the basket depends on the type, design, but mostly on the source of materials used. Colors used are diverse (vegetable dyes, mineral dyes, combination of the two, natural color of the materials themselves, among others) but the most preferred color by the markets is the natural dye (MINICOM 2009).

Bamboo is the most important raw material used in the handicraft industry. Bamboo resources abound in the NNP and VNP which are now protected. It was traditionally used for construction, handicrafts, climbing bean stakes, homestead fencing and various household tools and furniture. There are three species of bamboos indigenous in Rwanda: *Arundinaria alpina* (predominant in the north eastern part of VNP), *Bambusa vulgaris* (dominant in NNP), and *Oxythenanthera abyssinica* in less humid regions. There are also few clumps of introduced bamboo namely *Bambusa oreobambos* and *Dendrocalamus giganteus* at Ruhande arboretum, along river banks and elsewhere in the country.

Bamboo has not been widely cultivated in Rwanda except in some parts of the North where farmers have been growing bamboo on their farm and homestead. However, recently the government has set to enhance plantation and utilisation of bamboo in the country and it was planned that by 2013, about 25,000 hectares of bamboo were to be planted on farmers' land, public land and along rivers to protect riverbanks and lakeshores (MINAGRI, 2009). With the support of the China, modern equipment for processing bamboo products has been installed at Masaka Incubation Center. Bamboo offers a singular opportunity to produce school furniture such as matchsticks, pencils, incense sticks, slat-flooring, packaging and glue and stress laminated panel boards to be produced locally in addition to craft products such as baskets, mats, lamp shades, tray and other articles as well as furniture such as chairs, tables and pots.

The development of the bamboo sector is an opportunity to increase employment and income not only in rural areas, where it is produced, but also in cities and towns through handicraft products and furniture. It is anticipated that prior capacity building in bamboo handcraft (4,400 people), bamboo furniture (3,300 people), and bamboo modern processing (3,300 people) will be done by 2020, and income generating by 2020 will reach Rwf 576 million (ROR, 2011a).

Basket weaves are made from natural raw materials that all can be found growing in Rwanda – bamboo, sisal fibers, sweet grass, banana leaves and raffia. Dyed with either natural plant pigments or tea leaves as well as with commercial dyes, these baskets represent designs that have been woven in many cases for centuries. Basket weaving provide employment in preparation of raw material used to make baskets including collection of sisal leaves, preparation of fibers taken from inside the sisal leaves, cleaning and drying. Some plants such as *Euphorbia dawei* is used in the manufacturing of musical instruments like Inanga, Ikembe and other in fabrication of wooden utensils such of mortars (isekuru), and pestle (umuhini).

The majority of handicrafts produced in Rwanda are not adequately captured especially those sold in domestic markets to local buyers and tourists. Agaseke is the most important handicraft product sold in USA and EU. Gahaya Links is the largest exporter of Agaseke, but more 30 organizations and especially cooperatives engaged in the handicraft production and export. Statistics from BNR (2013) show that handicraft represented 4.4% (Rwf 625,653M) and 2.4% (Rwf 456,815M) of the values of nontraditional exports respectively in 2010 and 2011.

2.2.7. Biofuels

In Rwanda, biofuels included in NTFPs comprise Biodiesel (e.g. IRST (now NIRDA) products), bio-ethanol and creosote or tar (by-products of charcoal burning). Basing on the adopted definition of NTFPs, firewood and charcoal are excluded. Statistics on the quantities and utilization of biofuels in Rwanda were not found.

2.2.8. Fibers

In Rwanda, fibers have traditionally been used in several crafts and construction works. These include fabrication of bamboo and rattan baskets (ibitebo, ibyibo, etc.), bamboo and rattan mats (ibirago, imisambi, etc.), cordage in construction and household furniture (intebe, ameza, ibisenge, etc.).

Basket weaves are most popular products made essentially using fibers. The natural raw material growing in Rwanda that is used to produce fibers include sisal, sweet grass, banana leaves, raffia, palms and bamboo. Dyed with either natural plant pigments or tea leaves as well as with commercial dyes, basket weaves represent designs that have been woven in many cases for centuries. Rural population use plaits of *Cyperus latifolius* and *Typha domingensis* as traditional mattress of bed and carpet. They are also used for the drying of the agricultural produce or pack their deceased ones at the time of burial. Due to the relief of the country and the remoteness of some places in rural area, the transport of patient was done (and still in use) with a stretcher (Ingobyi) made in plaits. There are no statistics available on products made from fibers.

2.3. Supply chain of NTFPs

An NTFP supply chain can be broken down into several sub-sets of activities: production, collection, processing, storage, transport, marketing, and sale. The relative importance of each of these differs from product to product, they may not occur sequentially and some may even be repeated or omitted for particular products (Marshall et al., 2003). Some chains, particularly for locally traded products, are very short and simple with harvesters selling their products direct to consumers. Value chains that extend beyond the local level tend to be more complex involving a chain or network of different types of organizations, from individuals to loose associations to shareholder companies, involved in getting the product from the forest or field to the retail shelf.

2.3.1. Collection and production of NTFPS

2.3.1.1. 2.3.1.1 Collection from forests

NTFPs are harvested either in the forest by wild gatherers and/or local collectors/local traders or from domestication gardens by farmers or cooperatives. Part of the harvest is then either consumed at home or sold in local markets. Another part of NTFPs is sold to urban markets through rural and urban middlemen (Figure 4). Methods and practices of production of NTFPs depend on the nature of the NTFPs as plants or animals and the parts harvested. The methods used for extraction of the NTFPs have an impact on the sustainability of the living plant or animal depending on the quantity to be extracted.

Products from plants are harvested as leaves, fruits, flowers, bark, tubers, roots and timber, and concern medicinal plants, ornamental plants, bamboo, melliferous plants and raw material extracted for handicraft products. Normally, the harvesting of leaves, flowers and fruits do not threaten the regeneration of the plants, except in the case of overharvesting where immature part facilitating the reproduction of the plant are also harvested. In the case of bamboo, mature bamboo currently exist only in protected parks (NNP, VNP) which is a clear constraint to investing in large scale production of bamboo products.

As for bush meat, even though hunting is prohibited in National parks, Innocent Ndikubwami (staff of RDB, Pers. Communication) informed us at Kitabi that during park patrol they counted 5300 snares for small mammals in NNP in 2013. But due to ban on hunting, poachers use their spoils only for domestic consumption. Beekeeping is allowed and even supported around National Parks in the buffer zone. In fact, a lot honey is produced along the buffer zones of NNP and VNP. For example, according to Bana Mediatrice (WCS staff, Pers. Communication) the “*Ubwiza Bwa Nyungwe Honey Production Union*” which assembles 13 beekeeping cooperatives around NNP produce around 10 tons of honey annually.

2.3.1.2. Domestication

Where there is pressure on natural forests the cultivation of NTFPs on plantations or as part of agroforestry systems is generally a good strategy for reducing that pressure. This pressure often comes about as a result of increased demand due to commercialization. However domestication of NTFPs needs to be done cautiously because it can result in decreased productivity of NTFPs obtained in natural forests, lower their prices and hence reduce value of the NTFPs. This may lead to reduced motivation by communities to conserve their natural forests. Therefore, maintaining NTFPs in natural forests increases their value and hence the incentive to conserve them. In other argument against large scale domestication is the fact that there are many non-timber forest products that are more competitive in wild or semi-wild conditions than in domesticated plantations. One example is ginseng (*Panax* spp.) production, which is much more valued from natural stands than from plantations as well as some ornamental plants that are difficult to cultivate (Agustino *et al.* 2011). Nevertheless domestication is very important in ensuring sustainable production of NTFPs.

Some NTFPs in the country have been domesticated and therefore can be harvested from gardens or plantations. Examples of such domesticated NTFPs include bamboos, mushrooms, fruits and medicinal plants. During fieldwork a number of bamboo plantations were observed in southern province and along river banks like Nyabarongo, Nyabugogo, etc. Medicinal plant gardens were also noted at Musanze (Zirumuze Botanic garden and INES botanic garden), at Huye (former IRST Medicinal plant garden) and at Ngoma (Bare Traditional Clinic). In general the domestication of popular medicinal plants such as *Tetradenia riparia* (umuravumba) and *Vernonia amydalina* (umubirizi) was common practice in many Rwandan homesteads in southern, northern and western provinces.

