

**SMALL-SCALE FARMERS' PERCEPTIONS OF THE ECONOMIC IMPORTANCE OF
SHEA TREE IN KUJU SUB-COUNTY, AMURIA DISTRICT**

BY

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**A SPECIAL PROJECT REPORT SUBMITTED TO DEPARTMENT OF
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DECLARATION

I **Okwi Wilson** do hereby declare that this special research report titled “Farmers’ perceptions of the Shea tree as an economic tree” is my original work and to the best of my knowledge, has never been published or submitted to any university or higher institution of learning for any academic award.

Signature.

.....

OKWI WILSON

Date...16/10/2019.....

APPROVAL

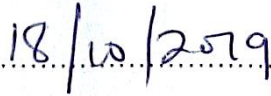
This special research report has been submitted with my approval as the academic supervisor.

Signature.



.....
Mr. CHRISTOPHER MAWA

Date.....



DEDICATION

I dedicate this work to my Heavenly Father, the Almighty God who by His grace enabled me to attain academic success.

I also dedicate the work to my late parents, supervisor, pastors, brothers, sister, friends and relatives for the moral, financial, and material support rendered to me during my education career.

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ABSTRACT

The importance of shea nut tree to the people of Uganda has been overlooked considering both the economic and environmental uses of the tree and therefore efforts have to be made to propagate its production by the farmers as the shea nut tree production still remains low. It would be worthwhile to investigate farmers' perception of shea nut tree as an economic tree among small scale farmers in Uganda. The specific research objectives were to (i) examine the farmers' perceived economic importance of Shea nut tree to small scale farmers on Kujju Sub county (ii) analyze the major challenges faced by small-scale farmers and associated opportunities in the production of *Vitellaria paradoxa* (iii) assess the factors that influence farmers' perception of *Vitellaria paradoxa* as an economic tree. Two parishes that had the highest number of shea nut farmers in Kobo sub-county were selected. A list of the households of all shea nut farmers in each of the parishes were obtained and a simple random sampling technique was used to select 40 farmers from each parish. In each household, the household head was interviewed, in his/her absence or upon his/her request, any other member who is knowledgeable about the household was interviewed. A structured interview schedule was used to collect data from the respondents. Descriptive statistics of means and percentages were used to describe the data while logit regression was used to determine socio-economic factors influencing farmers' perception. Results showed that Shea nut and shea nut oil were reported by over 65% of the respondents as very important products from the shea nut tree; and by more than 50% to be increasing resource trends. The major challenges reported were limited access to extension services (69.2%) and not belong to functional local producer groups (57.5%). Respondent's age, gender, marital status and whether the household was practicing agroforestry had significant effect ($P \leq 0.1$) on farmers' perception of *Vitellaria paradoxa* as an economic tree. In conclusion, farmers perceive *Vitellaria paradoxa* as an economic tree with a wide range of benefits; however, perception is influenced by other factors within the communities. As a recommendation, the government should support the Shea butter enterprise through skill enhancement program and formation of associations. In addition, farmer perceptions and attitudes should be considered with any initiatives to promote shea production in Uganda.

KEY WORDS: Perceptions, shea nut tree, economic tree, small scale farmers.

CHAPTER ONE

INTRODUCTION

1.1 Background

1.1.1 Origin and distribution

Globally, over the past decades, trade in shea butter has been on the rise because of increased demands in the European Union, Japan, India, Canada and the United States (Carette *et al.*, 2009). A rise in the demand for this product has some advantages on the countries that produce this fruit because of the positive observations observed lately related to shea butter processing and marketing. For example, shea is fast becoming an export crop in many West African countries and its products are listed among the top ten non-traditional exports of Ghana (Hatskevich *et al.*, 2011). In Burkina Faso it is the fourth most important export crop after gold, cotton and livestock and makes a contribution of about 6 million USD to the national economy (Konaté, 2012)

At the continental level, shea tree is the second most important oil crop in Africa after the palm nut tree but its potentials are not fully exploited. This is because; use of microwave extraction technology that has the potential of producing large volumes of good quality oil within short production cycles has been less used. The methods of extraction such as microwave extraction process is influenced by factors such as time, temperature, solvent type, dielectric properties of the solute solvent mixture (Terigar *et al.*, 2010). Several works have been reported in the literature on extraction of oil from shea nut kernels using super critical carbon dioxide (Nkouam *et al.*, 2012), soxhlet method (Maranz *et al.*, 2003; NdeBup *et al.*, 2012). It's noted that microwave method of extraction has been less used in Africa and the methods looks to be new.

In Uganda, shea trees are mostly found in the northern part of the country in places such as Kidepo area, West Nile and Acholi and Teso districts. Uganda Export Promotion Board (UEPB) together with the National Environment Management Authority (NEMA) has partnered to develop shea nut products into an export commodity (Dorothy, 2017).

1.1.2 Biology of shea nut tree

The shea nut tree *Vitellaria paradoxa* is known by several local names in Uganda: Ekun-gur (Teso), Komure (Kakwa), Kinakongole (Lugwere), Awa (Madi), Yao (Luo), Komoro (Lugbara). It is widely spread across the northern region of Uganda, in the districts of Kotido, Kaboong, Moroto, Abim, Otuke, Agago, Kitgum and in the west Nile. The shea tree grows very well on a wide range of soils, including highly degraded arid, semi-arid and rocky soil. (Dogbevi, 2007; Rasheed, 2012). The trees reproduce naturally by seed and grow slowly but steadily, reaching a height of up to 20m and a trunk diameter of up to 1m. The leaves are tough and clustered at the ends of branches. Shea nut trees are deciduous, but new leaves emerge when the old ones fall. The bark is dark, thick and deeply cracked into squares. These trees grow in areas with annual rainfall between 400 and 1800mm, but can survive multi-year droughts as well as the usual 6 - 8 months' annual dry season. Shea nut trees grow up to 1200m above sea level in areas with a minimum temperature of 18⁰C and maximum of 45⁰C (NRC, 2006). A shea nut tree will start producing fruit after 15 to 20 years, will reach full production at 40 to 50 years, and can live as long as 400 years. (NRC, 2006). The flowers bloom during the dry season. Fertilized flowers mature into fruits with green skin and pulp that is sweet and high in vitamins. Shea fruits consist of a thin epicarp and a soft mesocarp enclosing a single seed. The epicarp and mesocarp together make up 33–75% of the fresh fruit weight, with an average of 55% (Elias, *et al.*, 2006; Rasheed, 2012). During the rainy season, ripe fruits fall on the ground and are easily harvested. The inner seed or nut has a smooth, thin, brown outer covering that protects the nutritious kernel. A single tree typically produces 15 to 20 Kg of fruit; together, the nuts inside those fruits weigh around 3 to 4 Kg and contain 1.5 to 2 Kg of fat. (NRC, 2006)

1.1.3 Importance of shea nut tree

Shea nut tree is important to humans and animals for both environmental protection and for economic benefits as the oil extracted from them has several nutritional and health benefits. The nutmeats can be eaten fresh or roasted like almonds. They can also be processed to remove the butter. Shea butter is rich in Vitamins D, E and K, and is a good source of calcium and potassium. (Maranz *et al.*, 2004)

1.2 Problem statement

Shea nut has the potential of contributing greatly to the vegetable oils and fats industry in Uganda through the provision of vegetable oil and thereby contributing to foreign exchange and generating employment. Yet this potential has not been fully realized.

Shea nut production in developing countries like Burkina Faso has led to economic resilience and empowerment among women (FAO, 2017), yet the involvement of small-scale farmers in this activity remains very low in Uganda and specifically in the area of study. This undermines the government's effort to achieve the national target of attaining prosperity for all as enshrined in section 15 of vision 2040 agenda.

