

## **The Potentials of Shea Nut Tree to the Nigerian Economy**

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**Abstract:** The Shea nut tree is an economic crop indigenous to the Guinea and Sudan savanna zones of Nigeria. It is grown between latitudes 7<sup>0</sup>N -12<sup>0</sup>N. Its role in food production, foreign exchange earnings, raw materials for industries, income and employment generation to millions of Nigerians most especially women and young people makes it a crucial asset for National Economic Development. It is obvious that apart from the nutritional and medicinal properties of Shea nut tree, the evidences on its economic and environmental importance to the economy of the nation are enormous. With adequate exploitation, the crop has the potentials to make significant contribution to the country's Gross Domestic Product (GDP). Nigeria is the leading producer of Shea nuts: 355,000MT was produced in 1999, 58% of the African production and 414,000MT in 2005. Mali and Burkina Faso are other leading producers as at 2005, with 85,000MT and 70,000MT respectively. African processed Shea butter exports have increased from 1200MT in 1998 to 3200MT in year 2000. The market prospect is very bright particularly at the international scene. Therefore the greatest potential in this respect lies in the commercial development of Shea products with ready market value, which will give the nation a major economic boost of unimaginable proportions from the industry. Despite the numerous potentials of Shea nut tree, it is mostly grown naturally in the wild with little attention to planting in an organized plantation. Dearth of information on its potentials and the long period taken to reach maturity led to the development of cold feet to sustainable management of the Shea nut industry. This paper is therefore designed to unveil the potentials of Shea nut tree and its role in the development of the economy of the nation. In order for the development of Shea products trade to result in tangible improvement in sustainable management of the Shea resources in the country, partnership between rural producers, national policy – makers, the private sector and international industry is inevitable.

**Key words:** Shea nut, potentials, market, dearth of information, sustainable, tangible.

### **INTRODUCTION**

Shea tree is indigenous to the Guinea and Sudan savanna zone from Senegal to Sudan, and to western Ethiopia and Uganda, in a belt 500–700 km wide. It is found in the interior, separated from the Gulf of Guinea by forest; only in Ghana and Nigeria does it occur within 50km from the coast (Nikiema & Umali, 2007). Shea tree grows naturally throughout Guinea Savannah region. It is

perennial and deciduous. Mature tree height vary considerably with some trees attaining heights of over 14m and girth of over 1.75m (Yidana, 1994). The tree has profuse branches with a round or hemisphere crown. The bark of the stem is conspicuously thick, waxy, corky and deeply fissured that make it fire resistant. Many vernacular names are used for *Vittelatia*, which is a reflection of its extensive range of occurring nearly 5,000km

from (West) to (East) across the African continent. The nomenclature history and synonymy of the Shea tree follow a very tortuous evolution since the oldest recorded specimen collected by a European explorer. It eventually arrived at the name *Vittellaria* with sub species *paradoxa* and *nilotica*.

The abundance of the Shea tree in Nigeria exists in and thrives almost exclusively in the North. They mostly grow naturally in the wild, the long period taken to reach maturity has discourage its planting in an organized plantation. The Shea or Karite, formally *Butyrospermum* produces its first fruits (which resembles large plums) when it is about 20 years old and reaches its full production when the tree is at about 45 years old and continue to produce nuts for up to two hundred (200) years, after reaching maturity. Shea tree is important as an economic crop because of the heavy demand for its butter, both locally and internationally mainly as cocoa butter substitute for the production of chocolate, following increasing international interest in Shea butter as a cocoa butter equivalent in confectioneries and pharmaceutical and cosmetic industries. Shea nut products are used domestically and exported. The main importer is Europe. Nigeria is the largest producer of Shea nut in West Africa, producing about 58% Shea nut in 2008.

The long- term prospect of Shea products measure in any Nation includes research and development, the improvement of Shea productivity and product quality, the transfer of technology diversification and processing improvement of the sectoral infrastructure. The Shea tree also comprises a unique resource for rebuilding the lives and livelihoods of rural farmers, this resource were already in use by mostly women and children to generate substantial

income to support their domestic needs which in the medium- term, alleviates poverty amongst the rural women and in the long-term provides continuous employment opportunities for both rural women and young people, and not only that, the economic environmental and other benefits of Shea tree to the nation is undoubtedly clear in providing revenues for increased income from both export and local consumption. This will also open new frontiers for the country in the world export market for Shea products as a substitute to palms of economic value. Local farmers on the other hand, who have become serious about production and protection of Shea resources, will generate income to sustain their families and improve the quality of their lives.

