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Improving the Supply Chain of Non-Timber Forest Products in Ghana

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1. Introduction

Traditionally, NTFPs play an important role worldwide. In many areas, animal and plant resources derived from forests remain central to **subsistence and local economies**. The FAO estimated that (80%) of the population of the "developing" world use NTFPs to meet some of their health and nutritional needs (FAO, 1997). The importance of NTFPs in supporting livelihood of forest dependent communities has been widely promoted due to the recognition that NTFPs can contribute to improve the livelihoods of forest dependent communities (Belcher et al., 2005; Clendon, 2001; FAO, 2006; Marshall et al 2005; Ros-Tonen & Wiersum, 2005); household food security and nutrition (Clark & Sunderland, 2004; FAO, 1995; Shackleton & Shackleton, 2004); generate additional employment and income (Marshall et al., 2003; Peters, 1996; Ros-tonen; 1999); and offer opportunities for NTFP-based enterprises (Shackleton & Shackleton, 2004; Subedi, 2006). Moreover, NTFPs are more accessible to the poor (Saxena 2003); contribute to foreign exchange earnings (Andel, 2000; Shiva & Verma, 2002); and support biodiversity and other conservation objectives (FAO, 1995, Marshall et al., 2005; Arnold and Ruiz Pérez, 2001; Charlie and Sheona, 2004).

Furthermore, NTFPs can be harvested with relatively little impact on the forest environment (FAO, 2008; Myers 1988; Neumann & Hirsch, 2000). The importance of NTFPs goes beyond meeting **basic needs**. NTFPs are also rapidly growing at the international market. A recent FAO study suggests that at least 150 NTFPs are of major significance in **international trade** (FAO 1995, Shiva & Verma, 2002), including medicinal plants, mushrooms, snails, essential oils, tannin extracts, gums, nuts, rattans and bamboo. The total value in world trade in NTFP is estimated at approximately US\$ 11 billion (Ndoye & Ruiz Perez, 1998; Shiva & Verma, 2002), and the **market has grown by nearly 20% annually over the last several years** (Hammet, 1999). Future development of NTFPs offers a potential for increasing income, **expanding opportunities**, and **diversifying enterprises in rural areas**.

Plant products		Animals and animal products	
Categories	Description	Categories	Description
Food	Vegetal foodstuff and beverages provided by fruits, nuts, seeds, roots	Living animals	Mainly vertebrates such as mammals, birds, reptiles
Fodder	Animal and bee fodder provided by leaves, fruits etc.	Honey, beeswax	Products provided by bees.
Medicines	Medicinal plants (e.g. leaves, bark, roots) used in traditional medicine and/or by pharmaceutical companies	Bushmeat	Meat provided by vertebrates, mainly mammals
Perfumes and cosmetics	Aromatic plants providing essential (volatile) oils and other products used for cosmetic purposes	Other edible animal products	Mainly edible invertebrates such as insects (e.g. caterpillars), crabs and other "secondary" products of animals (e.g. eggs)
Dying and tanning	Plant material (mainly bark and leaves) providing tannins and other plant parts (especially leaves and fruits) used as colorants	Hides, skins	Hide and skin of animals used for various purposes
Utensils, handicrafts	Heterogeneous group of products including thatch, bamboo, rattan, wrapping leaves, fibres (e.g. Arouma, Bwa Flo, Silk cotton floss, Screw pine)	Medicine	Entire animals or parts of animals such as various organs used for medicinal purposes (e.g. caterpillars, crab legs, snake)
Construction materials	thatch, bamboo, fibres,		
Ornamentals	Entire plants (e.g. orchids, ferns, philodendron) and parts of the plants (e.g. pots made from roots) used for ornamental purposes	Colorants	Entire animals or parts of animals such as various organs used as colorants
Exudates	Substances such as gums (water soluble), resins (water insoluble) and latex (milky or clear juice), released from plants by exudation	Other nonedible animal products	e.g. bones used as tools

Adapted from FAO, 1995; Shiva & Verma, 2002

Table 1. Classification of Non Timber Forest Products

In Ghana, thousands of people across the country produce and market a diverse range of NTFPs on daily basis in the local, regional and international markets (Ahenkan & Boon, 2010). Despite the enormous potential of NTFPs to support rural livelihoods, the NTFPs supply chain has received very little attention from the scientific community. Several constraints hinder an effective management of the NTFPs supply chain for optimizing income generation and improvement of rural livelihoods. The information base of NTFPs in Ghana is still poor because research on them is relatively new and has received very little formal study. There is a serious lack of basic statistical information on their volumes, trade, income and nutritional values. The low representation of NTFPs in policy-making is due to the inadequate statistical information on NTFPs. NTFPs have not been accorded adequate attention in development planning and in nutrition improvement programmes in the country. Existing information sources are dispersed and no standardized system for compiling data on NTFPs is in place.