Boffa (1999), analyzed that the shea belt comprises more than 500 million fruiting trees and FAO, estimate the total African production is approximately 1,760,000mt of Shea nuts. From this potential yield, only 35% of the nuts are gathered and 85% of this harvest is locally processed, to make 100,000mt of local butter. The remaining portion, approximately 65,000mt are exported, mostly to the food industry. Less than 5% of the exported butter is used in the international cosmetics industry; a ball park figure would be 3000mt per annum.

According to the previous studies conducted in Uganda such as Okiror *et al.* (2012), especially on On-Farm Management of *Vitellaria paradoxis* clearly the local management strategies of shea trees in the field and how farmers can adopt them for better productivity. But these findings never focused on analyzing the perception of small-scale farmers towards shea nut production as an economic activity. Hence the study is worth for investigation. This study, therefore, seeks to investigate small scale farmer's perception towards shea production. This is important because it provides analysis showing personal interests towards shea trees and their associated economic benefits.

1.3 Objectives of study

1.3.1 General objective

To assess farmers' perception of *Vitellaria paradoxa* tree as an economic tree among Kujuba sub county small scale farmers.

1.3.2 Specific objectives

- i. To examine the farmers' perceived economic importance of Shea nut tree to small scale farmers on Kujju Sub county.
- ii. To analyze the major challenges faced by small-scale farmers and associated opportunities in the production of *Vitellaria paradoxa*
- iii. To assess the factors that influence farmers' perception of *Vitellaria paradoxa* as an economic tree.

1.4 Research questions

- i. How do small scale farmers in Kujju Sub County perceive *Vitellaria paradoxa*?
- ii. What challenges do small scale farmers face in the production of *Vitellaria paradoxa* in the study area?
- iii. What are the major opportunities in the production of *Vitellaria paradoxa* in Kujju Sub County?
- iv. What factors influence the small-scale farmers' perception of *Vitellaria paradoxa* as an economic tree in the study area?

1.5 Significance of study

The findings of the study may be of practical value in helping various agriculture institutions to elevate the standards of Shea tree production in Uganda. It is hoped that the study would help to point out the areas and issues that are not adequately tackled by relevant stakeholders. The findings of this study could be used by other researchers to get information for conducting future research in order to collectively address the various challenges in agriculture sector.

1.7 Definition of concepts

1.7.1 Shea nut tree

The Shea tree as an indigenous woody plant of Agroforestry parklands in Africa (Elias, 2015). It is a small, medium-sized deciduous tree that occurs in a wide range of territory above 1° of latitude in tropical Africa (Hall *et al.* 1996 and Gwali *et al.*, 2011).

Inside the nutritious fruit is a large hard seed which yields Shea-butter, a food-oil, cosmetic and sacred substance of great importance to the people who live with the tree, particularly the women farmers who process the nut and use income from the tree to sustain their families, and to improve their lives, thus making it an economic tree.

1.7.2 Perception

According to Oxford English dictionary, perception is defined as “the act or faculty of perceiving, or apprehending by means of the senses or of the mind; cognition; understanding or immediate or intuitive recognition or appreciation, as of moral, psychological, or aesthetic qualities; insight; intuition; discernment.”

1.7.3 Small-scale farmers

According to Kristen (1998), a small-scale farmer is one whose scale of operation is too small to attract the provision of the services he/she needs to be able to significantly increase his/her productivity." A small-scale farmer can also be a smallholder with a low asset base, operating less than 2 hectares of cropland (World bank, 2001; Proctor and Lucchesi, 2012).

1.7.4 Household

According to Beaman and Dillon (2012), a household refers to the smallest group of persons usually, but not exclusively kin related who form a more or less independent production and consumption unit during the cropping season.

CHAPTER TWO

LITERATURE REVIEW

2.1 Small scale farmers' perception of Shea tree as an economic tree

Although largely subjective, the role of perception in influencing the behavior and actions of individuals, including farmers, cannot be overlooked. Perception of shea nut tree as an economic tree by small holder farmers can be synonymous to farmers' perceptions to any new technology, which could be a new crop variety. Farmers' perception concerning a technology or practice, in this case shea nut production, can be related to their knowledge of the crop for them to be able to perceive it as important or not important (Ikponmwosa and Abby, 2017). Although knowledge here is defined as factual information and comprehensive understanding of a crop as being economically important and what it has to offer (Meijer *et al.*, 2015). However, this is arguable because one may not need facts and understanding of a crop to lead to perception. Perception can be defined as farmers' views regarding any crop based on their felt needs and past experiences. The fact that positive perception precedes adoption (Meseret, 2014), it is necessary to understand farmers' perception of shea nut tree as an economic tree.

A number of factors affect perception. These can be socio-economic and/or demographic characteristics/factors such as age, gender, income level, marital status and educational level (Meijer *et al.*, 2015). These are important because affect decision-making. High level of literacy is likely to make farmers more responsive to the adoption of technology needed for shea tree development. Farmers' perception of shea nut tree as economic tree is positively correlated with education. This is an indication that the more educated the farmers, the greater their ability to perceive the economic benefits accrue to shea nut tree understands and manage the related technologies for its production (Rasheed, 2011). Farming experience positively influences perception of farmers. This is as a result of farmers acquiring encouraging returns from shea nut trees in the past and thus be encouraged to sustain the anticipating benefits (Bonabana and Wabbi, 2002). Farm size positively influences farmers' perception implying that the larger the farms size the higher the perceived benefits that can be derived from the shea nut trees (Rasheed, 2011). With a big proportion of the population being youths implies that there is enough labour force to increase shea nut production, however if the largest proportion of the population are the elderly and the young, then this compromises on shea nut production due to labour shortage (Rasheed, 2011).

2.2 The economic importance of Shea tree to small scale farmers

Internationally, shea butter has been traded for so many years for use in food (margarine and chocolate) industry and also in the cosmetics industry. They are usually used as a cocoa butter equivalent (CBE) in the chocolate industry where they are mixed with other non-timber forest products (NTFPs) such as palm oil for further production. Shea butter has high concentration of triglyceride giving it rich consistency which is valuable for skin creams, shampoos as well as other cosmetics (NdeBup *et al*, 2014)

FAO (2013) and Lovett (2004) noted that the 21 sub-Saharan African countries where Shea tree grows can be grouped into 3 zones following their potentials for Shea nut production per year. These zones are; high production zone, average production zone and low production zone. For instance; Uganda is grouped among the countries in the high production zone which have the potentials of producing 70,000-300,000 tons per year (Bup *et al.*, 2014)

Ezema and Ogujiofor (1992) observed that the Shea trees can be used to combat the problems of desertification. In Uganda, this tree produces fruits and plays a vital role in rural livelihoods. Shea tree provides food supplements, has a cash importance in rural economies and international trade besides having a traditional role arising from the oil present in the kernels being a source of vegetable fat. Other uses of shea trees range from the household production of cheese through the industrial production of cosmetics and medicine, wood and soap production to illumination (Ezema and Ozoiko, 1992; Okullo *et al.*, 2004)

According to the study conducted by Adeola (2012) in Oyo state, south western Nigeria in 2010, the Shea tree constitutes an important source of raw material for gum and rubber industries. The Shea fruit also serve as a source of food to many people and as an income generating activity for most of the women that gather the fruits as the ripening of the fruits coincide with the lean season of food crops production.

Bup (2011) noted that shea butter is mostly used in cosmetic formulations in the United States, in the European Union and some Asian countries such as Japan and India; it is used both in cosmetics and chocolate formulations. In fact, Shea butter has a high content of essential fatty acids (oleic, stearic, linoleic and palmitic acid), more than most vegetable butters which play a very important moisturizing, softening, and anti-inflammatory role. In addition, Shea butter also contains vitamins

A and E, which have a recognized effect against skin aging due to its rich mineral content with skin protecting and regenerating benefits.