2.3.2. Transportation

Most NTFPs are harvested and transported by traditional means or bicycle from forest to home, collection center or rural market. From there, the transport is assumed by middlemen or traders from town and all means of transport are used depending on the distance and the status of the road. NTFPs or raw materials for producing NTFPs are transported using bicycle, motorcycle and vehicles. When vehicles or motorcycles are used to transport NTFPs, the price of products to destination reflects the transport costs. At this stage, no proper or adequate packaging is used. Only honey which is liquid is carried out using plastic containers. The products are supplied by middlemen or producers to whole sellers, retailers or consumers (local or international) directly or after processing. At all stages, the transport of NTFPs remains a core challenge especially when it has to be organized for huge volumes, because it affects the price or the quality of end product.

2.3.3. Processing, packaging and storage

Some NTFPs undergo minor processing and packaging before commercialization in plastic, paper or metal containers. Processing is done with traditional means using rudimentary equipment with poor unhygienic conditions, which may affect the quality and acceptable standards of products. For example, most of medicinal plants are pounded using mortars (isekuru) and dried using mats or weave plates (umusambi, inkoko) and their packaging system is very poor. Honey is relatively well processed, but the first stage of processing done by beekeepers is poor and may affect its quality (e.g. inclusion of foreign substances and impurities) (MINAGRI, 2009). However, the end product of honey is generally well packed and stored before sale on local or international markets. The treatment of bamboo to produce crafts and furniture is also still rudimentary, except those produced in the incubation center by Chinese at Masaka where modern equipment is installed but sufficient raw material is lacking.

2.2.1 Commercialization

Many NTFPs are produced in small volumes, dispersed over wide areas. The marketing chain of wild harvested products is organized in the producing areas (rural villages) and in urban centers but mostly in Kigali city. The more the product need processing and in big volumes or sold at international market, the more the market chain is long and involve more actors as middlemen. For medicinal plants, the chain is short because harvesters sell their products directly to consumers. Storage, processing and transport are less complex, because the product are harvested, and sold with little degree of processing and consumers do not have special requirements. However, for bamboo products, harvesters may be themselves artisans who process raw material to make bamboo crafts or they may sell to bamboo crafts artisans. Processed bamboo products such as crafts and furniture are sold by artisans themselves to middlemen or directly to wholesalers, retailers or consumers.

In the case of basket weaves, made from sisal fiber, bamboo, rattan or other material, the supply chain is complex because they are traded internationally, with export requirements such as certain quantities, quality standards, phytosanitary regulations, permits and taxes to be fulfilled. The export process needs local middlemen to collect products within the country and in the country of destination, with transport arrangements and storage facilities. Retailers and final consumers buy products from agents and distributors. Most of producers are not aware with this process and some specialized companies or the cooperatives of producers are involved in the exports. In some cases, products may also be re-exported to other destinations. Middlemen and intermediaries play a critical role in communicating information from consumers to producers, providing market acumen, organizing transport and quality control, advancing credit, consolidating volumes for export.

As for bee products, SNV/IFAD (2009) identified three main nodes for honey market: (i) the local market (friends, neighbors and surrounding villages); (ii) local and external bulking agents (middlemen, traditional liquor brewers, traders, non-governmental organizations); and (iii) farmer based co-operative societies. Those cooperatives are the most sellers after processing and packaging to the end consumers constituted by retailers, supermarkets, pharmaceutical companies and liquor brewing entities. The supply chain of NTFPs products in Rwanda is generalized and summarized in Figure 4.

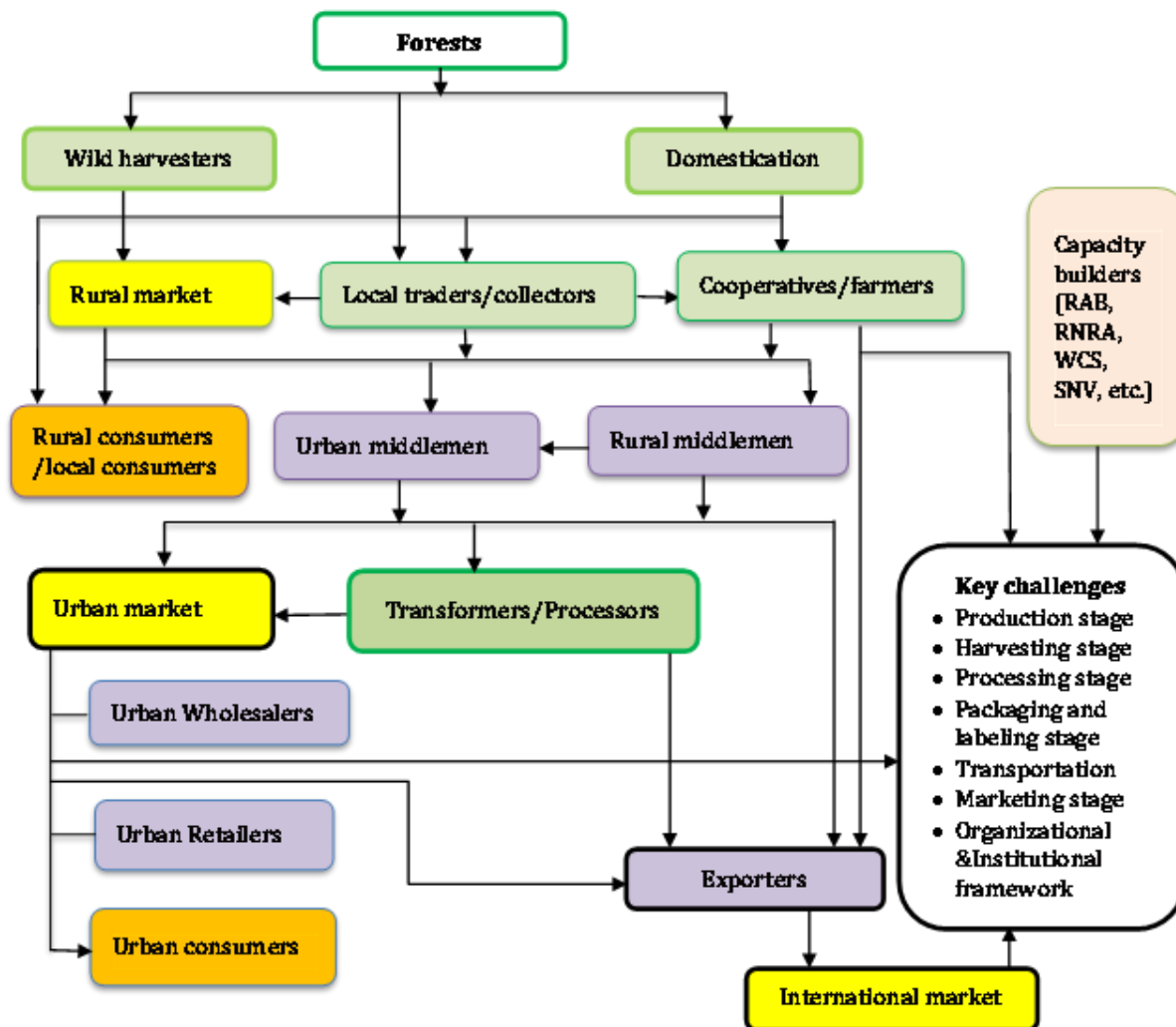


Figure 4: NTFPs supply chain and challenges

2.4. Major actors in the NTFPs sector and their activities

There are currently several actors in the NTFPs sector involved in the supply chain starting from the wild gatherers/collectors or farmers and cooperatives in the rural areas through middlemen and processing companies and cooperative unions to urban wholesalers, retailers and exporters. For example, there are hundreds of cooperatives registered by Rwanda Cooperative Agency (RCA) and a multitude of people involved in beekeeping /honey value chain including production, transportation, processing and labeling, marketing and export of bee products.

Basing on their functions along the supply chain of NTFPs, major actors can be broadly clustered into six categories: (i) **producers**: sell products after minor processing by extracting honey from the combs, (ii) **middlemen/bulking agents**: in most cases cooperative plant or local retailers who collect bee products in honey/bulking centers, and sell without much processing except packing in different containers, (iii) **processors & packers** (honey refining and packaging centers), (iv) **retailers in domestic market**, (v) **industrial buyers** and (vi) **exporters** to foreign markets. Excluded in this chain (but important in the supply chain) are the suppliers of inputs such as beehives and other beekeeping equipment such as SNV and ARDI as well as service and capacity builders such as RAB, RNRA, RDB and various Ministries. Major actors in the NTFPs sector in Rwanda are compiled in Table 4.