In today's global market, an effective management of the entire supply chain of NTFPs has become a key factor for their successful commercialization. The NTFPs supply chain is typically comprises a range of actors involved in the production of the products at the farm level to the final consumer. It is a network of producers, gatherers, collectors, retailers, distributors, transporters, suppliers and sellers that participate in the delivery and sale of the products to the final consumer at the local, regional, national and international level. Improving the supply chain of NTFPs has become very important in the efforts of most developing countries trying to enhance the economic empowerment of the rural poor. This chapter seeks to examine the NTFPs supply chain activities, actors and the key challenges of supply chain management.

1.1 Definition and classification of NTFPs

NTFPs are "biological resources of plant and animal origin, harvested from natural forests, manmade plantations, wooded land, farmlands, trees outside forests and or domesticated" (FAO, 1999; Peters, 1996; Marshall et al., 2005; Wong, 2000). NTFPs include fruits and berries, nuts, spices, medicinal plants, oils, gums, resins, honey, mushrooms, weaving and dyeing materials, aromatics, and recreation (FAO, 1995; Thomas & Schumann, 1993; Shiva & Verma, 2002). These products such as these are vital sources of income, nutrition and sustenance for many forest-based communities around the world. A globally applicable **standard classification system** for NTFPs does not exist (Shiva & Verma, 2002). However, NTFPs can be classified in many different ways: according to end use (medicine, food, drink, etc), by the part used (roots, leaves, barks, etc); or in accordance with major **international classification systems** such as the Harmonized Community Description and Coding System developed under the auspices of the Customs Cooperation Council (Shiva & Verma, 2002). For the purpose of this research, NTFPs are classified according to their end uses as indicated in Table 1.

2. Importance of NTFPs in Ghanaian economy

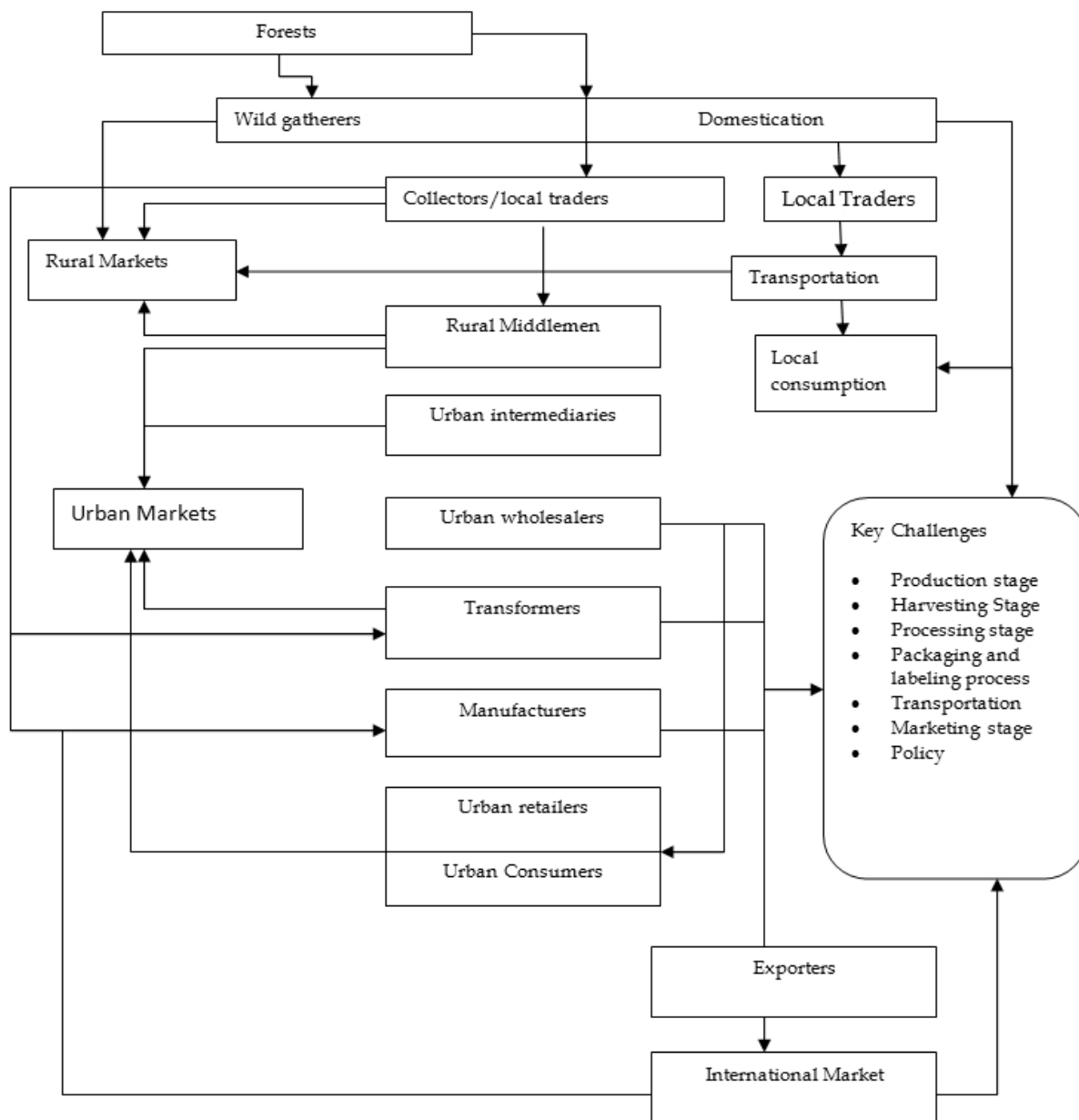
NTFPs play an important role in the Ghanaian economy by way of supporting rural livelihoods. They contribute significantly to the income and food security of many rural

