CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Forestry and Wood Sciences

DIPLOMA THESIS ASSIGNMENT

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Forest Engineering

Thesis title

Benefits and potential of non-timber forest products and ecosystem services

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Objectives of thesis

The thesis explores the untapped benefits/uses of the forest other than timber for their socioeconomic purposes in the lives of rural communities in Africa. The thesis also analyses case studies of the use of non-timber forest products (NTFP) in Europe and their applicability to Ghana.

Methodology

The thesis would, in addition, bring to bare several questions associated with NTFP, and with the aid of several case studies around the world recommend solutions to them.

The questions that would be addressed include the following:

What are the major commercially harvested NTFP in Ghana?

What is the importance of NTFP to rural folks?

What other uses can be derived from the forest out of the conventional ones?

How can governmental and non-governmental organizations support initiatives related to NTFP?

Are there any export markets available for such products?

Can certification and regulation contribute to sustainable NTFP harvesting and increasing local income?

The proposed extent of the thesis

60 pages

Keywords

Non-timber forest products, marketing, Ghana

Recommended information sources

Davenport, N.A., Shackleton, C.M., Gambiza, J., The direct use value of municipal commonage goods and services to urban households in the Eastern Cape, South Africa. Land Use Policy 29 (2012), 548– 557.

Glück, P., Policy means for ensuring the full value of forests to society. Land Use Policy 17 (2000), 177-185.

Illukpiya P and Yanagida JF. Farming vs. forests: Trade-off between agriculture and the extraction of non-timber forest products. Ecological Economics, 2010, 69: 1952-1963.

Peenella, D., Secco, L., Maso, D. NWFP&S Marketing: Lessons Learned and New Development Paths from Case Studies in Some European Countries. Small-scale Forestry 6 (2007), 373-390.

Secco, L., Vidale, E., Peenella, D. Comparing profitability and governance for recreational wild mushroom picking in forest and timber production. Presentation. IUFRO International Symposium, Paris, May 26-30, 2010.

Expected date of thesis defense

2017/18 SS – FFWS

The Diploma Thesis

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Declaration

I hereby declare that I have done this thesis entitled ***"Benefits and potential of non-timber forest products and ecosystem services"*** independently, all texts in this thesis are original, and all the sources have been quoted and acknowledged by means of complete references and according to Citation rules of the FTA.

In Prague dated

20th April, 2018

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Emmanuel Acquaye Kumi

ABSTRACT

NTFPs have been part of man's life since the beginning of his existence on earth. Most people living in rural areas have been obtaining food, medicines, fuel and several other items from the forest. Some parts of the world have advanced in their knowledge and use of these NTFPs but in contrast to this, most parts of Africa are yet to harness the full potential of these NTFPs for their own benefits. The research focuses on showing how well we can tap the full benefits of NTFPs to improve our livelihoods. The collection and marketing of Non-timber Forest Products (NTFPs) in Ghana are being promoted as a potential solution to the current high rates of malnutrition, the poor health of the rural population and the spread and intensification of poverty. Despite the high potential of NTFPs changing the lives of especially rural folk in Ghana, little knowledge is currently available about their proper way of cultivation, collection, processing, packaging, labelling, and storage and marketing. A proper knowledge about the benefits of NTFPs would go a long way to help us in our health and socioeconomic needs to mention but a few.

The thesis seeks to explore the untapped benefits/uses of the forest other than timber for their socioeconomic purposes in the lives of especially rural communities in Africa.

DEDICATION

This thesis is dedicated to my family in Ghana especially my Uncle Dan Acquaye whose impact in my life cannot be overemphasized, and also to all my friends and loved ones.

ACKNOWLEDGEMENT

I would like to acknowledge ASNAPP Ghana for their immense contribution to me in writing this thesis. I would like to also acknowledge RNDr. Marcel Riedl, CSc of Czech University of Life Sciences whose dedication and contribution to me on the preparation of this thesis has been overwhelming.

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SUMMARY

Non-timber forest products (NTFPs), are increasingly becoming products of great concern globally for the reason being that, they somewhat have the capacity to improve the lives of rural communities. This thesis with the topic BENEFITS AND POTENTIAL OF NON-TIMBER FOREST PRODUCTS AND ECOSYSTEM SERVICES has therefore been able to shed some light on the importance and usefulness of NTFPs and how we could help maintain a sustainable forest ecosystem. The objectives included but not limited to their importance, uses, harvesting, local and export market availability an also regulations needed in the industry.

In addition, there were elaborate discussions on the challenges, opportunities, value addition, supply chain and the various actors involved in the supply chain right from their point of collection to their point of final sale. Subsequently there were critical analysis of some special cases studies from some European countries who have been successful in developing the NTFPs market and how they are benefiting from their sustainable use of the forest ecosystem.

Consequently, the thesis has provided several recommendations intended to address the numerous challenges the industry faces. In conclusion, it is obvious from critical examination the several case studies and researches by several authors in the area of NTFPs and the forest ecosystem, that, a sustainable use of the forest and its services would go a long to support the livelihoods of rural folks in our current dispensation and the future.

CHAPTER ONE

INTRODUCTION

FAO (2005), defines Non-wood Forest Products (NWFP) as being “goods of biological origin other than wood derived from forests, other wooded land and trees outside forests”. Different terms like secondary, minor or non-timber forest products (NTFP) are also being used by governments, institutions and academicians. In Ghana these other wooded lands include savannah and any other natural vegetation types.

Since NTFPs have a vital role to play in the lives of people especially the rural folks, a judicious use of these products would ensure a sustainable supply of them for people’s needs. This thesis, therefore, seeks to bring to light several issues associated with NTFPs starting right from their point of harvest or collection through their subsistence and commercial use, point of sale, their role in forest conservation and how to ensure that their full potentials are tapped in a rather sustainable manner particularly in the case of Ghana, a typical tropical country.

CHAPTER TWO

HYPOTHESIS AND OBJECTIVE

Non Timber Forest Products (NTFPs) are a vital part of several households in most rural communities or even better still communities close to forested areas. They might serve as a sources of both direct and indirect income to several households. Direct income as in the case of collectors directly selling their products to customers or indirectly but consuming these products themselves and thereby saving monies which otherwise would have been used to purchase such goods on the market. Ghana as a developing nation has several rural communities whose dependence on the forest for NTFPs cannot be over emphasized. Such communities may depend on the forest for food, medication, energy and income amongst other.

The forest is interwoven into our sociocultural life such that we depend on the forest more or less on a daily basis for some provisions. Drums and other musical instruments that are used one various occasions are made from products from the forests mainly wood and skins and hides of animals.

Figure 1: Fontomfrom drum, from Ghana (mainly played during grand durbars)

Source: https://www.gettyimages.com

Moreover, most household items are made out of products harvested from the forest. Example of such products are chewing sticks, baskets, ladles, spoons, brooms, mats, stools (used in the homes and those used by chiefs in the palaces) and pestles and mortars. There are even festivals like ‘Aboakyere’ celebrated in Winneba whereby one of the two ‘Asafo’ factions is expected to be the first to hunt and bring back home a live deer with the bare hands. Mostly in the northern part of the country, skins and hides of wild animals are used as sitting mats in some palaces. In the area of arts, pieces of arts are carved of materials collected from the forest. All these go a long way to indicate how important the forest is to our livelihoods as a people.

Figure 2: Ghanaian Pentatonix Xylophone

Source: https://www.soundtravels.co.uk

Figure 3: Colorful Hand woven baskets made form tassels of grasses

Source: https://www.timeout.com

Figure 4: Wooden stools, usually made for Chiefs.