Table 4: Some of major actors in the NTFPs sector in Rwanda (2014)

N°.	Type of NTFPs	Name of Actor	Location	Type of actor	Role in the value chain
1	Many/all NTFPs	MINICOM	Kigali	Government	Capacity building
2	Many/all NTFPs	MINIRENA	Kigali	Government	Capacity building
3	Many/all NTFPs	MINAGRI	Kigali	Government	Capacity building
4	Many/all NTFPs	RBS	Kigali	Government	Capacity building
5	Many/all NTFPs	RDB	Kigali	Government	Capacity building
6	Many/all NTFPs	REMA	Kigali	Government	Capacity building
7	Many/all NTFPs	RNRA	Kigali	Government	Capacity building
8	Many/all NTFPs	RAB	Kigali	Government	Capacity building
9	Many/all NTFPs	UR-CAVM	Musanze	Gov. University	Capacity building
10	Many/all NTFPs	PSF	Kigali	Private Forum	Capacity building, marketing, advocacy
11	Bamboo products	ADARWA	Kigali	Cooperative union	Production, processing, marketing and trade
12	Bamboo products	ARECO	Kigali	Local NGO	Production, processing, marketing and trade
13	Bamboo products	China Bamboo Project	Kigali	Government	Capacity building, processing
14	Bamboo products	CJEPENYA	Nyaruguru	Local NGO	Production, processing, marketing and trade
15	Bamboo products	KIAKA	Rubavu	Private company	Production, processing, marketing and trade
16	Bamboo products	Masaka Business Incubation centre	Kigali	Government	Capacity building, processing and trade
17	Bamboo products	Rwanda Bamboo Society	Kigali	Private company	Production, processing, marketing and trade
18	Bee products	ADEPE	Rubavu	Local NGO	Production, collection, processing, marketing and trade
19	Bee products	ARDI	Kigali	International NGO	Capacity building
20	Bee products	CESAPI	Kigali	Local NGO	Production, collection, processing, marketing and trade

N°.	Type of NTFPs	Name of Actor	Location	Type of actor	Role in the value chain
21	Bee products	COOPANYA	Nyamasheke	Cooperative union	Production, collection, processing, marketing and trade
22	Bee products	COPAGARU	Rusizi	Cooperative union	Production, collection, processing, marketing and trade
23	Bee products	DUFATANYE	Rulindo	Cooperative union	Production, collection, processing, marketing and trade
24	Bee products	FAO	Kigali	UN organisation	Capacity building
25	Bee products	KOPAKI	Kirehe	Cooperative union	Production, collection, processing, marketing and trade
26	Bee products	MIG	Nyamagabe	Private company	Production, collection, processing, marketing and trade
27	Bee products	MINAGRI	Kigali	Government	Capacity building
28	Bee products	NAEB	Kigali	Government	Capacity building
29	Bee products	NBF	Kigali	Farmers' organisation	Production, collection, processing, marketing and trade
30	Bee products	SERUKA	Kigali	Local NGO	Production, collection, processing, marketing and trade
31	Bee products	SNV	Kigali	International NGO	Capacity building
32	Bee products	TMEA	Kigali	International NGO	Production, collection, processing, marketing and trade
33	Bee products	TWIYEGERANYE	Muhanga	Cooperative union	Production, collection, processing, marketing and trade
34	Bee products	Ubwiza bwa Nyungwe	Nyamagabe	Cooperative union	Production, collection, processing, marketing and trade
35	Bee products	UNICOAPIGI	Rubavu	Cooperative union	Production, collection, processing, marketing and trade
36	Bee products	WCS	Kigali	International NGO	Capacity building
37	Handicrafts	ASPAR ASBL	Kigali	Private company	Collection, trade, Export
38	Handicrafts	AVEGA Agahozo	Kigali	Local NGO	Collection, trade, Export
39	Handicrafts	COPABU-INGANOYACU	Huye	Cooperative	Collection, trade, Export

N°.	Type of NTFPs	Name of Actor	Location	Type of actor	Role in the value chain
40	Handicrafts	GAHAYA LINKS	Kigali	Private company	Collection, export, capacity building
41	Handicrafts	MILLENIUM VILLAGES	Bugesera	Cooperative	Collection, trade, Export
42	Handicrafts	MODIS SARL	Kigali	Private company	Collection, trade, Export
43	Medicinal products	AGA-Rwanda Network	Kigali	Federation of Traditional healers	Capacity building
44	Medicinal products	Bungabunga ubuzima	Ngoma	Cooperative	Collection, treatment
45	Medicinal products	MINISANTE	Kigali	Government	Capacity building
46	Medicinal products	NIRDA (former IRST)	Huye	Government	Capacity building
47	Medicinal products	Zirumuze New Life	Musanze	Private company	Collection, treatment
48	Mushroom	Care international	Kigali	International NGO	Capacity building
49	Mushroom	JUNCOA Project	Kigali	Government project	Inputs supply, production, capacity building
50	Mushroom	Jyambere Munyarwanda	Kigali	Cooperative	Inputs supply, production, trade

2.5. Challenges and opportunities in the NTFPs sector

2.5.1. Strengths, weaknesses, opportunities and threats (SWOT) analysis

In the process of preparing this national strategy for the development of the NTFPs sector in Rwanda, several actors were consulted during workshops and fieldwork. The following analysis of strengths, weaknesses, opportunities and threats (SWOT) resulted from those stakeholders consultations (Table 5):

Table 5: SWOT analysis of the NTFPs Sector in Rwanda (2014)

Strengths	Weaknesses
<ul style="list-style-type: none"> • Existence of related sectorial policies and laws such as National Forestry Policy and law, Biodiversity policy and law, bamboo policy, etc. • Forests with high species diversity • Regulations of forest products harvesting • Existing awareness regarding the depletion of NTFPs resources • Political will to conserve the environment and harness ecosystem services • International and regional initiatives 	<ul style="list-style-type: none"> • Lack of recognition of NTFPs value in livelihood improvement • Lack of clear legal and institutional framework • Lack of human, technological and financial capacity • Poor coordination and organization of actors in the sector • Poor processing, transport and storage infrastructure • Lack of clear classification of NTFPs and quality standards • Resource base not known (lack of comprehensive inventory of NTFPs) • Not enough research on NTFPs

Opportunities	Threats
<ul style="list-style-type: none"> • Domestication of NTFPs • High domestic and international market • Preferential/ fair trades agreements at regional and international (e.g. AGOA, COMESA, EAC, etc.) • Several initiatives to support sector • Existing unexploited handicraft products • Increasing flow of tourists • NTFPs quality standardization and certification • District Forest management plans 	<ul style="list-style-type: none"> • Depletion of forest resources • Poverty of forest depending communities • Overharvesting of NTFPs • Climate change impact • Illegal poaching and logging • Bushfire • Poor management of forest resources • Use of pesticides in intensive agriculture

2.5.2. Major issues in the NTFPs sector and justification of the national strategy

2.5.2.1. Organizational and institutional set-up

One of the major institutional and organizational challenges for the development of NTFPs is the lack of effective cooperation and coordination among and between different organizations in terms of duties and mandates. There are many organizations involved in NTFPs management and utilization. The mandates and roles of these organizations need to be clearly defined. Coordination between collectors, traders, exporters, governmental and non-governmental organizations continues to be weak. Cross-departmental and cross-ministerial coordination is crucial in order to share information, to avoid duplication of efforts and to witness a well-developed NTFPs sector in the country.

2.5.2.2. Access to harvesting sites

In Rwanda, due to depletion of natural forests, most of the remaining natural forests are now protected either as National Parks or Natural Forest Reserves. While access to natural forest reserves is relatively relaxed for collection of some NTFPs, access to National Parks is strictly prohibited for any activity whatsoever. As a result, the search of medicinal plants and wild foods has become an extremely tedious activity. Traditional healers have to spend more time travelling long distances to get the needed plants. This was reported during our field visit to Bare Traditional Medicine Clinic (Bungabunga Ubuzima Clinic) in Ngoma District and Farumasi Zirumuze (Zirumuze New Life) in Musanze District. In fact due to depletion of natural forests in their vicinity the members of this cooperative have to walk hours and hours in search of particular plants ingredients to medicines for specific diseases. Therefore, there is need to explore modalities of allowing controlled access to protected areas for non-destructive collection of NTFPs.