As a natural resource controlled by women, the Shea Butter Tree *Vitellaria paradoxa* supports the nutritional and economic health of rural families and sustains indigenous plant and animal biodiversity. This wild and slow-growing savannah tree provides food (nutritious fruit as well as food oil), and revenues from the sale of its annual bounty help rural households to feed themselves, to invest in livestock and other income-generating forms of wealth, to and meet cash requirements including shelter, clothing, health care, taxes, school fees, school uniforms and school books (Shea nut project, 2012). It then provides a viable opportunity for government and development partners in their effort to reduce poverty among rural women in Northern and Teso sub region. Shea tree which grows well in this region has over the years supplemented the livelihood sources of rural women. For instance, women are engaged in the sale of the fresh Shea fruits, Processing and sale of the Shea nuts, sale of charcoal made from the Shea tree etc.

2.3 Challenges facing small scale farmers in *Vitellaria paradoxa* industry

The shea tree has for several decades played significant role in the livelihood of rural people in the world as important natural resources that could be adequately exploited as a tool for poverty reduction especially in Northern and Eastern parts of Uganda. But this industry has faced a number of challenges which include;

2.3.1 Production challenges

The *Vitellaria paradoxa* tree has a long gestation period, begins to bear at the age of 20 years of growth and tends to reach its full production at the age of 40 years or 50 (Sanou *et al.*, 2004), this discourages small scale farmers from planting or even replanting these trees. Besides having along growth period, its seedlings tend to have a low survival rate along with many requirements for proper growth. This too is another changing factor in establishing larger-scale nurseries of the Shea, (Sanou *et al.*, 2004). In Uganda, places where there is shea nut production are already experiencing effects of climate variability and change (Okiror *et al.*, 2012). This is evidenced by the prevalence of floods and drought. However, the effects of climate change are directly experienced by the communities producing the Shea rather than by the tree itself. For instance,

when there is water shortage, processing of Shea butter is affected while in times of excessive rainfall, the drying process of Shea nuts is affected.

The complexity of land tree tenure complicates small scale farmer's participation in shea nut production. The rights to the Shea tree may be distinct from rights to land on which the Shea trees grow (Fortman,1985). Away from Uganda, rights to Shea trees and to land are distinct but intertwined access to Shea fruit may be open to certain extent in bushes and fallows. In farm land, the fruits may be shared between the land owner and the farmer who has hired it or is restricted to the land owner. Also, for small scale farmers to establish plantations of Shea tree, new institutional tenure arrangements need to be enforced (Berry, 1988). Shea tree is still perceived as a spontaneous tree and taboo exists within certain communities, with the planting of Shea associated with death and illness (ITC and EIF, 2015)

Throughout the shea belt of Africa, the shea nut tree continues to be exploited for charcoal production despite its 'vulnerable' status. Charcoal represents a significant portion of the domestic energy consumption in sub-Saharan Africa; as human population increases throughout the continent, demand for fuel is expected to soar placing an exceedingly greater burden upon tree resources preferred by the charcoal industry. In Uganda, charcoal and fuel wood account for 92% of the national energy demand. Uganda's annual energy consumption growth rate of 6% is expected to double by 2025 (MEM, 2007), meanwhile the country's charcoal industry remains largely unregulated. Similarly, Okiror *et al.* (2012) point out that loss of the species contributes to the degradation of fragile savannah ecosystems, loss of wildlife corridors due to habitat destruction, and a degraded environment in turn affects agricultural production.

2.3.2 Processing challenges

Shea nut production takes a long process of oil extraction which makes farmers reluctant. According to Coulibaly *et al.* (2009), Shea nut butter comprises of three methods; the traditional method, mechanical extraction method and the centrifugation method. Traditional methods involve collection of nuts from the field, drying and nut extraction through breaking the shells. The nuts are then roasted, crushed, ground, and water is added. The paste acquired is churned and heated, in order to separate the oil from the residues. Oil production is completed by decanting and bailing from the container. The average efficiency for this method ranges from 20 to 28 % (Coulibaly *et al.*, 2009).

Theophilus (2018) observed that despite the numerous benefits of the small-scale shea butter business both locally and internationally, processors who are mostly women are observed to record low revenues which are relatively insufficient to cater for costs of production *let alone* making profits to take care of their other needs. This alarming development for the rural economy as there is always a disincentive to invest in an unprofitable venture. Undeniably the small-scale local shea butter sector in Ghana for example has been identified as a tool for poverty alleviation and improvement in the way of life.

2.3.3 Marketing challenges

According to Al-hassan (2012), problems with marketing shea tree products is due to the over dependence on the traditional methods which yield poor quality products (Masters *et al.*, 2004). The majority of rural processors are not using improved methods despite their low levels of capital. Another cause of poor market access along the Shea value chain according to is the current demand and financing of nuts (Rammohun, 2010). Additionally, poor entrepreneurial skills and lack of training of processors are some of the limitation in accessing market (Al-hassan, 2012), However, Planet (2010) urges that the challenges in upgrading the Shea value includes processors 'lack of business orientation skills and equipment to provide the commodity which meets international standard'.

2.4 Opportunities in the shea nut industry for small scale farmers

According to Hibern (2014), shea butter has high demand in several sectors and world market. Principle factors driving market demand are continuous rising demand for cocoa equivalent products due to rising chocolate consumption by world population. Rising market demand for natural products-based cosmetics and skin care products are becoming another market driver for shea butter. For example, In Western Europe, Japan and North America markets shea butter are highly sought due to its high skin care, emollient and moisturizing properties. This Demand mainly comes from cocoa butter equivalent (CBE) as shea butter is approved to be used in chocolates.

Further, consumer awareness about hydrogenated oils containing Trans fats has also played an important role in the increased use of shea butter in food products. Emerging market demand for shea butter in the world market is proven employment source for villagers and the sector has got high economic important (Herbert, 2014)

Lovett (2004) points out that there are many countries in which assistance could promote the increased production of shea butter and finished products, which would benefit the rural producer. These countries possess two commonalities - either they lack processor associations, and/or have promising companies with opportunities of increasing production or quality of shea-based cosmetics. Observations from field visits and meetings during 2004 in the countries of relevance to WATH show Benin, Burkina Faso, Ghana, Guinea, Mali, Nigeria and Senegal as the most likely to benefit from inputs at this level (Lovett, 2004)

Boffa (1999) suggests at least 500 million production shea trees are accessible in (6,000 km x 500-1 km wide /one, which equates to a total crop of 2.5 million t of dry kernel per annum (based on 5 kg dry kernel per tree). Based on discussions with traders and parkland studies, 'potential" and maximum 'actual' shea production figures have been estimated for all countries across the species. These show that the total potential available for collection may only be half of the estimate based on Boffa's figure, since many shea trees are further than walking distance to village, and all shea nuts are collected by women and children picking fallen mature fruits from beneath the trees and carrying the harvest back to the homestead.