households in Ghana (Ahenkan & Boon, 2008; Falconer, 1992; FAO, 2001). Aggregate employment generation in forest product activities in Ghana is estimated to be growing at 6.9 percent per year (Townson, 1995). These products contribute significantly to household food security, nutrition, health, and income, especially during the lean seasons (Ahenkan & Boon, 2008). A considerable amount of food and medicinal plants are gathered from the forest. It is estimated that 20 percent of the economically active population derive income from NTFPs and 38% of the household in Ghana trade in NTFPs (Townson, 1995). In a similar study covering households in villages around the large market centre of Kumasi, Falconer (1994) found that 68% of the households surveyed were involved in supplying NTFPs to the market. Among persons generating some income from forest products activities in households surveyed in southern Ghana, 72% identified this income to be important either in absolute terms, or in meeting particular needs, or because of its timing (Townson, 1995). NTFPs are also used by people in Ghana to cure various diseases (Abbiw, 1990; Ahenkan & Boon, 2008). Rural people particularly depend very much on traditional medicinal sources for their health. Falconer (1994) and Abbiw (1990) have tabulated different medicinal plants and animal products used to cure various diseases in Ghana. Trade and use of plant products have assumed a wider dimension with more plant medicinal products being traded in the local markets.

2.1 The conceptual framework of NTFPs supply chain in Ghana

The conceptual framework on which this chapter is anchored is that supply chain management can help to boost the production of NTFPs and improve rural livelihoods through commercialization. NTFPs commercialization is defined as a process of increasing the value of these products in trade so as to improve income and employment opportunities. The principal premise of this chapter is that the success of NTFPs commercialization is dependent on an effective management of the supply chain challenges.

As is illustrated in Figure 1, NTFPs commercialization involves a complex process that involves farming or wild harvesting, processing, packaging, labeling, transportation and marketing of the products to final consumers. The marketing channels for NTFPs are diverse and in some cases, complex (Marshall et al., 2003). A clear understanding of the commodity chain for specific NTFPs is important if we are to understand where interventions to benefit harvesters would be most successful and productive. The relationship between NTFP producers and the markets they supply range from direct sale to consumers to a complex network of middlemen and retailers. Many hundreds of millions of people across the developing world trade in a diverse range of NTFPs everyday and which are marketed primarily in local and regional markets (Scherr et al. 2004). Building materials, fuelwood, charcoal, indigenous foodstuffs, medicines, craft items (from wood, grass, reeds, and vines), farm and household implements, furniture, and other more specialised products such as resins, honey, oils and alcoholic beverages are examples of just some of the products that may be found for sale in the vast majority of rural markets and in nearby towns and cities. Many of these markets are growing through both the entry of new products and growth in existing trade.