2.5.2.3. Production, processing/transformation, storage and technological issues

The production of NTFPs can significantly increase the income to the low income people while preserving the ecological sustainability of the resources. However the basic production, processing/transformation, storage and packaging technology currently in use needs further upgrading to enhance the product quality and hence increase the revenues from NTFPs. For example, in the case of bee products, many farmers are still using traditional log, grass and bark beehives. These traditional beehives are extremely low yielding in terms of honey production and honey collection is generally destructive. Most of beekeepers are not only too poor to afford acquisition improved beehives and associated equipment but also they are not trained to use them.

Small producers of NTFPs and other products often lack access to improved technologies that could increase their productivity and competitiveness. Many NTFPs producers are still using only local knowledge for production and processing. For example, the lack of appropriate processing, preservation and storage techniques of forest foods limit their potential contribution to the household diet since some species may not be edible in their harvested state, and many forest foods, being perishable, can only be consumed for a limited period in the year (FAO, 1995). Therefore, there is a need for the small scale producers to access improved equipment, tools, materials and skills in order to increase production and improve the quality of products.

2.5.2.4. Transportation of NTFPs

Some NTFPs are produced or harvested in remote areas where transportation infrastructure is poor. Therefore transport of raw materials and/or finished products from rural areas becomes expensive which raise the prices of NTFPs in urban markets. Moreover, poor or no packaging to facilitate transportation degrades the quality of NTFPs before they reach markets. Exported NTFPs also face very high freight charges because Rwanda is landlocked and therefore NTFPs from the country are less competitive in foreign markets.

2.5.2.5. Marketing and commercialization of NTFPs

Marketing and trade of NTFPs is beset with major impediments including the irregularity of supply and the large number of low volume products involved, cumbersome export regulations and procedures, inadequate quality control and product information to consumers, inadequate market information services to collectors and poor infrastructure for rapid transportation of products between production zones and the nearest markets.

2.5.2.6. Research on NTFPs

At present there is no enough research activities conducted in the NTFPs sector in terms of availability, ecological potential, domestication, marketability, etc. Due to lack of focused research in the NTFPs sector, it is not easy to address adequately issues related to production and processing technology, sustainable production/collection and marketing of the NTFPs. Some research has been done by IRST (now NIRDA) on medicinal plants and biodiesel production, and RAB on bee products but their output is still inadequate. It is worth mentioning here that, in order to ensure sustainability and easy transfer, all NTFPs related research should consider local knowledge. This strategy will promote integrated research in the NTFPs sector.

2.5.2.7. Use and management of NTFPs resources

Successful and sustainable management and optimal utilization of NTFPs resources require adequate resources and efficient and effective management. The following are the major issues regarding resource use and management of NTFPs in the country:

- No comprehensive assessment of NTFPs resource base and annual harvesting limits;
- Lack of studies on harvesting regimes and their effect on regeneration;
- Lack of guidelines for resource assessment and management;
- Lack of clear regulations which differentiate between NTFPs derived from the wild and cultivated NTFPs;
- No or insufficient research on ecological characteristics of NTFPs;
- No or insufficient research on domestication and propagation;
- Poor knowledge on cultivation of NTFPs with greater socio-economic benefits;
- Lack of NTFPs management and marketing plans;
- Lack of mainstreaming NTFPs development in forest planning and management;
- Lack of standardization and classification of many NTFPs;
- Need for training in resource assessments, cultivation, harvesting and management of NTFPs;
- Need to develop a good database system which provides adequate information about NTFPs species;
- Poor coordination among agencies involved in NTFPs management, trade, etc.
- Lack of a gender perspective and a limited understanding about roles, responsibilities, knowledge, aspirations and contributions women make to NTFPs management.

2.6. Gender dimension in the NTFPs Sector

Non-Timber Forest Products are an important source of income for rural people, especially those neighboring national parks even though harvesting NTFPs in protected areas is prohibited. In compensation to lost livelihoods, several schemes and interventions are now being undertaken to support communities surrounding protected areas. In addition to organizing cultural groups to welcome visitors, the Rwanda Development Board and other NGOs such as WCS, SNV and Care are supporting off-farm income generating activities and organization in cooperatives. NTFPs cooperatives (e.g. for beekeeping, basket weaving (mats and baskets), carving (ornaments, household tools, etc.) are supported technically and financially to improve collection, value addition and marketing of NTFPs. As a result, a number of rural communities involved in NTFPs business are increasing year by year. Women and youths are many in such endeavors. For example, women are increasingly involved in traditional dance and commerce of baskets in the cultural village initiatives around national parks.

NTFPs sector traditionally offers low returns, because of the low technical and financial entry requirements, freely available resource base and instant cash in times of need, which makes NTFPs activities attractive to rural women. But with the expansion of NTFP sector and increased commercialization of NTFPs, men also become interested in the business and because men are often middlemen, the benefit sharing is not adequate, where the big portion is allocated to traders than producers. In fact, rural areas women are not able to bargain price, with powerful men traders. In this regard, many government agencies and NGOs intervene to organize NTFPs local producers or marketing groups especially of women and help them with access to information and technological and economic resources, and chance of increasing their control over returns from the productive process. This was the case of basket weaving (Agaseke) sector, where several partners combined their efforts to support women, through their cooperatives, to improve their wellbeing. Interventions provided an opportunity for vulnerable, unemployed and landless women by supporting them to create their own employment and a sustainable livelihood thereby enabling them to redeem themselves and their families, out of extreme poverty.

These cooperative, have turned into small export oriented enterprises, with handicraft centers infrastructure, facilitation to Micro-credit access, Capacity building programme quality assurance, and linkages with overseas markets (Rwamsirabo, 2008). Those interventions enabled women to gain a more powerful position in the value chain, access to resources and to add value at the source. For example, under Agaseke Promotion Project, initiated by the Kigali City Centre, 16 cooperatives have been created among them Icyerekezo, Bahoneza, Injishi, Nozagaseke, Igicumbi, Agaseke k'Ababyeyi. With the support of Millennium Villages Project (MVP) COOVAMAYA-Imirasire was also created in Mayange-Bugesera.

The intervention of women in the main NTFPs in Rwanda (medicine plants, basket weaves, bamboo and beekeeping) has connection with the profession of their parents, because they learned from their mothers and grandmothers, carrying on a tradition that had been passed down from generation to generation. Basket weaving is traditionally a women's work, while in traditional medicine women and men are both equally involved. Bamboo and beekeeping sectors are in majority a men business.

Traditionally, beekeeping was practiced by men and is still a male dominated activity mostly carried out by elderly people (above 45 years of age), but with the organization of beekeepers in cooperatives, women, youth and even persons with physical disabilities can be interested because it is easy and an income activity with low investment (MINAGRI, 2009). In the case of bamboo, the traditional uses of bamboo give advantage to men than women, because they require more physical power. However, in the future, the Incubation Centers planned in almost all districts of the country will receive youth both men and women and equip them with adequate skills in handicraft making, and also skills in business development including areas such as quality controls, marketing, communication, entrepreneurship and gender and development (ROR, 2011a).

In general however, women are mostly involved in NTFPs marketing at the village market or roadsides close to their village. On the other hand, more men sell NTFPs at more distant district markets to take advantage of higher price and quick disposal of products owing to the higher number of buyers compared to the situation in the village market (Nahayo, 2013).

3. National strategy for the development of NTFP in Rwanda

3.1. Vision

Better utilization and sustainable development of the NTFPs sector, through an adequate and strengthened institutional and legal framework, better knowledge, sustainable management and improved processing, packaging and marketing of NTFPs. This should be achieved by involving all stakeholders in order to warrant fair access and building of human and technological capacities in the NTFPs sector of Rwanda. Based on the findings from FAO project entitled ***Enhancing the contribution of Non Wood Forest Products to food security*** in Central Africa and other projects carried out in Rwanda, the strategy should focus on the following NTFPs: Bambu, honey and honey products, mushroom, maracuja (*Passiflora edulis*), medicinal plants, prunier du japon;

3.2. Guiding principles

Building on government political and development priorities, particularly the Constitution of Rwanda, EDPRS II, Vision 2020 and related sectorial laws and policies such as the environmental law, the forest law, the land law, the national forestry policy, Rwanda biodiversity policy and the national bamboo policy as well as COMIFAC directives related to NTFPs and FAO Rwanda CPF, the following principles shall guide the implementation of the national strategy for the NTFPs in Rwanda:

- (1) **Food security and contribution to poverty reduction:** NTFPs should contribute to improving food security and livelihoods of people particularly those involved in the NTFPs sector;
- (2) **Sustainable management and development:** NTFPs resources shall be managed and developed to meet social, economic and ecological needs of the current generation without compromising similar needs of future generations. Thus relevant institutions and regulations shall be established to warrant sustainable management and development of NTFPs;
- (3) **Stakeholder involvement and partnerships:** All key stakeholders in the NTFPs sector at various levels (national, district and community) shall be involved in making decisions that are relevant and affect them including planning, implementation, monitoring and evaluation processes;
- (4) **Fair and equitable distribution of benefits from NTFPs:** there should be fair access to NTFPs and benefits accruing from NTFPs business should be fairly distributed among various actors;
- (5) **Research and development:** to the extent possible, key decisions on sustainable management and utilization of NTFPs shall be informed by appropriate knowledge emanating from research and indigenous knowledge;
- (6) **Gender and equity:** affirmative action to redress gender inequalities and disadvantaged groups shall be integrated in all NTFPs development and action plans; and
- (7) **International obligations:** all strategies and actions in the NTFPs sector shall internalize NTFPs related current and future international conventions, agreements and protocols.