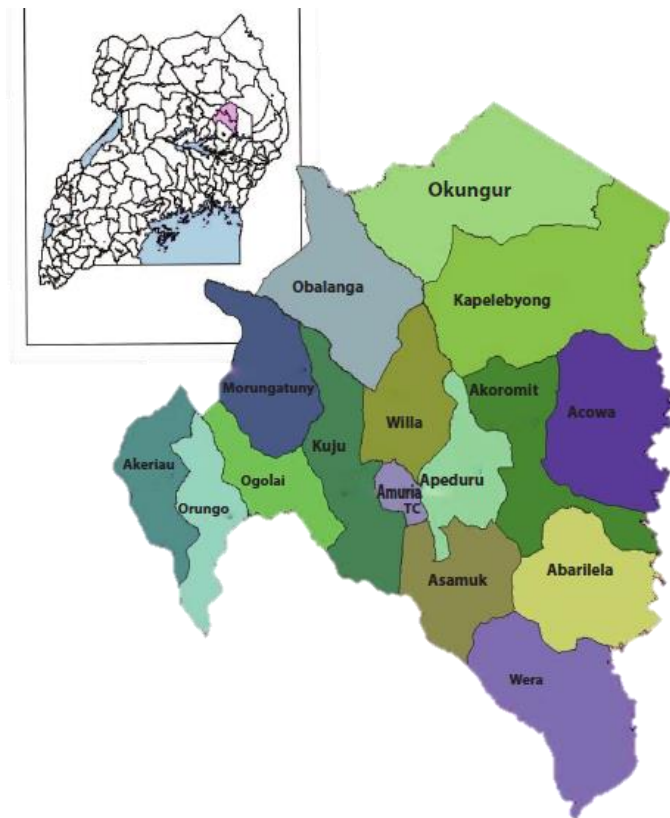
CHAPTER THREE

METHODOLOGY

3.1 Study area

3.1.1 Location

The study was conducted in Kuju sub-county Amuria district which is 2.5 km from Amuria town council along Soroti-Kotido road. Amuria district is found in the North Eastern region of Uganda and it is bordered by Katakwi District in the East, Soroti District in the South, Kaberamaido District in the South West, Napak District in the North East, Ouke District in the North and Alebtong District in the West. Amuria District comprises three counties of Amuria, Kapelebyong and Orungo. The District is also composed of 16 sub-counties which include; Abarilela, Acowa, Amuria town council, Asamuk, Kapelebyong, Kuju, Morungatuny, Orungo, Wera, Apeduru, Willa, Ogoi, Akeriau, Obalanga, Akoromi and Okungur (Figure 1).



Adapted from: Amuria District Local Government Development Plan II FY 2015/2016 - 2019/2020

Figure 1: Map of Uganda showing Amuria district

3.1.2 Climate and vegetation

The District is characterized by a bimodal type of rainfall with peak periods in the months of March-June September-November, However the District is faced quite regularly with pronounced erratic weather conditions. This is evident by either excessive rainfall within a short period leading to water logging, floods or lack of rainfall over a long period of time (not less three months). According to the statistics for 2009, the annual rainfall was 1,289.8 mm (Amuria District weather station). Rainfall is not uniformly distributed throughout the Eastern parts of Acowa and Abarilela sometimes registering low rainfall.

The vegetation is mainly savannah grassland type with dotted trees and shrubs. Other areas have savannah woodland composed of different tree species; the most notable include: *Combretum Collinum*, *Vitellaria paradoxa* and *Piliostima Thonningii* widely spread in the District. At present, the forest cover existing in the district is seriously declining despite there being areas that were once gazetted as forests. Amuria district has three Central Forest Reserves (CFR)-Akileng CFR (Obalanga sub-county), Achomai CFR (Kuju sub-county), Alungamosimos CFR (Kapelebyong sub-county). These forest reserves cover the following land area; 611, 243 and 4,646 hectares respectively and have the following Land registration No.s BP 1182, BP118 and BP1188 respectively (National Forestry Authority,1998)

3.1.3 Topography and drainage

The district is generally characterized by flat terrain with soils being predominantly shallow grey brown sandy loams over laterite and greyish-brown sands and sandy loams whose parent material is Lake Deposits derived from basement granite, gneisses and other materials. These can support agricultural production of fast maturing cereals, legumes and tuber crops. However significant area in the wetlands is covered by black and grey clays.

Amuria district is covered by a large network wetland and the 13 major local systems. The surface area covered by the wetlands in the district is approximately 14.6% of the total surface area. The main wetlands include river Alito, Moroto, Chanigweno, Alakaituk, komolo, Akeriau etc. Most of these wetlands are seasonal while a few of them are both seasonal and permanent. These major wetlands are connected with minor wetlands such as Ongor-Kipi, Alojut, Ebilu, Ibuga, Awulo,

Angole, Iditemany. These wetlands are mainly used for fishing, water collection, paddy rice growing, sugarcane growing and sand mining.

3.1.4 Population and socio-economic activities

According to provisional results of the National Population and Housing census, 2014, it estimated the population of the district to be 270,801 people and the population of Kuju sub-county is estimated to be over 18,111. A greater proportion of the population in the district (over 90%) derive their livelihood from farming production activities i.e. Crop production and animal rearing. The major crops grown are cassava, sweet potatoes, groundnuts, millet, peas simsim, sunflower, rice, maize, beans and cotton. Some fruit farming especially citrus is also gaining ground in the district. The major type of livestock kept by households include; cattle mainly zebu and crossbreeds, goats, sheep and poultry. There are no large water bodies like lakes in the district that could engage a significant proportion of the population in aquatic related activities like fishing and transport. However, there are some major wetlands where seasonal fishing takes place and where some farmers have established fish ponds.

3.1.5 Natural resources

Amuria District's total area is estimated at 2,613 square kilometers (666,086.123 Acres) and is blessed with natural endowments. Out of the District's total area, wetlands cover 382 square kilometers (14.6% of the total area). The greatest proportion of the district's land is covered with savannah grasslands which support grazing of livestock. The district is also blessed with substantial deposits of key minerals existing in the western side of the district. These minerals include gold and tin in Orungo, Ogolai, Morungatuny and Akeriau sub counties. Minor deposits of clay and sand are found in Wera and Asamuk sub counties.

3.2 Methods

3.2.1 Research design

A cross-sectional survey design was used to collect qualitative and quantitative data which involved random selection of participants from predetermined heterogeneous population of both men and women who were interviewed by using a semi structured questionnaire. This study was conducted over a period of three weeks and the unit of analysis was the household. This research design was preferred for the study because it covers a population of study of various socio-

economic backgrounds and it also enables a researcher collect both qualitative and quantitative data.

3.2.2 Sampling procedure

Two parishes that had the highest number of Shea nut farmers in Kuju sub-county were selected. A list of villages with the highest number of households was obtained from Amuria District Local Government Development Plan II FY2015/16-2019/2020. A list of the households of all Shea tree farmers in each of the villages was obtained and a simple random sampling technique was used to select 40 farmers from each parish. In each household, the household head was interviewed and in his/her absence or upon his/her request, any other member who was knowledgeable about the Shea tree value chain was interviewed.

3.2.2.1 Study population

The study population consisted of all small-scale farming households that had *Vitellaria Paradoxa* growing on their farms in Kuju Sub-county.

3.2.2.2 Sampling techniques

Both purposive and simple random sampling techniques were used for selecting the respondents out of a given population. The respondents were drawn from the two parishes (Amilimil and Orieta) of Kuju sub county with participants aged 18 years and above. This age was taken with assumption that these farmers had more knowledge and information on the growing and management of Shea trees. The eighty (80) respondents were randomly from these two parishes forty (40) from each parish to ensure diversity in respondents' education, farming experience and socio-economic backgrounds. The survey was carried out by administering semi structured questionnaires within the Three weeks period of June 2019 covering a mix of day times. The questionnaires were administered to respondents in semi structured interviews by well-trained interviewers.

3.2.3 Data collection

The letter of introduction from the department of extension and innovation studies was presented to the respective authorities' of Kuju Sub County so that the researcher gets permission to carry out research in the study area. This was accompanied by a letter of consent to the respondents designed to ensure confidentiality.