Source: Adopted from Ahenkan and Boon, 2010; IUCN, 2008

Fig. 1. The Supply Chain of NTFPs

3. Materials and methods

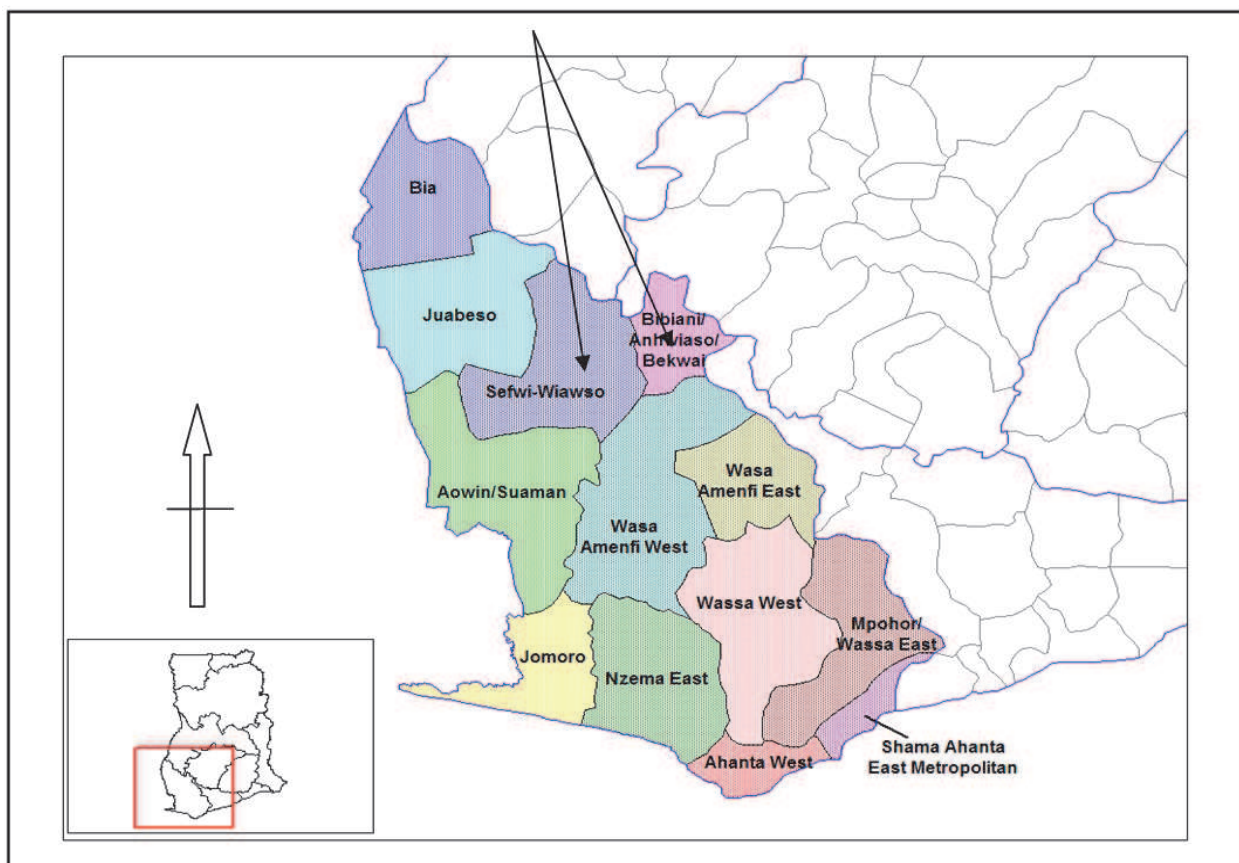
3.1 Study area

The Bibiani-Bekwai and Sefwi Wiawso Districts are located in the Western Region of Ghana. They fall within the moist semi-deciduous forest zone of Ghana, which covers most of Ashanti, Western, Brong Ahafo and Eastern regions. The two districts were selected for the study because they constitute a major area for NTFPs in Ghana and have common ecological, social, and economic characteristics that indicate high forest dependence. Figure 2 is a map of Ghana showing the Western Region and the study locations.

3.2 Data collection

The study was designed as an exploratory and qualitative research because little organised information of NTFPs exist in Ghana. Bibiani-Bekwai and Sefwi Wiawso Districts in the Western Region of Ghana were the study areas. These two districts were selected because they constitute a major area for NTFPs in Ghana and have common natural, social, and economic characteristics that indicate high forest dependence. Previous studies on NTFPs in other part of the world (Belcher, 2003; Greene et al., 2000; Hammett and Chamberlain, 1999; Marshall et al., 2005; te Velde et al., 2004) which used exploratory and qualitative designs provided the inspiration for modeling this study. A field survey was conducted between May 2010 to July 2010 and in March 2011. The survey aimed at understanding the supply chain of NTFPs in Ghana, the existing marketing system and the key challenges.

The data was purposively collected through interviews and administration of questionnaires to 200 actors in the NTFPs chain, including producers, collectors and sellers of NTFPs from 10 communities in the two districts. Non-probability sampling method was also utilised: snowball, where market actors were found as a reference from other respondents. A market survey covering two markets over a period of 6 months was also carried out to collect data about the types of NTFPs marketed, the local and seasonal variations in product prices and supply. The market survey also provided data to fill the gaps in the household survey.



Source: http://en.wikipedia.org/wiki/File:Western_Ghana_districts.png

Fig. 2. Map of Ghana Showing the Western Region and the Study Area

In addition, a stakeholder workshop was organized which brought together 50 participants including traders, agricultural extension officers and NTFPs farmers/collectors from the 10 selected communities. The workshop identified main production, processing, marketing and policy challenges facing NTFPs actors. Participant observation comprising of visitation to NTFPs farms of 50 respondents, market centres and traders during the survey period. The aim was to experience the production, harvesting, processing and marketing of NTFPs and also verify and identify various NTFPs that farmers collect, consume or trade in. The observations and visitations helped to verify and identify various NTFPs that farmers collect, consume or trade in. The data collected through administration of questionnaires, interviews and stakeholder consultations were analysed both quantitatively and qualitatively using statistical methods. The quantitative analysis was done using the Statistical Package for Social Sciences (SPSS version 17) and the results analyzed and presented in the form of descriptive statistics.