3.3. Strategic Objectives

3.3.1. Global objective

The global objective of the NSAP/NTFPs is to contribute to sustainable management and development of the NTFPs sector in order to ensure their effective contribution to the national economy and the enhancement of livelihoods of all actors in the NTFPs sector.

3.3.2. Specific objectives

The NSAP/NTFPs aims at the following specific objectives:

- (1) To establish and strengthen the institutional and legal framework that can support sustainable development of the NTFPs subsector;
- (2) To promote sustainable management of NTFPs;
- (3) To improve livelihoods of people particularly those depending on NTFPs business;
- (4) To develop value chains in the NTFPs sector;
- (5) To develop and update regularly the national database on NTFPs in Rwanda;
- (6) To enhance capacities in the NTFPs sector.

3.3.3. Expected results

An effective implementation of the NSAP-NTFPs will produce the following results:

- (1) An adequate institutional and legal framework for sustainable management of the NTFPs is established and strengthened in a participatory manner;
- (2) The potential of NTFPs and their mode of production (in-situ and ex-situ), better utilization, processing and commercialization are known, assessed and developed at national level
- (3) Livelihoods of people depending on NTFPs business, especially the aspect of health and food security are enhanced;
- (4) An adequate marketing and commercialization plan is in place;
- (5) Small and medium NTFPs enterprises and industries are supported and effectively operational;
- (6) A national database on NTFPs is developed and updated regularly;
- (7) Necessary human and technological capacities for sustainable management of the NTFPs are built and strengthened.

3.4. Strategic axes

The proposed major strategic axes for the development of the NTFPs sector in Rwanda are as follows:

- Axis 1:** Establishing an adequate political, institutional and legal framework for the management and utilization of NTFPs.
- Axis 2:** Sustainable management of NTFPs resources.
- Axis 3:** Mobilization of actors in the NTFPs sector and building of human, technological and scientific capacities.
- Axis 4:** Development of better utilization, marketing and commercialization of NTFPs.
- Axis 5:** Promotion and support of small and medium NTFPs enterprises and industries to develop and modernise.

4. Action plan for the implementation of the national strategy

4.1. ACTION 1: Establishment of an adequate political, institutional and legal framework for the management and utilization of NTFPs

Priority activities earmarked for action 1 and their performance indicators and chronology are detailed in Table 6.

Table 6: Activities, performance indicators and chronology for action 1

Activities	Performance indicators	Chronology					Estimated Budget total (USD)
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	
1. Establish and operationalize a multi-actors steering committee for the development of NTFPs	NTFPs steering committee set up and functioning						50,000
2. Elaboration and approval of a national policy for NTFPs in a participatory manner	NTFPs national policy document						60,000
3. Elaboration and approval of legal documents related to access and extraction of NTFPs internalizing all related current international conventions, agreements and protocols (COMIFAC, Nagoya protocol, etc.)	Legal documents elaborated						60,000
4. Advocate for creation of a specific unit dealing with NTFPs in the RNRA/DFNC and enhance its capacity	NTFPs unit well-staffed and operational at RNRA/DFNC						40,000
5. Awareness creation at decision making level about relevance and importance of NTFPs	Number of awareness forums or meetings and attendance						100,000
Total							260,000

4.2. ACTION 2: Promotion of sustainable management of NTFPs resources

Priority activities earmarked for action 2 and their performance indicators and chronology are detailed in Table 7.

Table 7: Activities, performance indicators and chronology for action 2

Activities	Performance indicators	Chronology					Estimated Budget total (USD)
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	
1. Inventory and describe the list of priority NTFPs in Rwanda	Document describing list of priority NTFPs						20,000
2. Conduct a national inventory and mapping of major/priority NTFPs	Inventory and mapping reports						200,000
3. Establish and maintain a database of major/priority NTFPs	Database of major/priority NTFPs						150,000

Activities	Performance indicators	Chronology					Estimated Budget total (USD)
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	
4. Conduct a value chain study of Major/priority NTFPs in Rwanda	Value chain study report						150,000
5. Conduct research on multiplication and/or conservation and production ex-situ of relevant NTFPs (e.g. in vitro propagation)	Research results and publications						300,000
6. Support and promote Research & Development (R&D) of NTFPs resources (extraction/harvesting, handling/seasoning, transformation/processing, storage and packaging)	Research results and publications						250,000
Total							1,070,000

4.3. ACTION 3: Mobilization of actors in the NTFPs sector and human, technological and scientific capacity building

Priority activities earmarked for action 3 and their performance indicators and chronology are detailed in Table 8.

Table 8: Activities, performance indicators and chronology for action 3

Activities	Performance indicators	Chronology					Estimated Budget total (USD)
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	
1. Establish and implement a communication plan for the NSAP/NTFPs	Communication plan document and communication materials						20,000
2. Organize information and sensitization workshops with main actors in NTFPs sector	Number of workshops organized						80,000
3. Organize training workshops for major producers/collectors of NTFPs on relevant topics	Number of training workshops organized						100,000
4. Support organization of producers/collectors of NTFPs into cooperatives	Number of cooperatives created and functioning						40,000
5. Organise and/or support organisation of forest dependent communities (particularly "abahejwe inyuma n'amateka") into lucrative organisations	Number of functioning lucrative organisations of forest dependent communities						200,000
6. Organize exchanges workshop and visits of NTFPs actors at national, regional and international levels	Exchange workshops/visits organized						150,000
Total							590,000

4.4. ACTION 4: Development of better utilization, marketing and commercialization of NTFPs

Priority activities earmarked for action 4 and their performance indicators and chronology are detailed in Table 9.

Table 9: Activities, performance indicators and chronology for action 4

Activities	Performance indicators	Chronology					Estimated Budget total (USD)
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	
1. Carry out a socio-economic study (value chain study) on utilization, marketing and commercialization of major/ priority NTFPs at national level	Study report						80,000
2. Carry out a study on processing, packaging and storage technologies of major/priority NTFPs	Study report						50,000
3. Develop and initiate implementation of a marketing plan for commercialization of major/priority NTFPs	Marketing plan						60,000
4. Support the promotion and commercialization of NTFPs at national and international level (Advertisement, business contact facilitation, exhibition, etc.)	Promotion instruments (flyers, pamphlets, exhibitions, etc.)						50,000
5. Establish national quality standards for major/priority NTFP in collaboration with Rwanda Bureau of standards and MINICOM	Quality standards documents for major/priority NTFPs in Rwanda						40,000
Total							280,000

4.5. ACTION 5: Promotion and support of Small and Medium NTFPs enterprises and industries

Priority activities earmarked for action 5 and their performance indicators and chronology are detailed in Table 10.

Table 10: Activities, performance indicators and chronology for action 5

Activities	Performance indicators	Chronology					Estimated Budget total (USD)
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	
1. Support the organization of Small and Medium NTFPs enterprises in NTFPs business forums	Number of operational NTFPs business forums						80,000
2. Support acquisition of modern Equipment for small producers/collectors of NTFPs organized in cooperatives	Number of acquired modern equipment and impact on production of NTFPs						500,000
3. Support Small and Medium NTFPs enterprises in developing and organizing	Number of Small and Medium NTFPs enterprises supported						100,000

Activities	Performance indicators	Chronology					Estimated Budget total (USD)
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	
NTFPs value chains							
4. Facilitate linkage and partnerships at national, regional and international level in order to diversify quality products from major NTFPs	Partnerships between NTFPs enterprises established						50,000
5. Organize informal processing units in formal processing, storage and packaging units of NTFPs	Number of informal units organized in formal industrial units						50,000
Total							780,000

5. Implementation plan of the NSAP/NTFPs

5.1. Monitoring and evaluation plan

The purpose of the monitoring and evaluation plan is to enable a smooth and harmonious implementation of the NSAP/NTFPs. It aims at informing regularly decision makers and stakeholders on the progress in the execution of the NSAP/NTFPs in order to enable taking timely corrective measures and coherence towards achieving the objectives of the NSAP/NTFPs. Accordingly, as for other sectors in the Ministry, there will be annual planning to define and revise targets/milestones, budget and responsibilities of actors.