Source: http://souvenirchronicles.blogspot.cz

Figure 5: Mortar and pestle

Source: http://www.giskaa.com

Figure 6: A captured live deer in celebration of Aboakyere festival

Source: http://www.pilotguides.com/articles/aboakyer-deer-hunting-festival/

The ***objectives*** that this thesis is seeking to address include the following:

- Identify the importance of NTFPs to rural folks
- How harvesting of NTFPs improve the economic needs of rural communities
- Identify whether their harvesting have a militating effect on the forest
- Identify the major commercially harvested NTFPs in Africa esp. Ghana
- Identify governmental and non-governmental organizations support initiatives related to NTFPs
- Assess the availability of export markets for such products
- Identify whether there are any dangers related with their over-exploitation
- Identify other uses than can be derived from the forest other than the conventional ones available
- Assess how certification and regulation can contribute to sustainable NTFP harvesting and increased local income

The purpose of this thesis is to as much as possible shed enough light on all issues concerning NTFPs and also provide enough basic information to governmental and non-governmental organizations whose works directly or indirectly affect the forest and for that matter rural folks.

The thesis would in addition, bring to bare several questions associated with NTFPs and with the aid of several case studies around the world recommend solutions to them.

CHAPTER THREE
LITERATURE REVIEW

Definitions and classifications of NTFPs

Neumann and Hirsch, 2000, defined non-timber forest products as “all the biological materials (other than industrial round wood and derived sawn timber, wood chips, wood based panels and pulp) that may be extracted from natural ecosystems, managed by plantations and utilized within the household, marketed, or have social, cultural or religious significance” There is a large variety of products included in the term ‘NTFP’. There are different products of relevance in different parts of the world, for instance the most prominent NTFPs in China are those of medicinal value. In the Czech Republic, mushrooms and berries are part of the most harvested products from the forest.

According to Kleinnn et al. 2006, for most of the NTFPs not much is known about the product line (commodity/supply chain), i.e. from the harvest in the forest up to the end user. Detailed knowledge about transport channels, value addition, distribution of benefits, final uses etc. will enable the resource planners to improve NTFP management and harvest and identify improved and/or alternative market channels (including organic and fair-trade certification).

Jones and Irene 2010, stated that, forests and woodlands have played a critical role in the survival of human populations. They have been direct providers of shelter and food for people and their livestock, and of water, medicinal plants, building materials and fuel. Sunderlin et al. 2004, cited a positive outlook regards NTFPs as a safety net. They are a source of emergency sustenance in times of hardship, i.e., when crops fail, when economic crisis hits, in times of conflict or war, or when floods wash away homes. But forests and woodlands also regulate our environment indirectly by slowing soil erosion, controlling run-off of rainwater and storing it, and regulating its release into our rivers and lakes.FAO, 1995. Indicated that, NTFPs include fruits and berries, nuts, spices, medicinal

plants, oils, gums, resins, honey, mushrooms, weaving and dying materials, aromatics, and recreation. Below is a table that show the various classifications of NTFPs available.

Table 1: classification of NTFPs

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*	Bush-meat	*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*
		Other edible products	*Mushrooms, snails*

SOURCE: Adapted from FAO, 1995; Shiva & Verma, 2002 Classification of Non Timber Forest Products

The conceptual framework of NTFPs supply chain in Ghana

One other important aspect in the NTFP industry is how they are collected and transferred from the point of collection to the final consumer which may range from small house holds to large industries. The route is a complex of processes that include collecting from the wild/ farm, processing, packaging, labelling, transportation and marketing of the product to the final consumer as seen in Table 3 below. Moreover it's also important to consider the various actors, their functions and challenges they face at each stage of the supply

chain as well as the opportunities that are available for them to take advantage of. The implementation of a good supply chain system would go a long way to help manage and boost the production of these products in order to improve livelihoods through their commercialization. Commercializing NTFPs as described by Ahenkan and Boon- Field Survey, 2010, is a process of increasing the value of these products in trade so as to improve income and employment opportunities. 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. Scherr et al. 2004, specified that, many hundreds of millions of people across the developing world trade in a diverse range of NTFPs every day and which are marketed primarily in local and regional markets. Below is table that shows several stages of their supply chain.

Table 2: Supply Chain Considerations

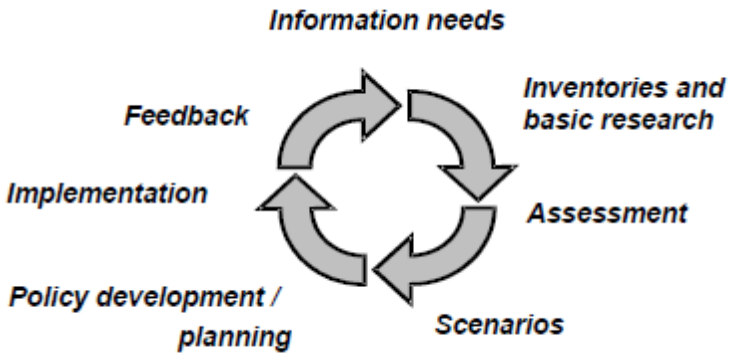
ACTORS	CHARACTERISTICS AND	MAIN CHALLENGES	OPPORTUNITIES
COLLECTORS	• Collect plant parts in small volumes and sell to sub agents and agents. • They are price takers and have minimum bargaining powers.	• Lack technical know- how • Lack input such as harvesting aids, drying mats. • They lack means of transport such as bicycles or motors.	• Establishment of plantation of NTFPs due to conducive agro-climatic conditions • Markets exists for some of the NTFPs found
PRIMARY AGENTS/BUYERS	• They serve as the first point of sale for the collectors. • Live within the same village with collectors • Operate with minimum funds	• Lack market information; • Lack technical know-how on postharvest handling; • lack business management skills • They are frustrated for lack of	• They can be developed as key buyers for the communities. • Businesses can be built around them to reduce the length of the supply chain

SECONDARY AGENTS/BUYERS	• These are the central buyers of the commodities. • They pre-finance the sub agents and link the primary buyers, wholesalers, processors & exporters. • Often reside in the main towns and cities are financed mostly by	• Lack business management skills, technical know-how regarding postharvest handling • They have difficulty in ensuring efficient monitoring and timely supply of goods by the primary buyers. • Their greatest challenge is	• Can be supported, trained and develop to become commodity traders
WHOLESALERS	• They are mostly found at the Kumasi Central Market • They pre-finance and buyer produce in large volumes from the secondary buyers.	• Poor warehousing conditions • Inability to adhere to recommended standards • Market fluctuations for some of the commodities • Seasonality of supply • Inability to get enough supply of some of the produce • High commodity prices sometimes making them uncompetitive	• Expand markets with the supply of high quality produce
PROCESSORS	• Few women were engaged in the processing of Ricinodendron nuts	• Lack the scientific skills for processing, taking over 6weeks to remove kernel from nuts • Lack basic equipment	• There is more demand for the produce • There were several wholesalers and exporters close to the
EXPORTERS	• They finance the secondary buyers • Export large volumes to neighboring countries	• Loss of funds through non-compliance to terms of agreement • Supply of poor quality goods • Erratic supply of goods • Disputes with secondary buyers • Lack of standards and certification • Lack of training on business skills	• Can expand markets with consistent supply of quality produce

Source: ASNAPP 2013, Non-Timber Forest Products: An Ethnobotanical Survey and Value Chain Study

Kleinnn et al. 2006, ascertained, that the large variety of NTFPs and their different characteristics and uses opens up a wide field of research covering various disciplines from natural to social sciences. Figure 1 below describes the cycle which depicts the flow of information in the industry.

Figure 7. Illustration of the process of policy formulation for the sustainable management of the natural renewable resource “forest”.



Source: Kleinnn et al. 2006, Sino-German Symposium 2006- The Sustainable Harvest of Non-Timber Forest Products in China citing FAO 2001

Akoto et al. 2017, Despite the enormous potential of NTFPs to support rural livelihoods, the NTFPs supply chain has received very little attention from the scientific community. Effectively managing the NTFPs supply chain resulting in optimizing the income generating potential and improvement in the livelihood of rural communities is confronted with a lot of constraints. There has been limited research in this sector and as such there is inadequate (*statistical*) information available involving their volumes, trade, income and nutritional values. A study conducted by ASNAPP (2007) in 56 communities in Ghana for example, shows that individual collectors in rural communities receive between $1,200 and $2,400 per season from the sale of NTFPs. This is a clear indication that a better and proper understanding of this industry would go a long way to provide some form of economic benefits to individuals and/or groups found in the supply chain.