4. Results and discussion

4.1 NTFPs supply chain activities and challenges in Ghana

NTFPs supply chain activities involve a network of activities ranging from production to consumption. A number of critical factors continue to constrain the ability of NTFP producers/collectors to exploit the full potential of commercialization of NTFPs in Ghana. The survey identified a number of factors that hinder effective management of the supply chain of NTFPs during the production, harvesting, processing, packaging and marketing stages. Generally, NTFPs are produced and harvested for both subsistence and commercial use under a broad range of regimes, ranging from strictly wild harvested, semi-domesticated and more intensively managed systems in the study locations. The study reveals that most of the NTFPs are picked freely from the forest during the season they blossom. This is obviously unsustainable since the extraction of NTFPs from natural forests has limited potential. Consequently, sustainable production and supply of NTFPs has been threatened due to inappropriate harvesting practices. In some cases, collectors cut plants that are too young or too close to ground and this inhibits re-sprouting. This over-exploitation is also due to the high demand for NTFPs. Some medicinal plants have progressively become depleted and extinct because their harvesting exceeds annual production. During the focus group discussions it was revealed that most communities in the two districts are losing access to these valued NTFPs either because of over-exploitation and habitat destruction. Three main strategies have been employed to militate against shortfalls in supply of NTFPs in most of the communities surveyed: travel further to find the products, substituting a particular product with a similar one or develop a more intensive or cultivated sources of supply.

As a result of the recognition that the extraction of NTFPs from natural forests has limited potential for improving household income and nutrition, or cannot be harvested indefinitely without proper management practices and domestication to sustain their yield, most of the farmers (54%) have started domesticating some of these products of forest origin, including honey, mushrooms, snails, grass-cutters, medicinal and aromatic plants and fruits. Key challenges identified during the production and harvesting stages include high cost of production, inadequate supply of inputs and harvesting accessories. In an in-depth with the District Directorate of Agriculture in the Sefwi Wiawso District, he noted that *"any strategy towards promoting and improving NTFPs farming in the district must tackle the issue of high costs*

of production". The cost of procuring production equipment or construction of NTFPs domestication structures and inputs for activities such as beekeeping, grass-cutters and snails is very high.

4.2 Processing skills and storage facilities

Another important challenge facing the supply chain of NTFPs in Ghana is the lack of processing and packaging skills. The NTFPs enterprise has not received the kind of support given to agriculture and forestry sectors in Ghana. Producers remain largely neglected by national and local government development strategies. Though a potential international market exists, producers cannot exploit it because of their inability of farmers to package NTFPs to meet domestic and international standards. Most of the farmers lack the necessary skills in processing, packaging and labeling the products. Over 90 % of the producers sell products either in their raw form without adding value. A significant proportion of the respondents (67.5%) cited lack of processing skills, equipment and financial assistance the most important constraints hindering the supply chain of NTFPs in the districts. The lack of processing and storage facilities is a major constraint hindering the sustainable management of NTFPs supply chain in Ghana. Most products like mushrooms get spoilt within a few days after harvesting. The deplorable state of the feeder road network in the country, particularly the roads linking agricultural communities to market centres affect the marketing of NTFPs in Ghana. Absence of local food processing and storage facilities also affects the marketing of NTFPs also affects the marketing of the products both locally and internationally.

4.3 NTFPs Labeling and certification challenges

The impropere Labeling and certification of NTFPs are major challenges to the NTFPs supply chain in Ghana. Compliance with quality standards is one in the marketing of NTFPs in Ghana. While discussions on NTFPs labeling and certification have increased recently, the applicability and its impact as a tool to promote the development of NTFPs remains unclear. Certification is defined by the International Organization for Standardization (ISO, 1996) as a procedure by which written assurance is given that a product, process or service is in conformity with certain standards. Standards for labeling of NTFPs in Ghana are not well developed and are not well developed. This is hindering the promotion of NTFPs in the country. Although, the quality aspects of food products are taken care of by Drugs Board, unfortunately most of the producers are not organized due to their locations. They are isolated and sell these products locally to individual customers without meeting the required international standards. Although there is potential for the international market for some NTFPs in Ghana, farmers have very limited capacity in meeting international standards. Lack of standardization is an important constraint of NTFPs supply chain in Ghana. Moreover, the quantities of products produced are insufficient and fail to meet international market standards. Eighty (80%) of the respondents surveyed have no idea about packaging and labeling requirements of NTFPs. Trade in certified NTFPs is still marginal compared to the trade of non-certified products. Major challenges of NTFPs labeling and certification in Ghana include lack of market demand, high costs of certification system, insufficient product definition and classification system since many NTFPs are not included in international classification or standardization systems.