The monitoring will consist in assessing how the process of implementation of the NSAP/NTFPs and its impact on NTFPs knowledge and treatment skills, institutional and legal framework, marketing and commercialization, NTFPs industry and livelihoods of majors actors including health and food security. The M&E process will follow the existing structures and institutions in RNRA/MINIRENA such as the setting and evaluation of performance contracts. However, in addition to existing M&E institutional and structural arrangement, the establishment and operationalization of the proposed multi-actors steering committee platform (Activity 5 of Axe 1) will greatly improve the monitoring and evaluation exercise. By involving all active actors and stakeholders, the M&E would be more comprehensive which will likely lead to successful implementation of the NSAP/NTFPs.

5.2. Communication plan for the NSAP/NTFPs

The objective of a communication plan is to inform actors and other stakeholders about the NSAP/NTFPs in order to engage them in its implementation. This activity will also enable communication of achieved results and progress in the execution of the NSAP/NTFPs. The Rwanda Natural Resources Authority (RNRA)/ Department of Forestry and Nature Conservation will be responsible for the implementation of this national strategy and action plan for NTFPs in Rwanda.

The following approach is proposed in order to ensure effective communication of the content of the NSAP/NTFPs and progress in its execution:

- Validation of the NSAP/NTFPs by stakeholders;
- Submission of the NSAP/NTFPs to higher decision making bodies including MINIRENA, Cabinet and Parliament;
- Publication on MINIRENA/RNRA website;
- Printing of hard copies (200-500 copies) for distribution to various actors and stakeholders in the development of the NTFPs sector;
- Disseminate content of NSAP/NTFPs in various media including Radios, TV and Newspapers;
- Organize information and sensitization workshops throughout the country;
- Organize annual events to present achievements and progress in the implementation of the NSAP/NTFPs.

5.3. Funding mechanisms

Successful implementation of the NSAP/NTFPs is greatly dependent upon availability of funding to support execution of different planned activities. There are essentially three levels of funding that may support the implementation of the NSAP/NTFPs: Funds at National,

Regional and International levels (Table 11). In addition to ordinary annual planning of activities, the RNRA will have to prepare relevant projects that would support the implementation of the NSAP/NTFPs and submit them to national, regional and international organizations for funding.

Table 11: Funding sources for the NSAP/NTFPs

Funding level	Potential sources
National	Government (local and central)
	FONERWA
	Public-Private Partnership
	Private individuals, Companies and Cooperatives
Regional	Congo Basin Forest Fund (CBFF)
	COMIFAC
	African Forest Forum (AFF)
	NEPAD, EAC, etc.
International	United Nations Agencies e.g. FAO, UNDP, UNIDO, etc.
	Bilateral cooperation: Belgium, Netherlands, China, Germany, SIDA, JICA, USAID, DFID, etc.
	Multi-lateral funding: INBAR, EU, World Bank, ITTO, etc.

6. References

- Agustino, S., Mataya, B., Senelwa, K., and Achigan-Dako, G.E. (2011)** *Non-wood forest products and services for socio-economic development. A Compendium for Technical and Professional Forestry Education*. The African Forest Forum, Nairobi, Kenya. 219 pp.
- Ahenkan, A. and Boon, E. (2011)** *Non-Timber Forest Products (NTFPs): Clearing the Confusion in Semantics*. *J Hum Ecol*, 33(1): 1-9
- Banque Nationale du Rwanda (BNR) (2013)**, *Annual Report July 2012 - June 2013*, Kigali
- Belcher, B.M. (2003). What isn't an NTFP? *International Forestry Review* 5(2), 2003: 161-168
- Boily, Y, Van Puyvelde L. (1986)** Screening of medicinal plants of Rwanda (Central Africa) for antimicrobial activity. *J Ethnopharmacol*.16 (1):1-13. PubMed PMID: 3747558
- CGIS-NUR/PAREF NL/RNRA** (Geographic Information Systems & Remote Sensing Research and Training Center of the National University of Rwanda/Programme d'Appui à la Reforestation, Netherland component/Rwanda Natural Resources Authority), (2012). *Rwanda forest cover mapping using high resolution aerial photographs*. Final Report, MINIRENA/RNRA, Kigali.
- Chamberlain, J.L., Bush, R. and Hammett, A.L. (1998)** Non-timber forest products: The Other Forest Products. *Forest Products Journal* 48 (10): 2–12
- Chandrasekharan, C. (1995)** Terminology, definition and classification of forest products other than wood. In: *Report of the International Expert Consultation on Non-Wood Forest Products*. Yogyakarta, Indonesia. 17-27 January 1995. FAO, Non-wood forest products No. 3.
- Food and Agriculture Organisation of the United Nations (FAO) (1995)** *Non Wood Forest Products for Rural Income and Sustainable Forestry*. Rome: FAO NTFPs 7. <http://www.fao.org/docrep/x2450e/x2450e0d.htm#fao%20forestry>
- FAO (2010)** *Global Forest Resources Assessment 2010. Terms and Definitions*. Rome
- Hostettmann, K., Marston, A., Ndjoko, K. and Wolfender, J. (2000)** The Potential of African Plants as a source of Drugs. *Current Organic Chemistry* 4: 973–1010
- Ibrahim, K. (1975)** Glossary of terms used in pasture and range survey research, ecology and management. AGPC:MISC/34. FAO, Rome
- Marshall, E., Newton, A. and Schreckenber, K. (2003)** Commercialisation of Non-timber Forest Products: First Steps in Analysing the Factors Influencing Success. *International Forestry Review* 5 (2): 128–137
- MIHIGO A. (1999)**, *Collecte et analyse de données pour l'aménagement durable des forêts -Joindre les Efforts Nationaux et Internationaux*
- MINAGRI (2011)** *National Beekeeping Strategic Plan 2007-2012*, Kigali
- MINICOM (2009)** *Rwanda Handcraft Strategic Plan Five Years (2009-2013)*, Kigali
- MINICOM (2012)** *SMEs Product Clusters in Rwanda*, Kigali
- Nahayo, A., Ekise, I.E. And Niyigena, D.(2013)**, *Assessment of the contribution of Non Timber Forest Products to the improvement of local people's livelihood in Kinigi sector, Musanze District Rwanda*. In Ethiopian Journal of Environmental Studies and Management Vol. 6 No.6

- National Institute of Statistics of Rwanda (NISR), (2012).** General Population Census www.statistics.gov.rw
- Republic of Rwanda (ROR) (2004)** Politique nationale des forêts. MINITERE, Direction des forêts, Kigali, Rwanda.
- ROR, (2010)** *National Forestry Policy*. Ministry of Forestry and Mines (MINIFOM), Kigali
- ROR, (2011 a)** *National Bamboo Policy*. Ministry of Forestry and Mines (MINIFOM), Kigali
- ROR, (2011 b)** *Rwanda Biodiversity Policy*. REMA, Ministry of Lands and Environment (MINELA), Kigali
- ROR (2013)** Law determining the management and utilization of forests in Rwanda. N°47bis/2013 of 28/06/2013. *Official Gazette n° 37 of 16/09/2013*
- Ros-Tonen, M.A.F., Wiersum, K. F. (2005)** The scope of improving rural livelihoods through Non-Timber Forest Products: An evolving research agenda. *Forests, Trees and Livelihoods*, 15(2):129-148.
- Rwamasirabo, E. (2008),** *Women empowerment in Rwanda: Agaseke project (Peace Basket project)*, Tokyo.
- Shanley, P., Pierce, A., and Laird, S. (2005).** Beyond timber: certification of non-timber forest products. *Forest Trends/People and Plants International*. CIFOR.
- Shiva, M.P, Verma, S.K. (2002)** *Approaches to Sustainable Forest Management and Biodiversity Conservation: With Pivotal Role of Non-timber Forest Products*. Centre for Minor Forest Products, Dehra Dun.
- SNV/IFAD (2009)** Developing Sustainable Beekeeping Activities in Rwanda, the National Program Framework Document by the Beekeeping Taskforce – Rwanda, Kigali
- UNEP/REMA (2011)** *Atlas of Rwanda's changing Environment. Implications for Climate Change Resilience*. Progress Press co ltd. UNEP/UNDP/UN Rwanda, Kigali
FAO, 1996
- Van Rijsoort, J. (2000)** *Non-timber forest products. Their role in sustainable forest management in the tropics*. Theme Studies Series 1 Forests, Forestry and Biological Diversity Support Group. National Reference Centre for Nature Management. International Agricultural Centre (IAC), Wageningen
- Wong, J.L.G., (2000).** *The biometrics of Non-Timber Forest Product resource assessment: A review of current methodology*. Report commissioned under the ZF0077 pre-project of the Forest Research Programme of the United Kingdom Department for International Development. www.etfrn.org/etfrn/workshop/ntfp/download.html.