#### **Shea tree as one of NIFOR's mandate crop**

In recent years the Shea tree has gained importance as an economic crop because of the heavy demand for its butter, both locally and internationally, and the need to find substitutes for cocoa butter. Shea butter is a useful cocoa butter substitute because it has a similar melting point (32–45°C) and high amounts of di-stearin (30%) and some stearo-palmitine (6.5%) which makes it blend with cocoa butter without altering flow properties.

The high proportion of unsaponifiable matter, consisting of 60–70% triterpene alcohols, gives Shea butter creams good penetrative properties that are particularly useful in cosmetics (Nikiema, & Umali, 2007). Therefore in recognition of the need to find substitutes for the rather expensive cocoa products, and to maximize economic exploitation of the vast Shea resource in Nigeria, the federal government of Nigeria included Shea tree as one of the mandate crop of

economic importance to the Nigerian Institute for Oil palm Research (NIFOR). This led to the establishment of NIFOR Shea nut tree research sub-station. The sole responsibility of this sub-station is to research into the economy, ecology and biology of the Shea tree and with the aim of improving its yield. The research sub-station, apart from providing job opportunities for researchers and others, it will also provide avenues for increased production of Shea nut yields if extended to the end users. And consequently, Shea nut output, for both export and local consumption, will increase tremendously in the next few years. Shea tree mostly occurs in 19 countries across the African continent, namely Benin, Ghana, Chad, Burkina Faso, Cameroon, Central African Republic, Ethiopia, Guinea Bissau, Cote D'Ivoire, Mali, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda, Zaire, and Guinea (FAO, 1988).

#### **METHODOLOGY**

This work comprises of review of literature on Shea nut tree. Sources of information were mainly from Nigerian Institute for Oil Palm Research (NIFOR) annual reports, NIFOR In-house Research review 2008, Articles and Journals, Conference papers, FAO statistics from the internet, International workshop on processing and marketing of Shea products in Africa Dakar, Senegal 4-6 march 2002; Project executing agency and co financier; Food and Agriculture Organization of the United Nation; Rome, Italy. (Forest products services of the forest products and economic division, Basic food stuffs service of the commodities and trade divisions and FAO intergovernmental on oilseeds, oils fats).

#### **The need for Shea tree production in Nigeria**

The Nigerian Agricultural industries have the potentials to contribute significantly to the economic and industrial development of the nation, especially with the wide range of industrial application of most of the nation's agro-produce like Shea nut. Nigeria is fairly blessed with Shea trees which could be harnessed for industrial development through which the quality of life of the people will be improved. The Shea tree occupies a pre-eminent position in the Nigerian economy in providing employment to a large number of people on the Shea tree belt if special consideration is given to its organized planting. Quite sizeable portion of unemployed population will find ready jobs if the opportunities provided by the numerous applications of Shea nuts were fully tapped. The planting, harvesting and processing of Shea nut in to fat and oil or (butter) and the kernels into Shea Nut Cake (SNC) will not only provide business opportunities to millions of Nigerians mostly in the Shea tree belt, it will also offers a wide range of investment opportunities that are economically attractive to the people at home and abroad. The role of Shea tree in food production, foreign exchange earnings, raw materials for industries, income and employment generation to millions of Nigerians including women and young people makes it a very crucial asset for National Economic Development.

The Shea butter processing in Nigeria is mostly done traditionally by women in the rural area; the procedure is quite tedious and time consuming, from collection of the Shea fruits to the production of the final product. A variety of methods are used traditionally to remove the husks. These include trampling, pounding using a mortar

and pestle, and cracking between two stones. In removing the oil from the kernels, it is estimated that the production of 1kg of Shea butter takes one person 20-30 hours and that 8.5-10.0kg of wood fuel is needed to produce it (Niess, 1988). This means that energy input is quite high. No estimates exist of the overall balance between cost of input energy and the economic profit from the sale of Shea butter. The traditional oil extraction technique of Shea butter is time consuming, physically exhausting and requires large quantities of fuel wood and water; resources that are often scarce in the regions where the butter is produced. In general, it is also inefficient in terms of the amount of fat extracted. These however could be improved in the modern way, and without doubt, the Shea nut output, for both export and local consumption, will increase tremendously.