Primary sources of data were used during field work. Structured questionnaire interviews were held to collect primary data. The participants were randomly selected from the two parishes of Kuju sub-county while five (5) interviewers were trained by the researcher to carry out face to face interviews in the study area. Structured individual household interviews guided by interviewer-administered questionnaire (Appendix II) were held with the heads of households or any adult household member in case of the absence of a household head. This ensured systematic flow and recording of information, it was also time saving and it also enabled the interviewee to seek clarifications from the interviewer.

3.2.4 Data processing and analysis

After the survey, questionnaires were checked for completeness, accuracy, consistency and uniformity of data. The data (each of the variables or questions) was then coded using whole numbers starting from zero (0) and entered into Statistical Package for Social Scientists (SPSS) version 16, using the codes. Analysis was done using STATA software, version 14. The data collected was then analyzed using both descriptive and quantitative statistics. Descriptive analysis included use of means, frequencies and percentages to describe characteristics of the households under study. These were used for farmer perceptions of *Vitellaria paradoxa* as an economic tree. Ordinal logit regression analysis was also used to determine factors that influence farmer perception of *Vitellaria paradoxa* as an economic tree.

3.3 Subject scope

Agriculture is the major economic activity practiced by farmers in Amuria district. The majority of the farmers are small scale farmers who grow both annual crops and perennial crops. The major annual crops include groundnuts, maize, beans, green grams, sweet potatoes and cow peas. The common perennial crop grown here is cassava and sugar canes. This study focused on farmers who manage Shea trees in their crop gardens and live in Kuju sub-county, Auria district. The study examined the small-scale farmers' perceptions of the economic importance of the Shea tree.

3.4 Time scope

This study was conducted in a period of three weeks in the month of June in 2019.

3.5 Ethical considerations

At the beginning of the study, participants were informed to feel free to leave at any time and that they could withdraw their data at the end of the study if they wish. The researcher ensured that the consent of the participants was obtained by introducing the objectives of the study and giving them an opportunity to agree before any information was provided. The researcher also guaranteed confidentiality of information that the participants gave so that they were not hurt. The researcher ensured that the research conducted did not cause harm to the respondents.

CHAPTER FOUR

RESULTS

4.1 Socio-demographic characteristics of respondents

Of the 80 respondents interviewed, 57.5% were females, while 42.5% were males (Table 1). The maximum age reported was 73 years, while the minimum was 20 years, and the average age was 44.29 ± 1.27 years. Majority of the respondents (77.2%) were married while only 6.3% of them were single. This indicates that a limited number of youths (≤ 35 years) are involved in shea nut production. This could be attributed to the fact that youths have a negative attitude towards farming and their desire for white collar jobs in the town/city centres have made them to abandon shea nut production and therefore left it to their parents. The largest proportion of households relied on income from sale of products from agrisilviculture for their livelihoods. Majority (83.7%) of the respondents had attained some level of formal education while only 16.7% of them had no formal education which positively correlates with the perceived importance. This is an indication that the more educated the farmers, the greater their ability to perceive the economic benefits of shea nut tree and be able to understand and manage the related technologies for its production. This high level of literacy is also likely to make them more responsive to the adoption of new technologies needed for shea nut tree development. The average household size was 8.65 members.

Table 1: Socio-demographic characteristics of the respondents (n = 80)

| Characteristic | Category | Frequency | Percentage (%) |
|------------------------------|--|-----------|----------------|
| Gender | Male | 34 | 42.5 |
| | Female | 46 | 57.5 |
| Marital status | Single | 5 | 6.3 |
| | Married | 61 | 77.2 |
| | Divorced | 5 | 6.3 |
| | Widowed | 8 | 10.1 |
| Education level | None | 13 | 16.7 |
| | Primary | 24 | 30.8 |
| | Secondary | 27 | 34.6 |
| | Tertiary | 14 | 17.9 |
| Main household income source | Sale of products from Agrisilviculture | 36 | 45.0 |
| | Sale of products from silvopasture | 13 | 16.3 |
| | Salary | 12 | 15.0 |
| | Wages | 9 | 11.3 |
| | Small scale businesses | 6 | 7.5 |
| | Boda boda riding | 4 | 5.0 |

4.2 Farm characteristics

The average farm size was 3.34 ± 0.221 hectares. All the respondents (100%) practiced agroforestry; and shea nut trees were among the main trees managed in their farms. The respondents had managed their agroforestry farms for an average of 20.28 ± 1.211 years. Farmer-managed natural regeneration (97.5%) was the major regeneration method of establishment of the on-farm trees. These are majorly scattered on the farm (93.8%), while a few (6.3%) formed farm boundaries (Appendix I). Shea nut oil was the major product obtained from this tree. Marketing of the shea nut oil is mainly done through middle men, wholesalers and retailers. The households were, on average, about 5.22 ± 0.27 kilometers away from the nearest markets.

4.3 Respondents' perceived importance of the shea nut tree as an economic tree

Five major products from Shea nut tree deemed to be of significant economic importance were reported: the shea nut, shea nut oil, charcoal, firewood and building material (Table 2). Of these, shea nut and shea nut oil were regarded by over 65% of the respondents as very important products from the shea nut tree. The rest of the products were regarded as important. The average yield of shea nut reported was 26.976 ± 2.258 kg per hectare. The average annual income obtained from was $151,434 \pm 15,454$ shillings.

Table 2: Respondents' perceived level of the usefulness of products of shea nut tree (n=80)

| Product | % of respondents | | | |
|-------------------|------------------|----------------|-----------|----------------|
| | Not important | Less important | Important | Very important |
| Shea nut | 5.3 | 2.7 | 22.7 | 69.3 |
| Shea nut oil | 12.8 | 2.6 | 14.1 | 70.5 |
| Charcoal | 0 | 8.3 | 83.3 | 8.3 |
| Wood fuel | 7.3 | 4.9 | 68.3 | 19.5 |
| Building material | 17.6 | 17.6 | 61.8 | 2.9 |

When respondents were asked to rate the resource trend of these different products, more than half indicated shea nut (54.1%) and shea nut oil (51.9%) to be increasing. Charcoal (58.3%), wood fuel (45%) and building material (48.5%) were reported to be decreasing (Figure 2).

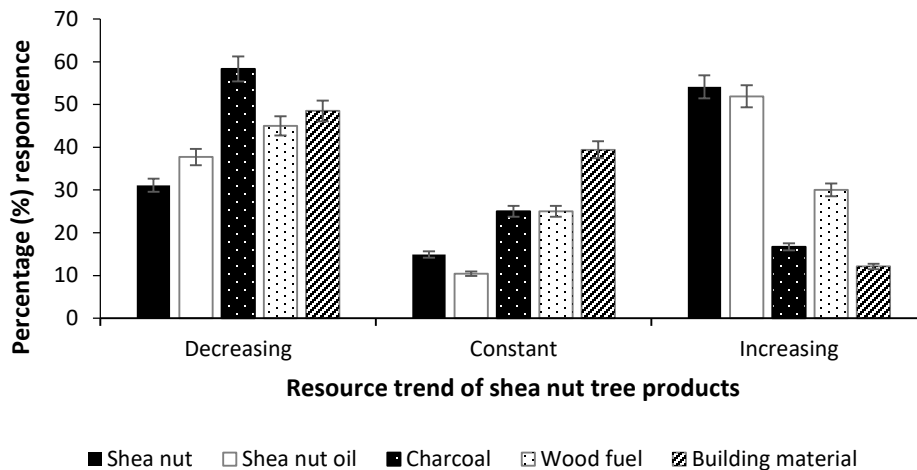


Figure 2: Respondents' perceived resource trend of shea nut tree products in the last five years

When respondents were asked who determined how these products were used in the household, majority of the respondents said the wife was the major decision maker on the usage of shea nut oil (91.3%), wood fuel (82.5%) and shea nuts (57.5%). The husband on the other hand decided mainly for charcoal (75%) and building material (85.7%) usage (Table 3).