7. Annexes

7.1. List of some relevant actors in the NTFPs Sector

N°	Name of Actor	Type of actor	Types of NTFPs	Role in value chain	Location
1	MINICOM	Government Agency	All NTFPs	Policy, regulation, capacity building: Commercialisation	Kigali
2	MINIRENA	Government Agency	All NTFPs	Policy and regulation, capacity building: Production	Kigali
3	MINAGRI	Government Agency	All NTFPs	Policy and regulation, capacity building: Production	Kigali
4	MINISANTE	Government Agency	Medicinal Plants	Policy and regulation, capacity building: service providers	Kigali
5	RDB	Government Agency	All NTFPs	Capacity building: production, marketing, trade	Kigali
6	NAEB	Government Agency	All NTFPs	Capacity Building: export	Kigali
7	RCA	Government Agency	All NTFPs	Capacity building of cooperatives, regulation	Kigali
8	RBS	Government Agency	All NTFPs	Capacity building: Quality control and certification	Kigali
9	PSF	Government Agency	All NTFPs	Capacity building	Kigali
10	RNRA	Government Agency	All NTFPs	Capacity building, regulation	Kigali
11	RAB	Government Agency	All NTFPs	Research and development, capacity building	Kigali
12	IRST	Government Agency	All NTFPs	Research and development, capacity building	Huye
13	REMA	Government Agency	All NTFPs	Policy and regulation, capacity building: production	Kigali
14	ARDI	Local NGO	Honey	Capacity building	Kigali
15	ADAR	Local NGO	Honey	Capacity building	Kigali

N°	Name of Actor	Type of actor	Types of NTFPs	Role in value chain	Location
16	WCS	International NGO	Honey	Capacity building	Kigali
17	SNV	International NGO	Honey	Capacity building	Kigali
18	TMEA	International NGO	Honey	Capacity building	Kigali
20	SERUKA	Local NGO	Honey	Capacity building	Kigali
21	ADEPE	Local NGO	Honey	Capacity building	Rubavu
22	REDO	Local NGO	Honey	Capacity building	Kigali
23	CESAPI	Local NGO	Honey	Establishment of Honey Collection Centres	Kigali
24	FERWACAPI	Farmers' network	Honey	Capacity building	Kigali
25	UNICOAPIGI	Farmers' cooperative union	Honey	Production, semi-processing and trade	Rubavu
26	COOPANYA	Farmers' cooperative union	Honey	Production, collection, semi processing, marketing and trade	Nyamasheke
27	COPAGARU	Farmers' cooperative union	Honey	Production, collection, semi processing, marketing and trade	Rusizi
28	KOPAKI	Farmers' cooperative union	Honey	Production, collection, semi processing, marketing and trade	Kirehe
29	CAR	Farmers' cooperative union	Honey	Production, collection, semi processing, marketing and trade	Gicumbi
30	UNICOPAV	Farmers' cooperative union	Honey	Production, collection, semi processing, marketing and trade	Burera
31	TWIYEGERANYE	Farmers' cooperative union	Honey	Production, collection, semi processing, marketing and trade	Muhanga
32	DUFATANYE	Farmers' cooperative union	Honey	Production, collection, semi processing, marketing and trade	Rulindo

N°	Name of Actor	Type of actor	Types of NTFPs	Role in value chain	Location
33	COOPABARU	Farmers' cooperative union	Honey	Production, collection, semi processing, marketing and trade	Ruhango
34	Ubwiza bwa Nyungwe	Cooperatives Union	Honey	Production, collection, processing, marketing and trade	Nyamagabe
35	Nyinawimana Catholic Parsh	Religious	Honey	Production, collection, processing, marketing and trade	Gicumbi
36	Rulindo Catholic Church	Religious	Honey	Production, collection, processing, marketing and trade	Rulindo
37	MIG	Private company/Investors group	Honey	Production, collection, processing, marketing and trade	Nyamagabe
38	ABDC	Private company	Honey	Production, collection, processing, marketing and trade	Kigali
39	BIO-HAP Ltd	Private company	Honey	Production, collection, processing, marketing and trade	Kigali
40	ATIC Ltd	Private company	Honey	Production, collection, processing, marketing and trade	Kigali
41	Nakumat Supermarket	Private company	Honey	Honey sales: retailers	Kigali
42	Simba Supermarket	Private company	Honey	Honey sales: retailers	Kigali
43	INBAR	International organization	Bamboo	Capacity building	Beijing
44	ADARWA	Local NGO	Bamboo	Capacity building	Kigali
45	ARECO	Local NGO	Bamboo	Capacity building	Kigali
46	CJEPENYA	Local NGO	Bamboo	Capacity building	Kigali

N°	Name of Actor	Type of actor	Types of NTFPs	Role in value chain	Location
47	China Bamboo Project	Government	Bamboo	Capacity building	Kigali
48	WCS	International NGO	Bamboo	Capacity building	Kigali
49	KIAKA	Private company	Bamboo, handcraft, export	Production, collection, processing, marketing and trade	Rubavu
50	Rwanda Bamboo Society	Private company	Bamboo	Production, collection, processing, marketing and trade	Kigali
51	MUGACY COMPANY	Private company	Bamboo	Production, processing, marketing and trade	Kigali
52	Modis International	Local NGO	Handcraft	Capacity Building	Kigali
53	AVEGA Agahozo	Local NGO	Handcraft	Capacity Building,	Kigali
54	COPARWA	Artisans federation	Handcraft	Collection, trade, capacity building	
55	COPABU	Artisans federation	Handcraft	Collection, trade, capacity building	Huye
56	FECAU	Artisans federation	Handcraft	Collection, trade, capacity building	Nyagatare
57	COPAK	Artisans federation	Handcraft	Collection, trade, capacity building	
58	FECOMEGI	Artisans federation	Handcraft	Collection, trade, capacity building	Rubavu
59	CAPLAKI	Artisans federation	Handcraft	Collection, trade, capacity building	Kigali
60	UCOVANGO	Artisans federation	Basket Weaving	Collection, trade, capacity building	Ngororero
61	UCOVARU	Artisans federation	Basket Weaving	Collection, trade, capacity building	Rutsiro
62	Gahaya Links	Private company	Handcraft	Capacity Building, export	Kigali
63	Rwanda Art	Private company	Handcraft	Collection, trade, Export	Kigali
64	Rwanda Heritage	Private company	Handcraft	Collection, trade, Export	Kigali
65	African Heritage	Private company	Handcraft	Collection, trade, Export	Kigali
66	Africana Art	Private company	Handcraft	Collection, trade,	Kigali

N°	Name of Actor	Type of actor	Types of NTFPs	Role in value chain	Location
	Rwanda			Export	
67	Agaseke Promotion project	Private company	Handcraft	Collection, trade, Export	Kigali
68	APROHADE	Private company	Handcraft	Collection, trade, Export	Kigali
69	Art mix Media	Private company	Handcraft	Collection, trade, Export	Kigali
70	ASAR	Private company	Handcraft	Collection, trade, Export	Kigali
71	Aux Beaux Arts	Private company	Handcraft	Collection, trade, Export	Huye
72	AGA-Rwanda Network	National Federation of Traditional healers	Traditional medicine	Capacity building	Kigali
73	COPEPEC	Cooperative	Mushroom	Production, marketing, trade	Musanze
74	Jyambere Munyarwanda	Cooperative	Mushroom	Inputs supply, production	Kigali
75	JUNCOA Project	Government project	Mushroom	Inputs supply, production	Kigali
76	IMBARAGA	Local NGO	Agriculture/Mushroom	Capacity Building	Kigali
77	UCODP	Farmer's Cooperative Union	Mushroom	Production, marketing, trade, Capacity Building	Kigali
78	Care International	International NGO	Mushroom	Capacity Building	Kigali
79	IMBARAGA	Local NGO	Agriculture/Mushroom	Capacity Building	Kigali
80	UCODP	Farmer's Cooperative Union	Mushroom	Production, marketing, trade, Capacity Building	Kigali