As stated in the introductory part of this thesis, Ghana is well endowed with several natural resources including the forest and as such NTFPs which cannot be left out. In most parts of Africa, Ghana inclusive, there are numerous NTFPs that can be identified such as bush pepper, bitter cola, country spice, bush cherry, bush yam, bush peanut, walnut, bitter root, calpocalyx, dura palm, shea nut, mushrooms, building materials. However their collection, processing, packaging, value addition and subsequently their transportation is very critical and as such need more consideration. The table below shows the major NTFPs harvested in Ghana according to their use.

Table 3: Most common commercial NTFPs

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

Source: Ahenkan and Boon- Field Survey, 2010, Improving the Supply Chain of Non-Timber Forest Products in Ghana

It is important to note, that these products or natural renewable resources are available for man's use and as such their full potentials need to be tapped for our benefit. The line needs to be drawn between overly exploiting the forest and the sustainable harvesting of

its products. As such, a judicious means of harvesting of these products should be encouraged. However it has been emphasized in FAO's State of the World's Forests (2003): "*if benefits are to be provided on a sustainable basis to local communities and to countries at large, more effective controls may be required to maintain populations of NTFPs at productive levels. The means to accomplish this will vary, but they must be built on sound economic and ecological principles, and often on traditional institutions*".

CHAPTER FOUR

APPROACH AND METHODOLOGY

The approach and methodology is a very vital aspect of every research, by way of it providing the grounds for collecting data and assessing them and in return drawing conclusions to hypothesis that have been made. Consequently, to ascertain the importance of NTFPs in the livelihoods of rural communities in Ghana and for that matter Africa, there is the need to collate the necessary information from several sources and other publications from different authors. At the end, the information gathered would provide the foundation to make a sound judgment, make recommendations and draw conclusions on the usefulness of NTFPs.

Information was gathered from several sources such as research and publications of numerous authors whose information is based directly on their interactions with stakeholders in the industry including, farmers, rural folks, consumers, suppliers and buyers in the NTFPs, with regards to their harvesting, processing, packaging, transport, storage and sale in Ghana and beyond. The areas of concentration were mostly in the rainforest areas basically the Brong Ahafo, Ashanti, Eastern and Western regions of Ghana.

There was also a direct consultation with an NGO Agribusiness in Sustainable Natural African Plant Products (ASNAPP) (by way of phone calls and emails) in Ghana whose activities include purchasing and exportation of plant products and capacity building of rural dwellers.

Moreover, it is obvious that some European countries serve as pacesetters in the area of NTFPs and it was therefore necessary that some of these countries were used as case studies to provide information and knowledge for other countries to emulate. Cases studies from Europe would help to compare and contrast activities pertaining to Europe to that which prevails in Ghana.

The countries used as case studies were, the Czech Republic, Finland, Switzerland, Sweden, United Kingdom, Scotland and Serbia.

Results from the various case studies have provided the basis for recommendations to policy makers in the case of Ghana specifically, and the numerous actors found in the supply chain of these products as well as others whose activities directly or indirectly affect the forest and as such its dependents. Moreover these studies helped to make recommendations to the scientific community, people in academia, governmental and non-governmental organizations as to how helpful they their activities could help with maintaining a sustainable forest ecosystem.

CHAPTER FIVE

CASE STUDIES

The case of Czech Republic (CR)

According to the result of an investigation conducted by Sisak 2009, it was proven that NWFP collection is important for the inhabitants of the Czech Republic and as such the importance lies in the material value of picked commodities which on the average year level is higher than 3,000 mil. CZK, which is a high value compared to the average year value of timber production sold in the market, which reaches 19,000 mil. CZK. The value is in fact even higher as only several collected commodities were incorporated into respective investigations (mushrooms and five major berries) as seen in Tab. 4 below. The value is further enhanced by collecting of such commodities that still have not been embraced in a reliable way into investigations like medicinal plants and ornamental plants. These products attain the character of externalities of a mediated market nature. Their harvest and social significance is surprisingly high in the CR. So, the socio-economic value of such service was experimentally derived by ascertained amounts of main NWFP collected and by shadow market prices – values (current prices) of the main NWFP collected by forest visitors as indicated by Šišák et al. 2017. Tab. 5, below also presents estimation (in economic terms) of the value of six products that are of great importance to the people of CR for the year 2016. Such estimated economic benefits could help boost the economies of several developing countries if they would pay much attention to such products.

Table 4: Amount of collected NWFP in CR (mil. CZK in current prices) in 1994 – 2016

Year	Mush-rooms	Bil-berries	Rasp-berries	Black-berries	Cow-berries	Elder-berries	Total
1994	1 314	881	180	161	22	140	2 698
1995	1 658	1 164	248	169	43	137	3 419
1996	1 082	456	173	129	42	113	1 995
1997	1 510	585	202	96	72	95	2 560
1998	1 578	727	260	138	51	118	2 872
1999	1 880	973	197	144	105	149	3 448
2000	2 087	628	290	218	66	72	3 361
2001	2 298	710	294	176	65	93	3 636
2002	1 922	821	261	162	89	111	3 366
2003	1 399	562	218	170	36	80	2 465
2004	1 420	538	198	138	194	102	2 590
2005	2 048	670	246	125	85	101	3 275
2006	2 677	849	257	130	103	103	4 119
2007	3 415	967	245	185	78	139	5 029
2008	1 968	430	106	63	71	57	2 695
2009	2 056	725	99	91	64	111	3 146
2010	2 950	920	215	187	35	63	4 317
2011	4 313	921	208	234	142	177	5 995
2012	5 241	762	422	382	45	222	7 074

2013	5 388	1 484	329	182	69	209	7 661
2014	4 295	848	252	179	83	195	5 851
2015	3 523	1 227	419	344	111	268	5 890
2016	3 589	851	237	219	64	101	5 060
Average	2 592	813	242	175	75	129	4 023

Source: Šišák et al. 2017, Report on the Experience with Long-term Data Collection for Investigations of Non-wood Forest Products Socio-Economic Importance in the Czech Republic.

From the table above, there is a clear indication that NTFPs play an important role in the economy of CR and as such its importance cannot be over emphasized. This indicates that developing countries with forests as part of their natural resources can earn a lot from these forests if a critical attention is given to the NTFPs

.

Table 5: Amount of collected NWFP in CR (mil. CZK, mil. Euro) in 2016

Products	**mil. CZK**	**mil. euro**
Mushrooms	3,589	133
Bilberries	851	31.5
Raspberries	237	8.8
Blackberries	219	8.1
Cowberries	64	2.4

Elderberries	101	3.7
Total	5,061	187.5

Source: Šišák et al. 2017, Report on the Experience with Long-term Data Collection for Investigations of Non-wood Forest Products Socio-Economic Importance in the Czech Republic.

The case of Finland

S. Olmos in 2008, stated that, in many parts of the Finland, picking NTFPs for sale is very important and as such since 1977, annual records have been kept on income from wild berries and mushrooms as well as garden berries bought by organized trade and enterprises. There are large annual variations in the value of berries sold. In most years, the value of wild berries has been greater than that of garden berries. Cloudberry is Finland's most valuable wild berry, and in recent years its price has been 40 markkaa (Fmk) per kilogram (Fmk 1 = US$0.17). This "orange of the north" has for centuries been an important source of vitamin C for the inhabitants and helped to keep them free of scurvy.