Table 3: Determinant of how shea nut tree products are used (n=80)

| Product | % of respondents | | |
|-------------------|------------------|------|-------|
| | Husband | Wife | Joint |
| Shea nut | 27.4 | 57.5 | 15.1 |
| Shea nut oil | 6.3 | 91.3 | 2.5 |
| Charcoal | 75.0 | 25.0 | - |
| Wood fuel | 15.0 | 82.5 | 2.5 |
| Building material | 85.7 | 14.3 | - |

The income obtained from the shea tree products was mainly used for buying planting material and paying medical bills as reported by over half of the respondents. Besides the economic importance, environmental values of the tree were also reported. Being a dominantly silvoculture system, the importance of the tree as a source of shade for crops and farm workers was reported by over 31% of the respondents. Other benefits included source of manure (14.9%), herbal medicine (13.2%), boundary marking (12.8%), among others as shown in Figure 3.

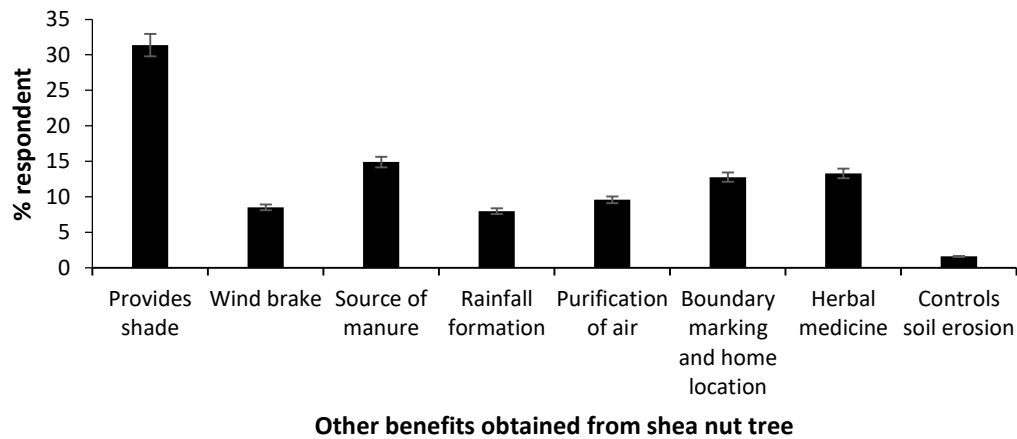


Figure 3: Other benefits obtained from shea tree

4.4 Challenges faced in management of on-farm shea trees

Majority of the respondents (69.2%) had limited access to extension services and over half (57.5%) did not belong to functional local producer groups. Natural hazards such as pests and diseases and storms and flooding were other challenges reported by over 25% of the respondents (Table 4).

Table 4: Challenges faced by small-scale farmers in production of shea trees (n=80)

| Challenge | Frequency | Percentage (%) |
|--------------------------------------|-----------|----------------|
| Limited access to extension services | 54 | 69.2 |
| No functional local producer groups | 42 | 57.5 |
| Pests and diseases | 25 | 32.5 |
| Storms and flooding | 20 | 26.0 |
| Lightening | 13 | 16.9 |
| Prolonged droughts | 9 | 11.7 |

4.5 Factors influencing farmers' perception of *Vitellaria paradoxa* as an economic tree

More than half of the respondents (51.3%) rated *Vitellaria paradoxa* as a very important tree of economic importance. The estimated marginal effects (parameter estimates) and t-levels (Sig.) from the ordinal logit regression model is presented in the Table 5. The results show that most of the explanatory variables (factors) considered is statistically significant at 10% except for marriage (married) (5% significant). The results show that household size, land size, access to extension, farming experience farm size, access to extension and single married age all had no significance effect on farmers' perception of *Vitellaria paradoxa* as an economic tree ($P > 0.05$).

The age, gender, marital status and whether the household was practicing agroforestry had significant effect ($P \leq 0.1$) on their perception of *Vitellaria paradoxa* as an economic tree. Marital status of the household heads and whether the household was practicing agroforestry had a positive statistically significant influence unlike age and sex of the household head, that negatively influenced perception of *Vitellaria paradoxa* as an economic tree (Table 5). Majority of the married respondents (78.9%) rated *Vitellaria paradoxa* as an important economic tree; while less than half of the males (43.4%) rated *Vitellaria paradoxa* as an important economic tree. Female-headed households on the other hand rated the tree highly compared to their male counterparts.

Younger household heads favorably rated the tree as an economic tree compared to the older household heads.

Table 5: Parameter estimates from ordinal logistic regression analysis explaining factors influencing farmers' perception of *Vitellaria paradoxa* as an economic tree

| Variable | | Parameter estimate | Std. error | p-value |
|-----------------------|----------|----------------------|------------|---------|
| Age | | -0.062* | 0.038 | 0.099 |
| Household size | | -0.039 ^{ns} | 0.071 | 0.583 |
| Land size | | -0.032 ^{ns} | 0.053 | 0.554 |
| Practice Agroforestry | Yes | 0.181* | 0.098 | 0.065 |
| Access to extension | | -0.584 ^{ns} | 0.511 | 0.254 |
| Farming experience | | -0.092 ^{ns} | 0.088 | 0.299 |
| Sex | Female | -0.889* | 0.490 | 0.070 |
| Marital status | Singe | 1.618 ^{ns} | 1.275 | 0.205 |
| | Married | 2.087** | 0.840 | 0.013 |
| | Divorced | 2.699* | 1.415 | 0.056 |

Log-likelihood function: 141.224, significance level: ($P = 0.062$); ** = significant at 5% ($P \leq 0.05$), * = significant at 10% ($P \leq 0.1$), ^{ns} = not significant; Std. = standard; Sig. = probability value; The categories of marital status were compared with the Widowed category.

CHAPTER FIVE

DISCUSSION

5.1 Socio-demographic characteristics of shea tree farmers

Shea tree farming is mainly done by females and by married people of an average age of 44 years. This was supported in the findings of Jamala *et al.* (2013) when he found out that 63% of the Shea tree cultivators were women. This fact was further reaffirmed by Wallace-Bruce (2005), who found out that Shea butter industry is mainly driven by the work of women across West African through collection of the Shea nuts extract the butter and sell the refined product. It was estimated that the Shea tree provides more than half of a Women's incomes in the Sahel regions. Women majorly participate in the Shea tree farming basically due to sectors' underdevelopment and since they are always undermined in the major professional jobs, they resort to such underdeveloped ones. Men totally exclude themselves from the act due mainly to non-recognition of the Shea butter industry potential to help the economy and women have their own limitation of complex including lack of access to key factors of production, lack of appropriate funding, and high level of domestic work (Agbogidi, 2010).

Shea cultivation is also done by people who have attained some levels of education and with an average household size of 8 members. This is in contrast with the findings of Jamala *et al.* (2013) which found out that the majority of Shea tree farmers had no formal education. The findings are possibly true due to higher levels of unemployment for the educated as well and as a result, graduates remain with no other choices but to lower themselves to even underdeveloped sectors of production like in the Shea tree farming.

Most farmers use 3.34 hectares of their land for the plantation of Shea tree of which their farms had a maturity age of 20 years. This is due to the fact that Shea tree farming is still not fully embraced by the communities and it is still undomesticated. According to Bayala *et al.* (2007), shea tree remains undomesticated probably because of lack of tradition to plant local tree species. Indeed, shea tree parklands result from naturally occurring individual trees that are protected by farmers when clearing their fields, thus creating parkland systems. Shea nut oil is the major product obtained from Shea trees and is mainly sold through middle men, retailers and wholesalers and its market are about 5 kilometers away from the farmers.