4.4 Marketing of NTFPs in Ghana

According to Marshall et al. (2005), the most constraining processes of NTFP commercialization are marketing and sales which are also major bottlenecks for many NTFPs farmers in rural Ghana. Thousands of people, especially women, are involved in the collection and marketing of NTFPs in Ghana and for many, it provides the main source of income (Falconer, 1994). It involves a great number of people selling a vast array of products, including mushroom, snails, bushmeat, honey, leaves, medicinal plants, food wrapping leaves, and chewing sticks etc. The NTFPs market in the study locations is also highly characterized by seasonality and differs in social structures. Gender plays an important role in the marketing of NTFPs. The NTFPs trade is dominated by women. However, the sale of some wild food products grass-cutters and other plant products (rattans, bamboo, hides and skins) and other wild animal products are dominated by men. The key actors in the NTFPs market consist of various levels of local collectors, village traders, road-head traders and large traders in the districts.

The results indicate that there is a strong market for NTFPs, especially in urban centres, and there are no signs of any decline. Most NTFPs traders rely on district and urban markets while others bypass markets altogether and sell their products directly to local restaurants and consumers in the district capitals. In most cases, the prosperity of a market depends on good access and the proximity of passing traffic. Most NTFPs traders, especially women, besiege approaching vehicles at the checking points along high ways to sell their products. The commonly exploited and traded NTFPs in the study locations are presented in Table 2.

Foods	Medicine	Household goods
Bush meat	Barks	Baskets
Fruits	Leaves	Mats
Honey	Fruits	Wooden trays
Mushrooms	Animal products	Grinders
Snails	Prepared tonics	Mortars
Spices	Hides	Pestles
cola nuts	Seed	Spoons
Gums	Roots	Chewing sticks
Essential oils	Essential oils	Dyes

Field Survey, 2010

Table 2. Commonly Traded NTFPs in Ghana

Although NTFPs trade is done in both local and urban markets, they have different characteristics and therefore the real benefits of the trade at the local level are unknown. The study shows that NTFPs marketing in the study area often occurs in an informal way, resulting in uncertainty about prices and income effect. Marketing is basically done individually; it is unorganized, dispersed and producers lack the necessary marketing skills and information required for optimal performance. As noted by Ndoye (1998), the process of price setting for NTFPs between the NTFPs farmer (the seller) and the trader (the buyer) involves bargaining to reach an equilibrium price somewhere between the lowest price the seller is willing to accept and the highest price the buyer is willing to pay. The bargaining power of the sellers and buyers is influenced by different factors depending on whether the

sellers have brought the NTFPs to the market or at the farm gate. The price received by the collector/producers depends on the length of the chain, location, quality and means of transportation. For NTFPs sold in the communities, the bargaining power of farmers depends on the number of traders coming to the village to buy the product, the accessibility of the village, the supply of NTFPs, the degree of perishability of NTFPs, and the level of market information available to farmers. Producers who are closer to urban markets get higher price than those not closer to the urban markets.

In addition, the lack of market information and difficulty in getting contact with final consumers are identified as some of the major challenges facing the NTFPs supply chain. Fifty-five percent (55%) of the respondents cited lack of attractive product presentation as the most important constraint of the NTFPs supply chain at the marketing stage. This is followed by inadequate access to market information (34%). Eleven percent (11%) mentioned lack of contact with final consumers as an important factor the commercialization of NTFPs. Lack of access to relevant and up-to-date marketing information is a major cause of the low pricing of NTFPs in the district. Inadequate market information, contacts and knowledge consistently constrain NTFPs producers, processors and traders from advancing the NTFPs value chain. Because producers and collectors find it difficult to sell their products directly to final consumers due to their geographical locations, middlemen take advantage and exploit the them. The NTFPs market is also constrained by inaccessible road networks, limited local buying power, poor access to markets centres and high transportation costs.

4.5 Lack of clear policy to promoting NTFPs

The legal and regulatory framework for the development of NTFPs in Ghana has received little attention. The forest policies still categorise NTFPs as "minor" forest products, resulting in less emphasis on these products than timber within forest management programmes and policies. The lack of a definite policy on NTFPs has impacted negatively on their promotion, development and their supply chain management. The forest policies have consistently been dictated by the economic priorities of the successive governments for exploitation of timber resources for foreign exchange generation. Ghana's forestry policies have failed to acknowledge the importance of NTFPs and the creation of an enabling environment for their promotion and development.

5. Strategies for Improving the Supply Chain of NTFPs in Ghana

A number of recommendations are provided in this section to policy-makers and development agents to help to boost the development and management of NTFPs supply chain in Ghana.

5.1 Improving harvesting, processing and marketing skills

The harvesting, processing and marketing of NTFPs remain major institutional problems in Ghana. NTFPs harvesters use unsustainable harvesting methods. Building the capacity of farmers and collectors in efficient harvesting and processing skills will significantly help to improve the supply chain of NTFPs in Ghana. It is important that processing facilities are provided to promote the commercialisation of these products on a permanent so as to create

more sustainable employment and income-generation opportunities, enhance food security and improve the livelihoods of producers, their families and communities. In order to add more value to NTFPs in Ghana, government also needs to facilitate the establishment of local food processing companies to process NTFPs. Farmers should be assisted to procure NTFP processing equipment such as honey extractors.