TABLE 6: Incomes from picking wild berries, edible mushrooms and garden berries and percentages of total, Finland, 1977-1996

Year	**Wild berries**		**Edible mushrooms**		**Garden berries**		**Total**
	(*1 000 Fmk*)[1]	(*%*)	(*1 000 Fmk*)	(*%*)	(*1 000 Fmk*)	(*%*)	(*1 000 Fmk*)
1977	72 295	87	719	1	10 233	12	83 247
1978	45 805	76	2 593	4	12 313	20	60 771
1979	50 071	72	1 720	3	17 332	25	69 123
1980	57 755	76	1 915	3	15 983	21	75 653

1981	35 277	51	3955	6	29 391	43	68 623
1982	53 235	50	2 454	2	51 711	48	107 400
1983	89 447	60	3 811	3	55 163	37	148 421
1984	31 601	36	3 340	4	53 813	60	88 754
1985	54 907	42	8 588	7	65 236	51	128 731
1986	44 669	41	4 396	4	60 058	55	109 123
1987	41 982	47	6 504	7	40 606	46	89 092
1988	85 304	62	11 646	8	41 140	30	138 090
1989	56 786	51	3 727	3	50 357	46	110 870
1990	52 073	48	6 801	6	48 965	46	107 839
1991	73 554	60	10 266	8	39 462	32	123 282
1992	45 667	49	6 001	7	41 242	44	92 909
1993	27 220	39	3 086	4	39 157	57	69 463
1994	136 276	80	5 919	4	26 780	16	168 975
1995	58 725	70	4 253	5	20 640	25	83 618
1996	52 158	63	4 090	5	25 960	32	82 209

Source: Santiago Olmos 1998. Non-wood forest products: utilization and income generation in the Czech Republic, Finland and Lithuania. Adopted from Food and Farm Facts Ltd, 1997

The case of Switzerland

Kilchling et al. 2009, stated that, the use of non-timber forest products (NTFPs) has a long tradition in Switzerland. Although Swiss NTFPs play a lesser role compared with wood production, current yields from NTFPs are not insignificant. With an estimated annual value of 18 million CHF (approx. 14.4 m. US $; 11.6 m. €; assuming currency exchange rates at the time of the survey), game is the economically most important NTFP in Switzerland, followed by forest honey, with 10.5 million CHF (approx. 8.4 m. US $; 6.9 m. €), and then forest mushrooms, with an estimated value of 9 million CHF (approx. 7.2 m.

US $; 5.8 m. €; BUWAL, 2005). The potential of NTFPs to generate income and jobs could increase with the orientation of society and forest management towards sustainability, according to Kilchling et al. 2009 citing Janse and Ottitsch, 2005; Schmithuesen et al., 2004.

Per the discussions on the study conducted by Kilchling et al. 2009, it was indicates that urban consumers in Switzerland are highly appreciative of NTFPs. In particular, there is a high demand potential for food products from the forest, such as honey, berries, roots, mushrooms, and chestnuts, as well as for medicinal, wellness, and hygiene products such as herbal teas and essential oils. The study also ascertained that the rate of actual buyers of NTFPs is, however, much lower than the demand potential as measured by the number of people interested in buying such products. Additionally, their survey showed a positive connection between the frequency of forest visits and the consumption of NTFPs. People, who rarely visit forests, also rarely bought NTFPs. This suggests that promoting forest visits and activities in the forest could enhance the marketing of NTFPs as well as generally strengthen consumers' environmental awareness via information and education, citing Kroeber-Riel and Weinberg, 2003.

The case of Scotland

According to Laird et al. 2010, increased mushroom picking for domestic and commercial purposes in the year 1999 were creating controversies in Scotland. People who gathered them for economic purposes were more interested in picking mushrooms with much more economic importance while others gathering for domestic consumption were collecting a wide range of these mushrooms. Such practices raised concerns on the part conservation organizations, that an absence of fungi harvesting experience could endanger particular species and habitats. One other concern was the potential for conflict between gatherers and owners of lands as there were increasing number of people who visited the forest in search of mushrooms. There was a code (Scottish Wild Mushroom) commissioned with

consultations for the Land Reform Act with the aim of clarifying the confused picture of legal and customary to gather wild mushrooms.

The code was developed by a group called the Scottish Wild Mushroom Forum, it also involved gatherers (both recreational and commercial), land owners, mycologists, entomologists, conservation organizations and regulatory bodies (Scottish Natural Heritage, 2003). The code was developed prior to the Land Reform Act, but is based on similar principles which include placing the responsibility for good conduct and personal safety on the gatherer and emphasizing courtesy and communication with other woodland users, particularly the landowners.

However, there is the need for proper implementation and acceptance of these guidelines and in order for these guidelines to be more effective in influencing gatherer and land owner practices, they need to be accompanied by measures that allow gatherers to police one another's conduct and ensure that landowners consider the impacts of broader land and forest management practices on NTFP species.

The case of Sweden

Information gathered from http://www.borealforest.org/world/world_sweden.htm indicates that, programs of forestry education are offered by upper secondary schools and by the Swedish University of Agricultural Sciences (Sveriges Lantbruksuniversitet, SLU). There is a system in place for various upper secondary schools to give a basic three-year course as well as special courses for machine operators, forest farmers and foremen. Since the autumn of 1996 a three-year program for 65 Forest Engineers per year will started at the National School for Forest Engineers. As a consequence of this. This in no doubt help provide information to such students concerning the importance of sustainable management of the forest.

Considering hunting as a sport or as a means of providing food and economic benefits, it still remains a widespread and significant activity of modern life in Sweden. Similarly, fishing is a major leisure activity for many. Both hunting and fishing need to be taken into

consideration since they are naturally connected to forestry's key environmental considerations.

Sports such as orienteering, cross-country skiing, as well as berry-and-mushroom picking are other popular activities which take place in the forests. It is therefore important that we protect our old roadways, paths and the like.

The Sami people, who inhabit the northern Nordic area, are dependent on the forest for grazing land for their reindeer. They earn their living from reindeer breeding, and reindeer wander through different areas throughout the year. The forest owners affected by this cooperate with Sami communities to ensure that reindeer herds can live according to their natural requirements.

The case of the UK

In the case of the United Kingdom one very fascinating venture which is gaining attention is the treehouse business. In this situation, houses mainly made of wood are constructed in tree tops to provide accommodation to people who want to enjoy the top view of the forest and also be in touch with nature. ‘Blue Forest’ is one company in that venture that has undertaken contracts of all sizes around the world. From a luxury ecolodge in Malawi, to jungle bridges in the Maldives and a number of treehouse hotels around the world. It is an award winning company that specializes in the design and construction of luxury treehouses and unique sustainable buildings. Blue Forest Treehouses have always been a symbol of imagination and adventure. Through the unique and creative nature of their treehouse designs they aim to change people’s perspectives, unlocking their imaginations and transporting them into a treetop world above the stresses of everyday life. In as much as this provision of such facilities comes with economic benefits to its owners, it also provides a means of eco-tourism, recreation and relaxation for its patrons. Such a venture could be described as providing socioeconomic benefit its stakeholders and as such even improve the health status of the consumers.

Figure 8: Treehouse

Source: http://www.blueforest.com/

The Story of Highland Game

Still in the UK, according to **Highland Game**, which was founded in 1997, by Danish entrepreneur known as Christian Nissen. He had by then acquired the production unit from a poultry & game dealer in Dundee. He had a clear vision from the very start to achieve wider popularity of venison by making it available through mainstream retail channels. During that period, venison was not widely consumed in the UK and was mainly sold through butchers and delicatessens. The fact, of the matter is that in 1997 just about 5% of venison produced in the UK was actually consumed domestically, with about 95% exported, mostly to France and Germany. Eventually, Highland Game has been successfully enough in generating awareness and marketing of venison. As at now, they are on a daily basis supplying ASDA, Aldi, Coop, Lidl, Morrisons, Tesco and Waitrose as well as to manufacturers and distributors of the catering and restaurant trade, in UK and on the Continent. The company has also launched 3 cook books; "The Name of the Game", "Venison" and "7 Days in Scotland" backed with Venison Master Classes and Cookery Tours throughout the country. Presently, Highland Game is essentially making strides by processing and marketing venison and also providing employment for over 100 people. Information sourced from the website of the company at https://www.highlandgame.com.