5.2 Respondents' perceived importance of the Shea tree as an economic tree

Out of all the four Shea tree products, Shea oil and Shea nuts are considered the most important products from Shea tree and have increasing trend than other products. According to Jamala *et al.* (2013), butter extracted from the kernels is the most important product of Shea tree and is frequently used for local domestic purposes such as cooking, lighting, in soap manufacture or as skin moisturizer, as well as in traditional medicine.

Shea oil and nuts also have an average yield of 26.98 kilograms per hectare. This is far much lower than 2.4 kilograms of dry kernels per tree and 48 to 65 kilograms per hectares as indicated in the findings of Boffa *et al.* (2001), carried out in Burkina Faso. This shows lack of efforts submitted in to the Shea tree farming in Uganda in form of new technology, application of fertilizers and lack of commitment of the farmers.

Household decision making on the usage of Shea tree products is also divided with wives being major decision makers on Shea nut oil, wood fuel and Shea nuts. And husbands deciding on usage of Charcoal and building materials than wives. Most farmers rely on Shea tree income for buying planting materials and for medication of the household members. This is in support of findings by Hall *et al.* (2006) that Shea trees also provide fruits, medicine, construction materials, fuel wood and carving wood.

Also, according to Agbogidi (2010), households world over depends on natural resources in order to meet a large number of their basic necessities. This fact was reaffirmed by Agbogidi and Okonta (2003), who pointed out that a large proportion of rural population earns their livelihood from the extraction and sales of Shea products. Shea trees are also used for environmental conservation, source of shade for other crops and farmers, source of manure, herbal medicine and boundary marking. This is also attested by Agbogidi and Eshegbeyi (2008), who maintained that forest provides a wide range of benefits at both the local, national and global levels.

5.3 Challenges faced in management of on-farm Shea trees

Shea tree cultivation is constrained by farmers' limitations from accessing services, lack of local producer associations, plants are faced by pests and diseases, storms and flooding. Others are inadequate modern technologies, under-developed markets and lack of storage facilities. Reliance on low level of technology input is inadequate to lead to desired rapid and sustained increases in the contribution and utilization of Shea tree. Lack of substantive information on the economic values of Shea trees has undermined their contribution to the national gross domestic products (Agbogidi and Ofuoku, 2005). Agbogidi (2010) noted that strengthening the local people's capacity to adopt sound and sustainable agroforestry practices such as retaining of economic trees on farmland can remarkably increase profit of rural farmers. On the other hand, availability of Shea trees could be enhanced through enrichment planting and assisted natural regeneration.

5.4 Factors influencing farmers' perception of *Vitellaria paradoxa* as an economic tree

Respondent's age had a negative significant effect ($P \leq 0.1$) on farmer perception. This slightly differs from findings by Adeola (2012), which observed a positive significance ($P \leq 0.05$). The higher the age of respondent, the more likely is the respondent to have more experience in shea nut production. Respondent's age significantly influences knowledge of shea as an economic tree (Gwali *et al.*, 2012), which in turn influences perception. According to Ferris *et al.* (2001), productivity increases with increase in age of both the farmer and trees. This in turn influences farmer perception. The young farmers are likely to perceive the importance differently. The younger farmers are more likely to be more educated than the elderly farmers. Education therefore increases one's knowledge of the economic importance of Shea nut tree due to awareness of the different products and benefits that can be realized from the tree.

Respondent's gender had significant effect on farmer perception. The females contributed more to this perception. This is not surprising since most of the respondents were females. The females are aware of more products from shea besides oil and seed, such as firewood. The females (women) are more active in dealing in products from shea (Elias, 2016). According to Adeola (2012), farmers with more knowledge of potential products of shea tree have a positive perception toward shea tree as economic tree.

Married household heads, compared to the widowed positively perceived shea tree as an economic tree perception. This is in agreement with findings by Buyinza and Okullo (2015) and Sheshi (2018), where marital status influenced willingness to plant; which is closely related to perception as an economic tree. Positive perception signifies willingness to plant. Respondent's practice of agroforestry had a positive significant effect on farm.

Household size, land size, access to extension, farming experience, access to extension and single married age all had no significant effect on farmers' perception of *Vitellaria paradoxa* as an economic tree ($P > 0.05$). This is disagreement with findings by Adeola (2012) who observed significance ($P \leq 0.05$) in some of these variables such as household size, farming experience and farm size. For example, according to Adeola (2012), farmers with more farming experience may have acquired encouraging returns from shea trees.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Shea tree farming in Kujū Sub-county has been left under the drive of women as it is a sector which is undermined by men who are engaged in more productive and highly invested in activities. Shea tree farming is also practiced by both educated and uneducated depending on the geographical location and the levels of unemployment in a region. Whereby in regions with higher levels of unemployment, the fairly educated participate in the Shea tree farming due to shortages of white color jobs and in regions where there are lower levels of farming, it is the uneducated who participate heavily on the sector for survival.

Shea tree farming is still practiced on a small scale and is dominated by low technology with limited government support and it is majorly sold on retail basis through middle men. Shea oil is also a most treasured by product from Shea tree due to its various uses in the day to day of the households. Shea tree yield in Uganda is very low as compared to both the standard expected yields and average yields from other countries due to limited commitment from both the farmers and the authorities. Shea tree products are usually decided by both men and women depending on the usage; men make decisions on charcoal and building materials and women on Shea oil, wood and nuts. Shea tree farming is treasured by all categories of households as important despite less motivational approaches from the respective authorities to make farmers believe in their perceptions.

Incomes obtained from Shea tree farming is mainly used for buying planting materials and medication of the farmers. This shows that the country is dominated by farmers and the activity of Shea tree farming is also carried out by already existing farmers who participate in other farming activities as well. Shea trees provide shade to both the plants and farmers and conserve the environment. Farmers are always faced with a challenge of natural droughts and lack of togetherness through associations. Among the factors that influence shea as an economic tree, respondents' age, gender, marital status and whether practicing of agroforestry had significant effect on farmer perception. Marital status and whether practicing agroforestry had a positive significant influence unlike age and gender, that influence perception negatively.

6.2 Recommendations

The following recommendations are suggested to enhance shea tree production, productivity, profitability in the study area:

- i. Provision of economic incentives and technical assistance will facilitate and boost the Shea enterprise in the study area.
- ii. Government should support the Shea butter enterprise through skill enhancement program and formation of associations. A deliberate bylaw should be formulated to provide public awareness and positively influence farmers' attitudes towards the tree and its products for boosting household incomes.
- iii. Farmers should be encouraged to protect and plant Shea trees on their farms and a demand-driven approach is needed to revitalize the market for the tree products.
- iv. Farmer perceptions and attitudes should be considered with any initiatives to promote shea production in Uganda.