7.2. List of some indigenous medicinal plants for human medicine identified in Rwanda

Scientific Name	Family	Vernacular Name	Origin
1. <i>Rhamnus prinoides</i>	Rhamnaceae	Umunanira	NF
2. <i>Phytolacca dodecandra</i>	Phytolaccaceae	Umuko	S
3. <i>Erythrina abyssinica</i>	Fabaceae	Umuko	S
4. <i>Euphorbia candelabrum</i>	Euphorbiaceae	Umuduha	S
5. <i>Senecio manii</i>	Asteraceae	Umutagara	OF

Scientific Name	Family	Vernacular Name	Origin
6. <i>Macaranga mildbraediana</i>	Euphorbiaceae	Umusekera	NF
7. <i>Vernonia amygdalina</i>	Asteraceae	Umubilizi	S
8. <i>Maesa lanceolata</i>	Myrsinaceae	Umuhanga	NF
9. <i>Solanum incanum</i>	Solanaceae	Umucucu	S
10. <i>Ricinus communis</i>	Euphorbiaceae	Ikibonobono	A
11. <i>Vernonia auriculifera</i>	Asteraceae	Isagara	NF
12. <i>Jaundea piñata</i>	Connaraceae	Intamwa	-
13. <i>Hibiscus fuscus</i>	Malvaceae	Umutozo	S
14. <i>Clerodendrum buchhorzii</i>	Verbenaceae	Umukuzanyana	S
15. <i>Clerodendrum myrcoides</i>	Verbenaceae	Umukuzanyana	S
16. <i>Apodytes dimidiata</i>	Ilaciniaceae	Umusibya	S
17. <i>Solanum terminale</i>	Solanaceae	Umuhanurankuba	S
18. <i>Plectranthus longipes</i>	Lamiaceae	Icyegera	S
19. <i>Mytragyna rubrostipulosa</i>	Rubiaceae	Umuzibaziba	S
20. <i>Rhus vulgaris</i>	Anacardiaceae	Umumara	S
21. <i>Dracaena steudneri</i>	Agavaceae	Umuhati	A
22. <i>Rubia cordifolia</i>	Rubiaceae	Umukarara	NF
23. <i>Dracaena afromontana</i>	Agavaceae	Umuhati	A
24. <i>Polycias fulva</i>	Araliaceae	Umwungo	NF
25. <i>Chrysophyllum</i>	Sapotaceae	Umubombwe	NF
26. <i>Acanthus pubescens</i>	Acanthaceae	Igitovu	Sa
27. <i>Clausena anisata</i>	Rutaceae	Umuno	NF
28. <i>Clutia abyssinica</i>	Euphorbiaceae	Umutalishonga	NF
29. <i>Vernonia thompsoniana</i>	Asteraceae	Umukurazo	NF
30. <i>Vernonia lasiopus</i>	Asteraceae	Igiheriheri	NF
31. <i>Rumex usambarensis</i>	Polygonaceae	Umufumbegeshi	-
32. <i>Myrica kindtiana</i>	Myricaceae	Isubyo	S
33. <i>Acacia abyssinica</i>	Mimosaceae	Umunyinya	S
34. <i>Pennisetum purpureum</i>	Poaceae	Urubingo	OF
35. <i>Ficus thoningii</i>	Moraceae	Umuvumu	OF
36. <i>Crotalaria incana</i>	Fabaceae	Umuyogera	S
37. <i>Crotalaria intermida</i>	Fabaceae	Umuyogera	S
38. <i>Eucalyptus sp.</i>	Myrtaceae	Inturusu	P
39. <i>Psidium guajava</i>	Myrtaceae	Ipera	OF

Scientific Name	Family	Vernacular Name	Origin
40. <i>Lantana trifolia</i>	Verbenaceae	Umuhengeri	S
41. <i>Tetradenia riparia</i>	Lamiaceae	Umuravumba	OF
42. <i>Entada abyssinica</i>	Mimosaceae	Umusange	S
43. <i>Ocimum suave</i>	Lamiaceae	Umwanya	S
44. <i>Acacia brevispica</i>	Mimosaceae	Umugeyo	S
45. <i>Indigofera arecta</i>	Fabaceae	Umusororo	-
46. <i>Cassia didymobotrya</i>	Cesalpiniaceae	Umubagabaga	S
47. <i>Maesopsis eminii</i>	Rhamnaceae	Umuhumura	NF
48. <i>Fadogia ancylata</i>	Rubiaceae	Umutanoga	S
49. <i>Cassia occidentalis</i>	Cesalpiniaceae	Umuyoka	S
50. <i>Harungana madagascariensis</i>	Clusiaceae	Umushayishayi	NF
51. <i>Markhamia lutea</i>	Bignoniaceae	Umusave	S
52. <i>Ocimum americanum</i>	Lamiaceae	Isonga	-
53. <i>Coleus sp.</i>	Lamiaceae	Igicunshu	S
54. <i>Psorospermum febrifugum</i>	Clusiaceae	Ishangi	-
55. <i>Protea madiensis</i>	Proteaceae	Igihungeri	S
56. <i>Olea europa sp. Africana</i>	Oleaceae	Umunzenze	S
57. <i>Synadenium grantii</i>	Euphorbiaceae	Umukoni	S
58. <i>Aloe volkensii</i>	Liliaceae	Igikakarubamba	S
59. <i>Solanum abyssinicum</i>	Solanaceae	Umutobotobo	S

NF: Natural Forest, S: Savannah, O: others (outside forest), P: plantations

Source: Mbarubukeye et Niang (1996)

7.3. List of some indigenous medicinal plants for Veterinary Medicine

Scientific Name	Family	Vernacular name	Origin
1. <i>Phytolacca dodecandra</i>	Phytolacaceae	Umuko	S
2. <i>Erythrina abyssinica</i>	Fabaceae	Umuko	S
3. <i>Senecio manii</i>	Asteraceae	Umutagara	O
4. <i>Erythrococca bogensis</i>	Euphorbiaceae	Umutinski	S
5. <i>Maesa lanceolata</i>	Myrsinaceae	Umuhanga	NF
6. <i>Solanum incanum</i>	Solanaceae	Umucucu	S
7. <i>Ricinus communis</i>	Euphorbiaceae	Ikibonobono	O
8. <i>Senecio petitianus</i>	Asteraceae	Icyegera	S
9. <i>Dracaena steudneri</i>	Agavaceae	Umuhati	O
10. <i>Clerodendrum johnstonii</i>	Verbenaceae	Ikinyakurwe	NF
11. <i>Clerodendrum myrcoides</i>	Verbenaceae	Umukuzanyana	S
12. <i>Sesbania sesban</i>	Fabaceae	Umunyegenyeye	O

Scientific Name	Family	Vernacular name	Origin
13. <i>Cinchona ladgeriana</i>	Rubiaceae	Ikinini	P
14. <i>Dracaena afromontana</i>	Agavaceae	Umuhati	O
15. <i>Acacia abyssinica</i>	Mimosaceae	Umugenge	S
16. <i>Acacia hockii</i>	Mimosaceae	Umunyinya	S
17. <i>Acanthus pubescens</i>	Acanthaceae	Igitovu	S
18. <i>Clusia abyssinica</i>	Euphorbiaceae	Umutarishonga	NF
19. <i>Milletia dura</i>	Fabaceae	Umuyogoro	NF
20. <i>Vernonia.kirungae</i>	Asteraceae	Ikamambogo	NF
21. <i>Vernonia pogosperma</i>	Asteraceae	Ivumavuma	S
22. <i>Tetradenia riparia</i>	Lamiaceae	Umuravumba	O
23. <i>Entada abyssinica</i>	Mimosaceae	Umusange	S
24. <i>Indigofera arecta</i>	Fabaceae	Umusororo	S

NF= Natural forest, S= savanna, P= plantations, O= others (outside of forest)

Source: Mbarubukeye et Niang (1996)