Therefore, it will be appropriate that the national economic searchlight for national development focus on developing Shea nut tree especially in the aspect of processing and marketing of its kernels so that the current over dependence on crude oil as the main source of the country's revenue could tilt a bit in favor of agricultural produce as it were before the discovery of crude oil.

#### **Production and international trade**

*Vitellaria paradoxa* is one of the most important sources of vegetable oil in rural areas of the savanna zone of West Africa. The bulk of the Shea nuts produced are for home consumption and local trading. Nigeria is the leading producer of Shea nut: 355,000MT produced in 1999, 58% of the African production, but 10,000MT lower than in 1996 and 414,000MT in 2005 (FAO, 2005). Mali and Burkina Faso are other leading producers;

at the end of 2005 they produced 85,000MT and 70,000MT respectively, followed by Ghana (65,000MT), Côte d'Ivoire (36,000MT), Benin (15,000MT) and Togo (8,000MT). Up-to-date statistics on Shea nut production are not available for most countries. Reports on Burkina Faso show a remarkable increase in production to 222,000MT in 2005. Similar trends probably take place in other West African countries. In 1998, Africa exported 56,000MT Shea nut, valued at US\$ 10.5 million, of which 60% came from Ghana. Benin's exports decreased from 15,266MT in 1994 to 5,600MT in 1998, Togo had only a slight decrease from 6,562MT in 1994 to 5,100MT in 1998, whereas exports from Burkina Faso increased from 5000MT in 1994 to 7,632MT in 1997 and then to 26,600MT in 2003. African total export for five years (1993-1997) amounted to over 48,000MT, valued at over US\$ 10,000. No export data have been reported for Nigeria since 1995. Processed Shea butter exports in 1998 for the whole of Africa amounted to 1200MT, worth US\$ 571,000. African exports of Shea butter have increased to 3200MT in year 2000. (Nikiema, & Umali, 2007). Major Shea nut importers in recent years were Belgium, Denmark, Japan, the Netherlands, Sweden and the United Kingdom (FAO).

#### **The nutritional importance of Shea**

The fruit of the Shea tree ripens during the annual hunger season when food supplies are at their lowest ebb and agricultural labour requirements are at their peak. When the Shea fruits ripen, they fall under their own weight to the floor and are gathered by hand mostly by Nigerian women and children. The fruit, which is green in colour, has a fleshy edible pulp, it is rich in vitamins and minerals and not lacking in protein

too. It contains 0.7-1.3g of protein and 41.2g of carbohydrate and is very sweet. The fruit pulp is a particularly rich source of ascorbic acid: 196.1mg/100g compared with 50mg/100g in oranges. The iron and calcium content compares favorably with raspberries: 1.93mg/100g as against 0.92mg/100g for iron, and 36.4mg/100g as against 26mg/100g for calcium. (FAO, 1988), reports that vitamin B is also present. The sugar content varies from 3-6%, equally distributed between glucose, fructose and sucrose. Shea butter has several industrial applications, but the majority of kernels (approximately 95%) provides an important raw material for Cocoa Butter Replacers (CBRs), and is used for manufacturing chocolate and other confectionery. Shea butter could be used as a pan-releasing agent in bread baking. The fruit pulp, being a valuable food source, is also taken for its slightly laxative properties. Although not wide spread minor uses include cosmetics and pharmaceuticals. The fruit is also an important source of food for many organisms, including birds and bats.

Inside the fruit is a seed rich in the mixture of edible oils and fats known as Shea butter. The mature kernel contains 61% fat which when extracted is edible- a crucial nutritional resource for millions of Nigerian rural households and can serve as medicinal as well as industrial purposes. The oil extracted from the kernel (45-60%) is important in the U.K as cocoa butter substitute in chocolate manufacture. Greater quality assurance of the Shea butter throughout the supply chain is a pre-requisite if the Shea tree is to reach its full nutritional resource for rural and urban households across the nation and for future generations.