Figure 9: Roast Haunch of Venison with Rosemary and Root Vegetables

Source: https://www.highlandgame.com

The case of Serbia

An interesting story we can learn from is the case of Vaso Kaljevic a private businessman from Arilje in Serbia, who in 1989, founded a family business known as BMD d.o.o. Their main objective was the processing and distribution of a wide range of NWFPs from Serbian forests. Such products include dried boletus edulis and cantharellus, which are highly demanded products of the company. Most of these mushrooms are collected in the UNESCO biosphere reserve Golija-Studenica. In this area, *the use of pesticides in forestry is not permitted*. About 20% of the boletus edulis are marketed with the organic certificate. The company BMD d.o.o. holds a Certification of compliance with production rules equivalent to Regulations (EC) 834/2007 and (EC) 889/2008. Organic certification by the organic control agencies BCS in Nuremberg and IMO in Constance helps BMD d.o.o. to enter new markets. The organic certification also includes a limitation on the amount of mushrooms that can be picked in order to prevent overexploitation. The company has three collection points where collectors (about 300 to 500 depending on the season) of these mushrooms in the Golija Mountains make their deliveries. Wild mushroom picking and sustainability are strictly controlled. About 90% of the exported mushrooms are sun dried in the Golija mountains which is a natural means of drying and as such guarantees the gentlest way to dry the mushrooms thereby helping to maintain a high level of vitamin D and vitamin B12 and keep the best flavor. Following the drying process is sorting and

packaging of the dried mushrooms which is don the company's buildings. A critical process during sorting is the removal of residues of soil as well as lignified patches or other patches spoiling either flavor or optics. After the sorting the dried mushrooms are immediately quick-frozen at minus 20°C. At BMD d.o.o Chemical storage protection, pesticides, fumigation with the toxic gas methyl bromide or food irradiation for improved durability is not applied, this goes a long way to ensure that the products maintain their organic nature. Packages for export come in different weights ranging from 20g to 8kg. Upon request, the packages could be labelled with the costumer's label on the spot. Most of these dried mushroom products are imported to Germany by Belt's Bio-Produkte whose aim is to support the Serbian wild fruits and berries to gain access on the German market. About 20 tons of fresh boletus edulis are annually sold as organic certified products and marketed at best price. These products are generally purchased for example by organic specialist shops and organic supermarkets.

Figure 10: Dried musroom

Source: http://bmd.co.rs

CHAPTER SIX

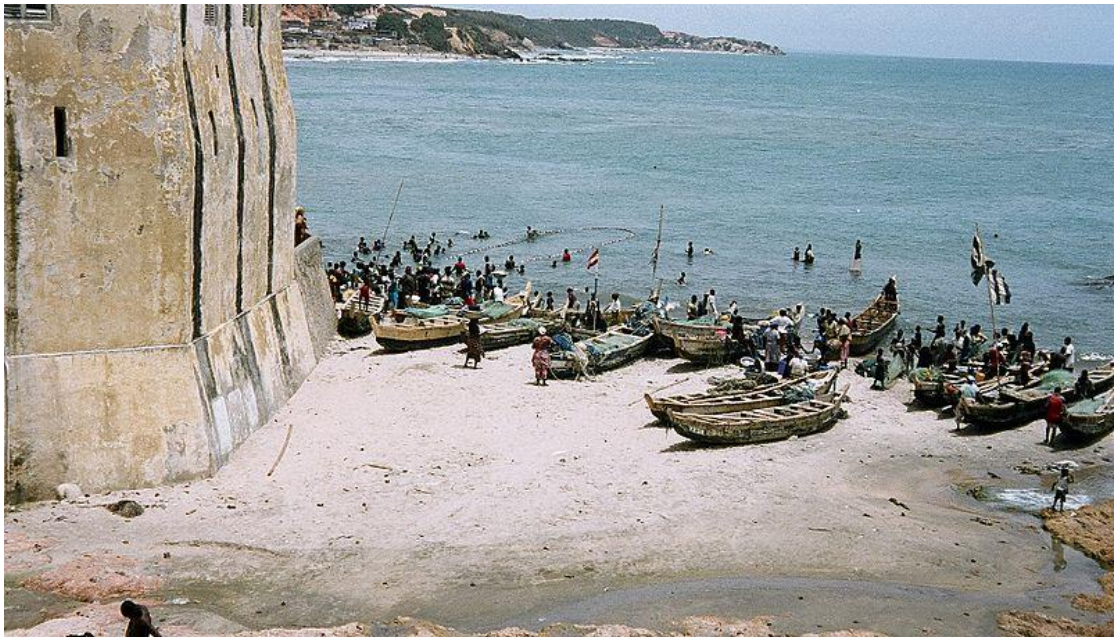
DISCUSSIONS

FAO (2004) pointed out that definitions are the cornerstone of any information and knowledge system and observed that even minor variation in their formulation will increase the likelihood of outcomes that diverge from those intended. It is therefore important to base a typology on sound definitions. Most African countries are well endowed with forests that are rich in NTFPs from which most rural communities can derive their livelihoods.

Ghana as a typical West African country is endowed with several resources being it renewable or nonrenewable of which the forest is part. Other resources include, gold, bauxite, diamond cocoa, water bodies and the latest addition is the discovery of crude oil. The country with a current population of about 30mil is well noted for its hospitality, rich cultural heritage and beautiful people. It shares borders with Burkina Faso to the north, Togo to the east, Cote d'Iviore to the west and to the south with the beautiful Atlantic Ocean which provides fish to support the livelihoods of coastal communities.

The ocean also serves as source of recreation generally on holidays or during festive seasons where people troop to the shores, where some engage with friends and relatives and others enjoying swimming to cool off and refresh their bodies.

Figure 11: Fishing in Cape Coast, Ghana



Source: https://commons.wikimedia.org

Consequently, most inhabitants in the coastal areas are fishermen while on the other hand the main occupation of the communities in the forested areas of the country is agriculture with majority of the farmers being women. Subsistence farming is highly practiced since mechanization is on the lower side. Cocoa (used for chocolate), oil palm, rubber and coffee are amongst the main cash crops that are commercially cultivated in the rain forest zones of the country.

Ghana for the purposes of agricultural, have been divided into about six ecological zones according the types of vegetation that can be found in such areas; beginning from the north with sparsely distributed trees, shrubs and grasses through the middle belt with rainforests which are thick and richly endowed with timber and NTFPs down to the southern part with also sparsely distributed trees and coconuts along the coastal areas.

Figure 12: Cocoa farm

Source:https://www.amazon.in/chocolate-Plant-Theobroma-cacao-Healthy/dp/B077MLQ1X6

Figure 13: West African map

Source: www.inquirer.net

Figure 14: A map depicting some of Ghana's natural resources.

Source: www.timeforkids.com

Ecological zones of Ghana

There are six agro-ecological zones in Ghana, namely

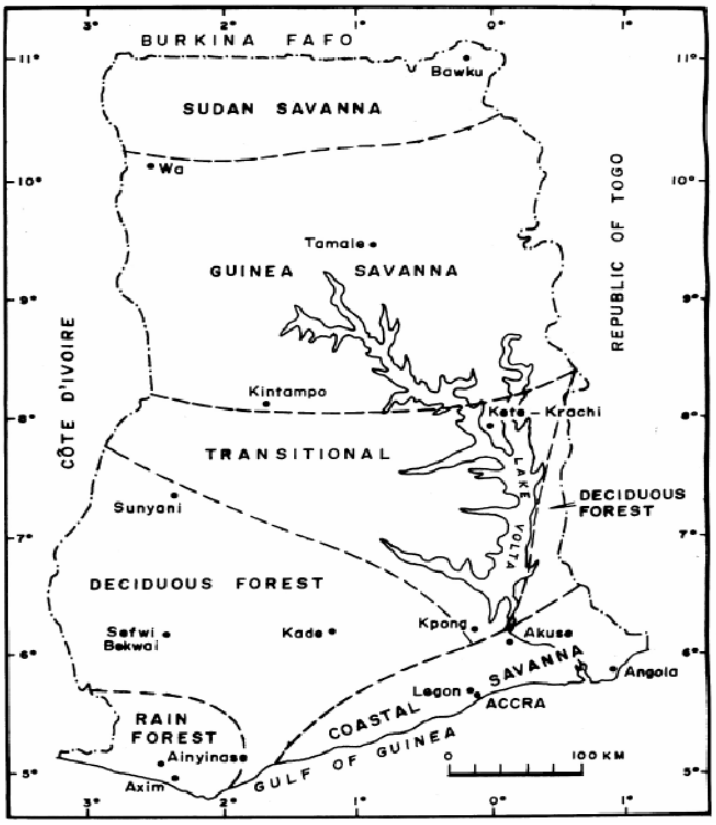
- Sudan Savannah,
- Guinea Savannah,
- Coastal Savannah,
- Forest/Savannah transitional zone,
- Deciduous Forest zone and
- The Rain Forest zone.