In addition, the government needs to improve the feeder road network in the country, particularly the roads linking agricultural communities to market centres. The Ministry of Food and Agriculture (MoFA) should facilitate the dissemination of agricultural marketing information to NTFPs producers. General improvements in marketing transport and Communication infrastructure go a long way to facilitate the commercialization of NTFPs of the products. The sale of NTFPs should be well organized by encouraging farmers to form associations so as to enhance their bargaining power. Increasing access to market information can be achieved through information dissemination, empowerment of collectors and establishment of linkages between collectors and traders. The Ministry of Food and Agriculture (MOFA) in particular should facilitate the dissemination of agricultural marketing information to farmers and also encourage farmers and collectors to form farmer-based organisations and foster linkages between farmers and traders.

5.2 Encourage domestication of NTFPs

The domestication of NTFPs should be promoted as an integral part of strategies aimed at halting the depletion of forest products. Sustainable harvesting of NTFPs relies on the ability to reconcile ecosystem productivity with human exploitation. NTFPs cannot be harvested indefinitely without proper measures to sustain their yield and availability. It is therefore important that the government introduces strategies to encourage farmers to domesticate NTFPs to redress shortfalls in supply. This will help to reduce pressure on forest resources and enhance the livelihoods of forest communities. Domestication of the products will significantly enhance forest-based livelihoods and help to optimize NTFPs production.

5.3 Provision of credit to NTFPs farmers

Inadequate finance to start up NTFPs farming has been identified as one of the most critical economic challenge facing farmers. The management of farm credit services commercial banks in the country is very complicated and cumbersome. Most farmers rely heavily on commercial banks credits facilities but their rigid character is not friendly to the requirement of farmers of the small-scale farmers. Most of the poor NTFPs farmers also have no collateral to secure credits from the banks. This has limited access by farmers to credit to finance their farming activities. Government should introduce measures to strengthen the rural and agricultural development banks and make them to provide low interest loans to farmers to enable them expand their NTFPs farms.

5.4 Prevention of deforestation

Widespread deforestation in the study locations and Ghana in general has led to ecological deterioration, particularly in marginal ecological zones which harbour NTFPs. This is due to reckless farming practices, hunting, bush fires, illegal logging, and unsustainable methods

of gathering NTFPs. The continuous depletion of these forest resources point to their eminent loss in the long-term. If efforts are not made to redress the situation, the consequences on the forest and the livelihood of the population will be enormous. Measures must be put in place to halt the perennial bushfires in the country. NTFP farming especially beekeeping provides an incentive to farmers to prevent the outbreak of bush fires. It is also an incentive for farmers to engage in agro-forestry and afforestation projects. It is therefore important that the government capitalises on the opportunity offered by NTFPs farming to sensitise the rural population to actively engage in this activity as a means of redressing poverty and protecting the environment.

5.5 NTFPs construction materials

Any effective strategy towards the promotion of NTFPs must address critically the continuous diminishing of wood products for the construction of NTFPs structures. Wood for the construction of NTFPs farming structures is becoming very scarce and expensive due to indiscriminate logging over the years. Consequently, prospective farmers find it extremely difficult to afford wood products for the construction of bee hives, snails, mushrooms and grass-cutter rearing structures.

5.6 Effective promotion of NTFPs

An effective promotion of NTFPs constitutes an essential mechanism for popularizing NTFPs. Awareness creation on the nutritional, medicinal, and environmental benefits of NTFPs by the Ministries of Agriculture, Health and Environment can significantly help to promote the farming of NTFPs in Ghana. Also, the potential contribution of NTFPs to poverty reduction has to be adequately promoted. Sustainable promotion and development of these products will significantly provide an important opportunity for food security, nutrition and poverty reduction, particularly for the economically marginalised and forest-dependent communities in Ghana.

5.7 Encourage research on NTFPs

There is the need for the government to encourage and facilitate collaboration with and within research institutions in order to document useful NTFPs and their utilization. The identification, evaluation and sustainable utilization of NTFPs requires detailed information on the natural resource system where they originate; biological and chemical properties; geographical distribution; potential uses and values; harvesting and processing methods; the market situation. This can only be possible when research on NTFPs is promoted.

5.8 NTFPs policy

Clear and visible NTFPs policy and management mechanisms are required to catalyze the development and promotion of NTFPs in Ghana. The forestry policy should be founded on carefully organized research on forest products. A clear policy on the development and domestication of NTFPs will help to ensure sustainable harvesting of the products, reduce pressure on forest resources and enhance the livelihoods of forest communities. Table 3 summaries the principal challenges facing the supply chain of NTFPs in Ghana and strategies recommended for their redress and mitigation.