### **Medicinal properties of Shea tree**

Shea butter is one of the main edible oil for the rural people of northern Nigeria being the most important source of fatty acids and glycerol in their diet. It is an unguent for the skin. Alander and Aderson (2002) and Alander (2004) identified other specific compounds such as triterpene alcohols, known to reduce inflammation; cinnamic acid esters, which have limited capacity to absorb ultraviolet (UV) radiation; and lupeol, which prevent the effect of skin aging by inhibiting enzymes that degrade skin proteins. Shea butter also protects the skin by stimulating production of structural proteins by specialized skin cells. It also has anti-microbial properties, which gives it a place in herbal medicine. It is also used in the pharmaceutical and cosmetic industries as an important raw material and/or a precursor for the manufacture of soaps, candles, and cosmetics. Shea butter is used as a sedative or anodyne for the treatment of sprains, dislocations and the relief of minor aches and pains. Other important uses include its use as an anti-microbial agent for promotion of rapid healing of wounds, and as a lubricant for donkey carts. In Roger Caillie's own words as reported in (Hall et al., 1996), "the indigenous people trade with it, they eat it and rub their bodies with it; they also burn it to make light; they assure me that it is a very beneficial remedy against aches and pains and sores and wounds for which it is applied as an unguent". Today the Shea tree produces the second most important oil crop in Africa after oil palm (Poulsen, 1981), but as it grows in areas unsuitable for palm, it takes on primary importance in West Africa, and in regions where annual precipitation is less than 1000mm of rainfall. However, it loses popularity in urban areas

within these regions due to the pungent odor it emits, should it become rancid (Ayeh, 1981).

As a cosmetic, it is used as a moisturizer, for dressing hair (Ezema & Ogujiofor, 1992) and for protection against the weather and sun. It is used as a rub to relieve rheumatic and joint pains and is applied to activate healing in wounds and in cases of dislocation, swelling and bruising. It is widely used to treat skin problems such as dryness, sunburn, burns, ulcers and dermatitis (Bonkougou, 2001) and to massage pregnant women and small children. Having a high melting point of between (32-45°C) and being close to body temperature are attributes that make it particularly suitable as a base for ointments and medicines (Bonkougou, 2001). It is also used to treat horses internally and externally for girth galls and other sores. The healing properties of Shea butter are believed to be partly attributable to the presence of allantoin, a substance known to stimulate the growth of healthy tissue in ulcerous wounds (Wallace-Bruce, 1995).

A leaf decoction is also used as an eye bath (Abbiw, 1990; Louppe, 1994). The leaves are a source of saponin, which lathers in water and can be used for washing (Abbiw, 1990). Mixed with tobacco, the roots are used as a poison by the Jukun of northern Nigeria. Infusions of the bark have shown to have selective anti-microbial properties, as being effective against *Sarcina lutha* and *Staphylococcus aureus* but not *Mycobacterium phlei* as well as for diarrhea or dysentery (Soladoye et al., 2000).

Refuse water from production of Shea butter is used as a termite repellent. In Burkina Faso, Shea butter is used to protect against insect (*Callosobruchus maculatus*) damage to cowpeas

(*Vigna* sp.). Research has shown that after treatment with Shea butter a reduction occurs in the life span and fertility of the insects and hence the infestation rate. Shea butter, however, is not as effective as cottonseed or groundnut oil (Owusu-Manu, 1991).

#### **Other uses of Shea tree;**

The Shea tree also has a great, untapped capacity for producing copious amounts of sap that can constitute an important source of raw material for the gum and rubber industry. Research into the properties and potential industrial uses of Shea butter began in the first few decades of the last century. Previously, it was used in edible fats and margarine, e.g. Oleine, and was only beginning to attract the soap and perfume industry when interest ceased because of the 2nd World War. Revival of the Shea industry after the war suffered serious setbacks from an insufficient pricing mechanism, logistical problems of transport (low availability and unpredictable) unable to cope with the supply of the nuts, thus making the ventures economically non-viable. During the mid 1960s Shea trade re-emerged when Japanese traders joined their European counterparts, which saw a considerable expansion of the industry, particularly in the cosmetics and confectionery industry barely a decade thereafter.