The total annual rainfall in the country usually ranges from 780 mm in the dry eastern coastal part to 2,200 mm in the wet southwest part. The rainfall pattern is such that there is one major (uni-modal) rainfall in the Coastal, Sudan and Guinea Savannah zones, but there is one major and one minor (bi-modal) in other three remaining zones.

Forests in the various zones have several NTFPs they produce to support the livelihoods of communities located in such zones. The upper savanna zones usually produce

products like nuts (Shea nuts), honey, medicinal plants and fuel wood among others. The middle zones produce edibles like snails, mushrooms, fuel wood, game etc. The costal zones also produce coconuts, fuel wood and several others. Fig. 2 below is a map of Ghana showing the distribution and location of the various ecological zones.

Figure 15: Map of Ghana showing the ecological zones



Source: Awadzi and Breuning-Madsen. 2009. Harmattan Dust Deposited in Ghana within 2000–2005

Figure 16: Picture of the savanna area in the northern part of Ghana

source: https://www.flickr.com/photos/ciat/5206933555/

Figure 17: Picture of the coastal savanna area in the southern part of the country

Source: http://www.tropicalbirding.com/africa-tours/ghana/

Figure 18: Picture of the rainforest of Ghana in the middle part of the country

Uses and Importance of NTFPs

The main thought that comes into people's mind is timber and its associated products when we talk about the forest. But in actual sense, the forest has more to offer than just timber. We can derive from the forest as seen in tab. 2 above, cane and bamboo for furniture, other non-wood products, game, fuel wood for energy, and even others that cannot be quantified in monetary terms like their effects on the micro climate, their soil protection services, their effect on ground water, serving as a habitat for game and also serving as repository for biodiversity. The FAO, (1997), estimated that (80%) of the population of the "developing" world use NTFPs to meet some of their health and nutritional needs. Ahenkora and Boon (2011), in most traditional settings, NTFPs play an important role worldwide. In many areas, animal and plant resources derived from forests remain central to subsistence and local economies.

They play an important role in meeting the needs of rural communities in the sense that they provide food, serve as a means of poverty reduction (*by way of selling surpluses*) and sustainable management of forest resources and livelihoods improvement. According to a report by the World Bank on 'Sustaining the World's Forest' (2015), it was estimated worldwide, that 350 million people depend on forests as their primary source of income, food, nutrition and medicine. It is a traditional source of household income and sustenance

in rural areas around the world. In many parts of Ghana, these resources are critical, especially for the rural folks, particularly the women. The commercialization of NTFPs can provide an important means for poverty reduction, food security, nutrition and sustainable forest management in local communities.

Figure 19: Mushrooms and snail in Ghana forest

Source: http://www.mangrovegh.org

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; Shacleton & 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). In many regions medicinal plants play an economically much more important role than timber! But it is also the services that forests offer which are of interest for monitoring and for sustainability issues: forests, for example, help maintaining water clear, they serve as recreation area, they filter the air, produce oxygen, they prevent and control erosion, and they are home to many plants and animals as such conserving biodiversity.

As presented by Ahenkan and Boon, 2010, the collection and marketing of Non-timber Forest Products (NTFPs) in Ghana are being promoted as a potential solution to the current high rates of malnutrition, the poor health of the rural population and the spread and intensification of poverty. A research conducted in Ghana by the Forestry Research Institute of Ghana *(https://csir-forig.org.gh/about-fpm*), 2010, indicated that over 11 million Ghanaians derive their livelihoods from the forest. In addition to timber, nuts, fruits, resins, gums and charcoal, fruits, medicinal plants, bush meat, honey, 'pesticidal plants' etc. are continuously exploited from the forest and therefore there are concerns on unsustainability partly due to lack of institutions that support marketing of most forest products, particularly NTFPs and hence poor access to markets.

In Ghana, Agriculture researchers at the Forestry Research Institute (*http://ngonewsafrica.org/?p=16711*), 2016, have identified 289 species of plants notable for food or medicinal purposes or both but say there are no laws protecting indigenous knowledge. Out of these 289 plants species recorded, 43 were recognized as food, 199 medicines and 47 seen to have properties of both food and medicines. Ahenkan and Boon 2010, in many parts of Ghana, these resources are critical, especially for the rural poor, particularly the women. The commercialization of NTFPs can provide an important means for poverty reduction, food security, nutrition and sustainable forest management in local communities.

Most rural folks are involved in farming on subsistence basis for their livelihood. Products obtained from the forest are therefore used to augment what these farmers obtain from their farms. It is very typical to find that most of these products are consumed domestically and then the surplus is sold in the local markets for some income. Such incomes are used to pay for their children's school fees and also to purchase a few items as and when they are needed.

Opportunities

Akoto et.al, 2017, cited that NTFPs, previously used for subsistence purposes and small-scale trading by rural communities, are increasing in demand by large-scale industries. FAO 1995, study suggests that at least 150 NTFPs are of major significance in international trade including medicinal plants, mushrooms, snails, essential oils, tannin extracts, gums, nuts, rattans and bamboo. Ndoye and Perez, 1998; Shiva and Verma, 2002, the total value in world trade in NTFP is estimated at approximately US$ 11 billion and according to Hammet, 1999, the market has grown by nearly 20% annually over the last several years. According to Ahenkan and Boon 2011, future development of NTFPs offers a potential for increasing income, expanding opportunities, and diversifying enterprises in rural areas. Townson, 1995, indicated that aggregate employment generation in forest product activities in Ghana is estimated to be growing at 6.9 percent per year.

There is an increase in the demand for most of these NTFPs especially in the areas of pharmacy and medicine, cosmetology, furniture and the confectionary industries. ASNAPP, 2009, specifically, cited Griffonia, Bitter Kola, Kombo, Thaumatococcus, as being traded in commercial volumes on the international markets and these markets are increasing with time and several communities have been found to have these in abundant supply. For Black Pepper, there is an existing market that buyers are willing to buy even if they are collected from the wild and this is a major advantage that has been observed.

Challenges

In as much as there are numerous benefits of potential roles the NTFPs can play in the lives of its dependents, there is limited knowledge in Ghana and even on the international market about their collection/harvesting, procession, packaging utilization, and labeling requirements. ASNAPP, 2009, indicated that in Ghana, most development organizations involved in the commercialization of NTFPs have focused their attention on the promotion and domestication of grasscutter breeding, Snail farming and Honey Production, neglecting the potential contribution of minor crops, medicinal plants, spices, or natural

products to economic development. Moreover accessibility to some forests is a disincentive enough for most people to venture into the NTFP industry as well as there are no clear cut governmental policies regarding their sustainable harvesting

Lack of adequate information

Akoto et al. 2017, the low representation of NTFPs in policy-making is due to the inadequate statistical information on NTFPs thereby these products have not been accorded adequate attention in development planning and in nutrition improvement programmes in the country. The environmental and socioeconomic *(part of positive externalities)* contribution of the forest remains largely undervalued and understudied due partly to limited accurate and comprehensive data on these products and their value chain in Ghana. As a result, there is difficulty in estimating their true environmental and socioeconomic importance in poverty reduction, livelihood improvement and sustainable forest management.

Harvesting/collection

Akoto et al. 2017, in today's global market, an effective management of the entire supply chain of NTFPs has become a key factor for their successful commercialization. Since there has not been enough research in this area, there hasn't also been enough proven scientific or specialized tools for their harvesting. As result there is difficulties in their harvesting especially those that are high up the canopy of the forest. In my own experience, some of the ways of harvesting some of these products e.g.: griffonia is very destructive which involves cutting down in some cases the whole plant before one could harvest the fruits.