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APPENDIX

Appendix I: Farm characteristics

| Characteristic | Category | Frequency | Percentage (%) |
|--------------------------------|-------------------------------------|-----------|----------------|
| Shea tree establishment method | Natural regeneration | 2 | 2.5 |
| | Farmer-managed natural regeneration | 78 | 97.5 |
| Shea tree location on farm | Boundary | 5 | 6.3 |
| | Scattered on-farm | 75 | 93.8 |
| Decision making on trees | Husband | 32 | 40.0 |
| | Wife | 7 | 8.8 |
| | Joint | 41 | 51.3 |
| Products from shea tree | Shea nut | 74 | 30.8 |
| | Shea nut oil | 79 | 32.9 |
| | Charcoal | 13 | 5.4 |
| | Wood fuel | 41 | 17.1 |
| | Building material | 33 | 13.8 |
| Processing of shea nuts | No | 4 | 5.1 |
| | Yes | 74 | 94.9 |
| Marketing means | Local markets | | |
| | Less important | 66 | 91.7 |
| | Important | 0 | 0.0 |
| | Very important | 6 | 8.3 |
| | Wholesales | | |
| | Less important | 0 | 0.0 |
| | Important | 3 | 37.5 |
| | Very important | 5 | 62.5 |
| | Middlemen | | |
| | Less important | 1 | 1.6 |
| | Important | 15 | 23.8 |
| | Very important | 47 | 74.6 |
| | Retailer | | |
| | Less important | 5 | 7.4 |
| | Important | 51 | 75.0 |
| Very important | 12 | 17.6 | |

Appendix II: Questionnaire

RESPONDENT’S INFORMED CONSENT

Dear Sir/Madam,

My name is OKWI WILSON, a student of Makerere University pursuing a Bachelor’s degree in Agriculture. I am conducting an academic research study on the topic: Assessment of farmers’ perception of shea tree as an economic tree among small scale farmers in Kujua Sub-County You have been selected for the study based on your long-term experience in managing the trees on your farm.

I kindly request you to take time to provide me with the possible responses to the questions given in this form. This information will be kept with confidentiality and will be used solely for academic purposes.

Thank you in advance.

Wilson Okwi

Telephone: 0777954866/0784068271

PART A: SOCIAL DEMOGRAPHIC CHARACTERISTICS OF RESPONDENT [Tick where applicable]

1. Bio-data

| | |
|--|-------------------|
| Correspondent No: | Age: |
| Sex: Male: <input type="checkbox"/> Female: <input type="checkbox"/> | Village: |
| Parish: | Sub-County: |

2. Marital status of the respondent

Married Single Widowed Divorced

3 What is your highest level of education?

a) None b) Primary c) Secondary d) Tertiary e) University

4. How many people are in your household? _____

| Number of Household members | Below 14yrs. | 15-24 yrs. | 25-34 yrs. | 35-60 yrs. | >60 yrs. |
|-----------------------------|--------------|------------|------------|------------|----------|
| | | | | | |

5. What size of land do you own? _____[Acres]

PART B: FARMING CHARACTERISTICS OF THE RESPONDENT

6 a). Do you practice agroforestry in your farms?

YES _____ NO _____

b). If yes, for how long have you been practicing it? _____

7 a). Are shea tree species grown in your farm?

YES _____

NO _____

b). If yes, how were they established? (Select options that apply)

1. Natural regeneration _____

2. Planting _____

3. Farmer-managed natural regeneration _____

4. Others (please specify)

8. Where are the shea trees established in your farm? (Select options that apply)

1. Boundary _____

2. Scattered on-farm _____

3. Home garden _____

4. Woodlot _____

5. Others (please specify)

9). who determines where these trees are established and managed?

a) Husband_____

b) Wife_____

c) Joint.....

10.a) What are the three main products you get from the shea tree?

a) Nuts

b) Shea oil

c) Charcoal

d) Wood fuel

e) Building material

b). How are these products useful to you? (1=Not important.....5=Very important)

.....

| Product | Usefulness | | | | | Resource trend in the last five yrs. (increasing, decreasing, constant) |
|---------|------------|---|---|---|---|--|
| | 1 | 2 | 3 | 4 | 5 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

c)Who determines how these products are used in your household?.....

| Product | Determinant of use in the household |
|---------|-------------------------------------|
| | |
| | |
| | |

d) What are the three other main benefits your household derives (other than the products above) from shea trees on your farm?

| Use | Rank |
|-----|------|
| | |
| | |
| | |
| | |

11). a). How much yield did you harvest from your shea trees last season?

.....

b). How much money did you earn from the shea products harvested in last season?

.....

c) How important is the income stream from shea products to the household?

(1 Not important.....5 very important)

| Income use | Rank |
|-------------------------------------|------|
| Buying land | |
| Paying school fees | |
| Meeting medical bills | |
| Buying planting materials | |
| Buying other needed household goods | |

d) What are your **three** main household income sources?

| Income source | Monthly average (UGX) | Rank |
|---------------|-----------------------|------|
| | | |
| | | |
| | | |

e) How important is the income stream from shea products the household? _____

(1 Not important.....5 very important)

12. How many years have you spent managing shea trees?.....

PART C: THE SHEA VALUE CHAIN CHARACTERISTICS

13). a). What natural hazard mainly affects shea trees in your farm for the past 3 years?
.....

b) How frequent does it occur in your farm in a year?.....

14). a). Do you receive agricultural extension services related to shea tree growing and management?

1. Yes

2. No.

b). If yes, where do you receive the extension services from? (select options that apply)

i). NGO's (name them)

ii) Governmental institutions (name them)

.....

iii) Researchers.....

c) How often do you receive extension services in a year?

1. Weekly

2. Monthly

3. Quarterly

4. Occasionally

d) How do you usually receive the extension service? (select options that apply)

1. Face-to-face home visit

2. Workshops

3. On-farm demonstrations

- 4. Radios/Televisions
- 5. Phones (Messages/Internet)
- 6. Fellow farmers
- 7. Others (please specify)

15). a). To what extent was the extension service beneficial to you? (On a scale of 1. Not beneficial, 5 very beneficial)

| Extension service | Relevance (Scale) |
|--|-------------------|
| Acquisition of new skills and techniques of shea tree management | |
| Acquisition of market information | |
| Knowledge on the new varieties of shea tree | |
| Knowledge on shea butter processing | |
| Knowledge on post-harvest handling | |

16). a). Do you have access to credit services for farming activities?

YES _____ NO _____

b). If yes, from where?.....

17). a). How easily do you access (or receive) credit?

i). Very easy _____

ii). Easy _____

iii). Not easy _____

b). How far is your farm from the nearest credit facility?

_____ km

19). a). Do you belong to any farmers' group?

YES _____ NO _____

b). If yes, for how long have you been in this group?

_____ days/months/years

c). Has it been useful to you?

YES _____ NO _____

d). If yes, how has it been useful to you?

| Importance | Rank |
|-------------------|-------------|
| | |
| | |
| | |

20). a). Do you process your Shea products before selling?

YES _____ NO _____

b). If yes, how are they processed?

I. locally

II. Factory

21). a). How do you market the shea tree products from your farm?

| Marketing agents | Rate of gain |
|-------------------------|---------------------|
| Local markets | |
| Wholesalers | |
| Middlemen | |
| Retailers | |

22. How far is your home from the nearest;

A) main road?.....

b) Main market?.....

c) Agricultural extension service Centre?.....

PART D: ASSESSMENT OF SMALL-SCALE FARMERS' PERCEPTION OF VITELLARIA PARADOXA.

- a) [Please indicate the extent to which you perceive the economic value of the shea tree to your household, community and the nation. Your respective answers are to range from a minimum of one (for strongly disagree) to a maximum of five (for strongly agree). Place a tick at the appropriate answer of your own choice].

| Statement | SD | D | N | A | SA |
|--|-----------|----------|----------|----------|-----------|
| Shea nut production is my main source of income | | | | | |
| My household is experiencing food security because of growing shea trees | | | | | |
| My household income has increased because I earn more money from the sale of shea tree products. | | | | | |
| By establishing a shea nut processing factory in my area, many employment opportunities can be created | | | | | |
| Promoting shea nut production in Uganda can increase the country's foreign exchange earnings | | | | | |
| Promoting shea nut production and marketing can lead to better roads and other infrastructure in my district | | | | | |

- b) In your view, what should your fellow farmers, government, NGOs and research community do to increase the economic value of shea trees in your household?

| Entity | Recommendation |
|---------------------|----------------|
| Fellow Farmers | |
| Government agencies | |
| NGOs | |
| Researchers | |