No	Key Challenges	Current Situation and Opportunities	Recommended Strategies
1	Lack of a clear policy to guide the use, management and development of NTFPs	The Ghana Poverty Reduction Strategy Paper (GPRSP). Increasing potential of NTFPs in poverty reduction	Effective promotion of NTFPs farming as a core element of the country's forestry policy-making process and national poverty reduction strategy
2	Inadequate research on NTFPs in Ghana	The surge in global interest in NTFPs	Government should encourage and facilitate collaboration with and within research institutions in order to document useful NTFPs
3	Over harvesting and deforestation	Domestication potentials More farmers ready to engage in the domestication	NTFPs domestication should be promoted as an integral part of strategies aimed at halting the depletion of forest resources.
4	Inadequate finance for NTFPs farmers	The establishment of agricultural development and rural banks in Ghana	NTFPs farmers should be given access to credit facilities to enable them engage in the production of these products Government to encourage agricultural development and rural banks to provide low interest loans to farmers
5	Poor NTFPs harvesting and processing skills	Potential for international market for some products exists	Building the capacity of farmers and collectors in efficient harvesting and processing of NTFPs Establishment of local food processing companies to process and can NTFPs
6	Lack of packaging and labelling skills	Opportunity for international market Growing influence of green economy principles and practices	Build the capacity of farmers in packaging and labeling of their products. Development of standards for labeling and certification of NTFPs in Ghana
7	In adequate marketing information	High demand for NTFPs in Ghana Opportunity for penetrating the international market with NTFPs	Ministry of Food and Agriculture to facilitate the dissemination of agricultural marketing information to farmers. Government should improve marketing, transport and communications infrastructure Empowerment of farmers and collectors to form farmer-based organisations and foster linkages between farmers and traders

8	Lack of inputs and farm construction materials	A number of NGOs are already involved in promoting NTFPs in the country	New and more innovative and sustainable materials should be developed for this purpose. MOFA should set up demonstration farms in rural communities to serve as centres of excellence for educating and training farmers
9	Inadequate awareness creation on the nutritional and health values of NTFPs	The increasing potential of NTFPs in nutrition and health improvement and poverty reduction strategies	Awareness creation of the nutritional, medicinal, and environmental benefits of NTFPs by the Ministries of Agriculture, Health and Environment will significantly help to promote the farming of NTFPs in Ghana

Table 3. Challenges of NTFPs Supply Chain

6. Conclusion

The importance of supporting the livelihoods of forest dependent communities has been widely promoted. The NTFPs supply chain is a sequence of processes involved in the production of these products at the farm level to the final consumer. An effective management of the entire supply chain is a key factor for a successful commercialization of NTFPs in the global market. This will enable most developing countries to empower the rural poor. This chapter examined the various stages of NTFPs supply chain in Ghana, the actors involved in the chain and its key challenges. The study revealed that the supply chain of NTFPs in Ghana faces a number of critical challenges from the production to the marketing stage. The chapter identified number of strategies for improving the management of NTFPs supply chain in Ghana. These include processing and marketing skills, promoting the domestication of NTFPs, provision of credit to NTFPs farmers, prevention of deforestation, effective promotion of NTFPs, up-scaling research on NTFPs and development of NTFPs policy to guide the production, harvesting, domestication and marketing of the products. Improving the management of NTFPs supply chain in the country will enormously help to boost employment and income-generation opportunities, enhance food security and improve the livelihoods of farmers, their families, and communities. To promote the development of NTFPs in Ghana requires that government and development stakeholders effectively treat NTFPs supply chain as core element of the country's development policy-making process and as an integral part of the national development agenda.

7. Acknowledgement

Our heartfelt gratitude goes to the Vlaamse Interuniversitaire Raad (VLIR) for the financial support that made this study possible. Our sincere thanks go to the Non-timber forest products (NTFPs) farmers, collectors, processors and marketers in the Bibiani-Bekwai and Sefwi Wiawso Districts for their generous participation in the field survey. We also wish to express our heartfelt appreciation to the management and the entire staff of the International Centre for Enterprise and Sustainable (ICED), Accra for their support and their enormous contribution towards the completion of this paper.

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Supply Chain Management - New Perspectives

Edited by Prof. Sanda Renko

ISBN 978-953-307-633-1

Hard cover, 770 pages

Publisher InTech

Published online 29, August, 2011

Published in print edition August, 2011

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How to reference

In order to correctly reference this scholarly work, feel free to copy and paste the following:

Albert Ahenkan and Emmanuel Boon (2011). Improving the Supply Chain of Non-Timber Forest Products in Ghana, Supply Chain Management - New Perspectives, Prof. Sanda Renko (Ed.), ISBN: 978-953-307-633-1, InTech, Available from: <http://www.intechopen.com/books/supply-chain-management-new-perspectives/improving-the-supply-chain-of-non-timber-forest-products-in-ghana>

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