Figure 20: Griffonia seeds

Source: http://www.plus-saine-la-vie.com

Deforestation/forest degradation and over-exploitation

FAO, 2003 estimated that the net forest loss between 1990 and 2000 was 120,000 ha or 1.9% per annum. Forest degradation as a result of illegal logging, mining *(mostly surface mining locally called galamsey)* and bush fires are serious contributory factors to the loss of biodiversity in several forests in Ghana. Moreover loss or conversion of forest lands to other forms of use by man in the area of agriculture, construction and settlement are all militating factors to loss of biodiversity. Zhengxi *et al.,* 2007, indicated that from the global perspective, wildfires contribute significantly to environmental degradation including global warming. Nsiah-Gyabaah, 1996, in Ghana, wildfires have become a major cause of forest cover loss and decline in agricultural crop production since the 1983 wildfires ravaged the semi-deciduous forest zone. Overly exploiting these resources since their cultivation is on a lower side leads to loss of biodiversity. It also deprives future generation from benefitting from such resources. Moreover it would have a militating effect on the forest ecosystem since they all play important role in nature. In addition there is going to be a huge economic loss since there wouldn't be enough supply of NTFPs to meet demand most especially on the international market. Table 7 below shows the trends in forest losses from 1990 to 2010.

Figure 21: Forest degradation as a result of mining

Source: www.change.org

Table 7: Ghana: Trends in Natural Forest Cover (Deforestation), 1990-2010

FOREST COVER (excluding planted forests) (1000ha)			
1990	**2000**	**2005**	**2010**
7398.00	6034.00	5357.00	4680.00
ANNUAL CHANGE RATE (1000 ha) *Negative number represents deforestation*			
	1990-2000	**2000-2005**	**2005-2010**
	-136	-136.00	-135.00
ANNUAL CHANGE RATE (percent) *Negative number represents deforestation*			
	1990-2000	**2000-2005**	**2005-2010**
	-1.8	-1.84	-2.24

Source: https://rainforests.mongabay.com/

Additionally, it is important to consider the forest ecosystem as helping to control global warming and also has a huge impact in CO_2 sequestration. According to the

Environmental Defense Fund (EDF), a leading green group, 32 million acres of tropical rainforest were cut down each year between 2000 and 2009—and the pace of deforestation is only increasing. “Unless we change the present system that rewards forest destruction, forest clearing will put another 200 billion tons of carbon into the atmosphere in coming decades…,” says EDF (https://www.scientificamerican.com/article/deforestation-and-global-warming/)

Transportation

One major challenge that rural communities are faced with is the impassable nature of the roads leading to most of these places. The problem is compounded even in the rainy seasons when the roads become so muddy that vehicular movements are impeded making transportation of people and goods very difficult. As a result most people especially from the urban areas find it difficult to involve themselves in the supply chain of products harvested from the forests or remote areas. This is a great disadvantage to the rural communities since they might not be able to get their harvested products (mostly those of short life span) to the markets on time before they start to go bad. Ahenkan and Boon in 2011, cited that 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 centers affect the marketing of NTFPs in Ghana. Several harvested goods are left to rot in remote area due to the inaccessible nature of some the roads which also come at a great to loss to producers or collectors. Figure 10 below presents a clear picture of some the roads leading to some remote communities and how they become inaccessible in the rainy season.

Figure: 22. The bad nature of some forest roads in Ghana

Source: http://kessbenfm.com

Processing and storage

Coupled with the other challenges the industry faces is the lack of proper means of processing and packaging NTFPs which more or less make them less competitive on the international market. In a research conducted by Ahenkan and Boon in 2011, it was realized that a significant proportion of the respondents (67.5%) cited lack of processing skills, equipment and financial assistance as the most important constraints hindering the supply chain of NTFPs in the districts. They also cited that over 90% of the producers sell their products in the raw form and therefore may not attain the full economic benefits of trading in such products. The unhygienic way of processing some of these products especially game, makes them unattractive to prospective customers and thereby reduce their interest in patronizing such products. The sheer lack of processing and storage facilities serves as a huge constraint hindering the sustainable management of the supply chain of these products in Ghana. Individuals in the supply chain are not able to take advantage of both local and international markets all due to the absence of local food processing and storage facilities for their products. Private individuals can also learn from the case of 'Highland Game' by strategizing well enough, standardizing, processing, packaging and labelling some of the NTFPs to meet international standards such that these products can easily exported and earn some foreign exchange in return.

Figure 23: Meat displayed in the open space for sale

Source: http://ghana.uoregon.edu/2017/07/20/chaos-ghanaian-market/

Marketing

As stated by 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. Several people, particularly women, are involved in the supply chain of NTFPs right from the point of collection through to their sales in Ghana and as result serves as a main source of income to them. According to Ahenkan and Boon in 2011 the industry involves a great number of people selling a vast array of products, including mushroom, snails, game (*bushmeat*), honey, leaves, medicinal plants, food wrapping leaves, and chewing sticks etc. Since the industry hasn't received much attention, there is also not enough information for industry players to standardize the various aspects of the supply chain including marketing of such products. As such marketing of such commodities is done basically on individual basis which results in uncertainty about their prices. Moreover, marketing of these products could be termed as unorganized and dispersed, thus, producers lack the necessary marketing skills and

information required for optimal performance. Ndoye, 1998, noted that, 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. Surpluses of game (bush meat) are mostly sold by to high ways to passersby, drivers/passengers, on the local markets or are sold to local restaurants popularly called ‘chop bars’.

Figure 24: Sale of grass cutter by the road side

Source: www.fionaleonard.net

CHAPTER SEVEN

RECOMMENDATIONS AND CONCLUSION

Adelaja et al., 2003, NTFP have been sorely undervalued in part because in contrast to the timber and mineral sectors, there is no main industry that speaks for and supports this sector, local government regulations on collection, sales and trade are limited, enforcement even less, and government agencies simply rarely track such trade. According to Ariyawardana et al., 2009, the global natural products industry that includes NTFP among many other botanical products, has been valued at about US$ 65 billion per annum and continues to grow. This figure suggests many potential opportunities for increased trade in natural products. Therefore the need to pay a critical attention to this industry and put in sound measures that would ensure their sustainability and support for the livelihoods of the various actors in the supply chain. Below are descriptions of how some measures, if instituted, could help us harness the full potential of NTFPs while maintaining a very healthy ecosystem.

Education/ capacity building

Regarding education, Akoto, S.D et.al, 2017, stated that, to ensure strict monitoring and sustainability of the resource, there is the need for sensitization programs on the importance of NTFPs in rural livelihood and why their conservation is vital in meeting the needs of the present generation whilst not undermining their potential in supplying the needs of future generations. Non-governmental organizations can also help by creation of awareness and capacity building of especially rural folks on the economic importance of NTFPs. Moreover we could learn from the case of Sweden where programs of forestry education are offered by upper secondary schools and by the Swedish University of Agricultural Sciences (Sveriges Lantbruksuniversitet, SLU). Whereby there is a system in place for various upper secondary schools to give a basic three-year course as well as special courses for machine operators, forest farmers and foremen. There should be a holistic approach in the building the capacity of local communities to cover all aspects of

forest management how to minimize damages to forest through their livelihood activities. Relevant governmental and non-governmental institutions can organize field days for farmers, forest owners and managers, and others whose activities in one way or the others affects the forest and educate them on the causes and effects of forest degradation and on the other hand the importance of maintaining the forest ecosystem and how helpful it would be for us all. For it is said that 'when the last tree dies, the last man dies'.

Inventory keeping

Making information on NTFPs available with regards to their collection and subsequent benefits can provide a better understanding of the industry and as such help us to tap its full potentials. Sunderlin et al. 2004, stated that, forests have an important role to play in alleviating poverty worldwide in two senses. First, they serve a vital safety net function, helping rural people avoid poverty, or helping those who are poor to mitigate their plight. Second, forests have untapped potential to actually lift some rural people out of poverty. These characteristics are unknown to many policymakers and planners because the safety net functions of forests are, in some respects, poorly understood and recognized and because the scientific community has not explained them well. One reason for this is that the contribution of forests to poor households is largely unrecorded in national statistics, most of it being for subsistence or for trade in local markets. In addition, the lion's share of wealth from timber goes to better-off segments of society while some aspects of timber resources actually inhibit their potential to assist marginalized people. In spite of these obstacles, forests can increase their contribution to poverty alleviation, provided that decision-makers recognize and act on their potential. It is therefore imperative, that the scientific community, ministries, NGOs, governmental organizations and people in academia take a closer look at NTFPs and their potentials in poverty alleviation, keep the necessary records on them and make such information available to policy makers as and when necessary.

Governmental Policies

The legal and regulatory framework for the development of NTFPs in Ghana has received little attention. Ellefson, 1992, cited in Fraser 2002, defines policy as “a general agreed-to and purposeful course of action that has important consequences for a large number of the people and for a significant number and magnitude of resources”. The term “forest policy” is used in many different contexts, from a general statement of the overall aim, goals or general objective of forest resource management for a country, to a fairly detailed prescription of a course of action with specific objectives for a rather narrowly defined field as indicated by Ahenkan and Boon, 2010, citing Fraser 2002 and Shahbaz et al. 2007. The forest policies still categorize NTFPs as "minor" forest products, resulting in less emphasis on these products than timber within forest management programs and policies. The lack of a definite policy on NTFPs has impacted negatively on their promotion, development and their supply chain management. There should be clear cut policies and creation of the enabling environment by the government to help promote the usefulness of NTFPs. The issue of forest degradation should be of great concern to policy makers. Institutions who have responsibilities of ensuring a sustainable forest management must be well tooled to deliver their services of protecting the forests and ensuring their sustainable use. Additionally, there severe punitive measures to individuals or groups who would flout such policies and also should be made to reforest any areas they might have degraded.

Improving accessibility to forested and rural areas

Most forest road in the country are inaccessible to motorists and to some extent even pedestrians especially in the rainy seasons. There is the need for policy makers to take a critical look at such forested areas and be informed of the benefit the country stands to gain if roads linking such remote areas to urban areas are improved to make movement of people and goods easy. Improvement of the roads in forested and remote areas would ensure easy, fast and unimpeded movement of food from these areas to the urban areas at affordable costs. This would help reduce losses incurred by producers and collectors

as a result poor road networks. Additionally, it would ensure the availability and easy affordability of forest products in the urban areas.

Value addition

Value addition is a critical aspect in marketing and as such should be considered. Further processing, packaging and labelling would go a long to make these products more attractive and competitive on the market and as such enhance the economic benefits of various actors in the supply chain. According to ASNAPP, 2013, industry players need to understand the importance of (high) quality for products targeted at regional and international markets as a way to open a market window, to add value, drive market demand and receive higher prices for their products and repeat buyers. Packaging is one of the marketing mix, is very important, in that, it presents the product in a more portable and attractive manner to the consumers. Hygienic means of processing should be considered and standardized to ensure that such products are free of any infection and thus are healthy to their consumers.

Cultivation of NTFPs

Improving the supply of these products by establishing farms of some of these products to ensure a continuous and sustainable supply and reduce our overdependence on the forest which might lead to forest degradation is very vital. As stated by Sisak, 2009, NWFP can be produced commercially and then marketed by forest owners, tenants, farmers and businessmen. In such case, the NWFPs have big potential importance as a market product. A great part of the NWFP (forest fruits – berries, mushrooms, medicinal plants and others) can be taken as alternative to agricultural production, and can be produced to a great extent without the use of chemicals.

Governmental and Private organizations can take up the challenge of training NTFP collectors on proper ways of cultivating some of these and sustainable ways of harvesting

them to reduce our dependence on the forest to prevent it being overly exploited. People should also be encouraged to farms or raise some of the animals in the wild. Animals like, deer, grass cutters, duikers among others could be raised domestically to augment the ones harvested from the forest. It's obvious that some of these animal farms have already been existing by they need to be intensified and their activities regularized. Grass cutters happen to be one of the most raised animals in several homesteads. Their meat happens to be a major delicacy in Ghana served in homes and several local restaurants.

Another NTFP of significant importance found the tropics and which demand our attention is the Miracle berry which has a peculiar property. It derives its name from the fact that when the flesh of the fruit is eaten, it has the ability to bind it active ingredient (active glyco-protein molecule, within miraculin) with the tongue which causes some bitter and sour fruits to taste sweet. Its active ingredient can be extracted and used as food sweetener in place of sugar. If proper awareness is created on this plant, large farms could be cultivated and exported to earn foreign exchange.

Figure 25: miracle berries (Synsepalum dulcificum)

Source: https://www.miraclefruithut.com/pages/about-miracle-fruit

Figure 26: Grass cutter farming (Thryonomys swinderianus)

Source: http://farmingbizsetup.com

Fees for deforestation

According to Sisak, 2009, fees for deforestation can also be considered as economic instrument protecting and promoting forest environmental services. The fees express loss of non-market environmental services for public in case the respective forestland area is deforested for other purposes of landscape use. The fees can be differentiated by zones expressing different grades of importance of respective forestland area for providing environmental services. The higher forest environmental services importance, the higher fee for contemporary or perpetual deforestation. For example, in the CR, such fees are employed directly in the Forest Act (No.289/1995) and their level is from 1.4 to 5 times higher than the level of timber production service value. Afforestation programs could also be incorporated to reclaim already degraded forestlands. This would ensure that the timber production services of the forest are enhanced in such areas where degradation is high. Offenders of deforestation should be surcharged for the total cost of afforestation or should be made to serve a sentence in cells.

Ecotourism

Most tropical countries are endowed with several tourist sites but the unfortunate situation is that their cultural and socioeconomic benefits are not fully harnessed. Ghana has several sites and places of interest like the Fiema Monkey Sanctuary (where there are monkeys who interact with humans), Mole National Park (noted for hosting a large number of elephants), Water falls, and the Kakum Canopy Walk way among others. All these sites are located in forested areas and if much attention is given to them and are well packaged and presented, the country stands to gain a lot economically by way of tourist patronizing such sites. We could learn from the case of treehouses in the UK where wooden houses are constructed in the upper canopies of forests to provide accommodation to tourists and patrons of forest services or who just want have a hideout from the pollution and hustles in the cities. Educational trips for students could also be organized by schools and other institutions, so students could familiarize themselves with the forest ecosystems and their benefit to man. The ministry of tourism in conjunction with other private organizations can help advertise these tourist sites so as to attract even foreign patrons.

Figure 27: Kakum canopy walkway

Source: http://www.expertravel.com.gh/portfolio-item/kakum-national-park/

Figure 28: Tourist at the Fiema monkey sanctuary

Source: https://www.youtube.com/watch?v=M829xV3iLUM

Figure 29: Kintampo waterfalls

Source: http://amedzofevillage.com/en/2016/07/23/kintampo-waterfalls/

Figure 30: Mole National Park

Source: http://cocoa-village.com/mole-national-park/

Figure 31: Elephants at the Mole national park

Source: http://cocoa-village.com/mole-national-park/

Certification and Regulation

Although there has been several discussions about certification of products lately, its applicability and impact as a tool to promote the development of NTFPs has not been fully implemented and understood. 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. According to Ahenkan and Boon, 2010, 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. Lessons could be drawn from the case of Serbia where 'organic certification also includes a limitation on the amount of mushrooms that can be picked in order to prevent overexploitation'.

The Ghana Standards Authority and Food and Drugs Authority are responsible for inspecting and regulating the quality aspects of products particularly food products. The most unfortunate situation is that, most of the producers are not organized, isolated and sell these products locally to individual customers without meeting the required international standards. This thesis would therefore recommend that the relevant authorities should be up to the task, collaborate with other stake holders to acquire the necessary and required information to help them formulate the necessary regulations and certification procedures to help regulate the veracious aspects of the supply chain of NTFPs.

In conclusion I would say that the forest can contribute immensely to our economy, environmental and sociocultural welfare when considered in the broader sense as not producing only timber but also has other non-timber forest services. Its influence on the environment, human health, education, culture and income to its users cannot be overlooked. It is therefore essential that much attention is paid to the forest to ensure its sustainable use and it's continues benefit to the environment.

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