The residual meal, as in the case with Shea butter, is also used as a waterproofing agent to repair and mend cracks in the exterior walls of mud huts, windows, doors and traditional beehives. The sticky black residue, which remains after the clarification of the butter, is used for filling cracks in hut walls and as a substitute for kerosene when lighting firewood (Wallace-Bruce, 1995). The husks reportedly make a good mulch and fertilizer

(FAO, 1988), and are also used as fuel on three stone fires. Latex is heated and mixed with palm oil to make glue (Hall et al., 1996). It is chewed as a gum and made into balls for children to play with (Louppe, 1994). Shea tree seed husks have a capacity to remove considerable amounts of heavy metal ions from aqueous solutions, for example, from wastewater. These were found to be more effective than the melon seed husks for absorption of Pb (II) ions (Eromosele & Otitolaye, 1994). The brown solid that is left after extracting the oil and the hard protective shell, are used as a waterproofing material on the walls of mud-buildings to protect them from the eroding forces of the wind and rain. Poor quality butter is not only applied to earthen walls but also to doors, windows, and even beehives as a waterproofing agent. In a traditional setting, Shea butter of poor quality is used as an illuminant (or fuel, in lamps or as candles).

#### **Shea butter and its markets**

The Shea fruits picking is basically an occupation for rural women and children, it serves as the main source of livelihood for the rural women and children who are engaged in its gathering. As a natural resource controlled by mostly 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 meet cash requirements including shelter, clothing, health care, taxes, school fees, school uniforms and school books. Hazards in Shea fruits gathering

include scorpions and snakes, especially beyond cultivated areas (Schrechenberg, 1996).

The Shea business was previously, a largely opportunistic trade, with little or no organization at community level. Men do not participate in Shea nut gathering in most parts of Nigeria and regard this as the preserve of women and children. It is called an “opportunistic business” because no one has ownership rights over the trees and gathering is equally open to all. The owners of farms and old abandoned farms maintain the right to harvest their trees. Women and children sometimes pick Shea fruits from their husbands’ plots; They are taken to the market in various measuring containers ranging from Sacks, Plastic rubber, empty Tins etc for fair price ,fruits are sold directly to consumers while some times are processed into Nuts or Butter for sale.

Butter has become a valued ingredient in the finest natural cosmetics (Fin trace Corporation, 1999) and even small amount in a formulation can earn a prominent display on the label. The cosmetic and pharmaceutical industries alone consume an estimated figure of 2,000 to 8,000MT of Shea butter each year, and this figure is expected to rise with growing demand in the world’s markets, the market prospects of Shea butter is high both locally and internationally.

Nigeria is endowed with Shea trees it is therefore important to reinforce sound management to sustain the species and maximize its productivity, it’s important also to maximize returns to the primary producers (the farmers) who make the management decisions on which the future of the tree and the ecological integrity of the landscape depend. Shea butter does have a higher value than Shea nut, but the value depends very

much on the market on which it is sold. In both local and international markets, one of the most straightforward means of adding value to any commodity is processing of raw material into higher value end products, higher-quality butter will fetch a higher market price, and it is also preferred for home consumption and will keep longer in storage than poor-quality product. There may also be scope for improving products quality through identification of Shea tree population with specific chemical attributes conferring enhanced value, given the degree of chemical and genetic variation between populations (Lovett and Haq 2000); Fontaine et al,2004) and the extremely specialized high value products and market applications derived from the species particular compounds (Alander; 2004) to this end; Shea tree database has to be developed giving economical and chemical profiles, including analysis of Shea fruit, Shea nuts and Shea butter for increased productivity and for the development of the industry.

The processing and marketing of Shea nut and butter help rural women immensely to engage themselves in fair trade, this allows women in the agricultural sector to rise above poverty and make a decent living. It allows them to provide for their families and educate their children without getting into debt. Fair trade gives the hardworking women options. It allows her to know that her hard work has value. This goes beyond paying a fair rate for the nuts and the time the women spent extracting oil from the nuts. It also includes capacity building which includes training and creating opportunities for the women to sell their products in the international market.

In Nigeria, processing of Shea kernels in to Butter is mostly done traditionally by women with their crude processing materials which affect the quantity and the quality of butter produced, thereby affecting its market credibility, as consumers will only be willing to pay more for higher quality products. Research has also established that typically unpleasant odour due to poor quality of Butter of West African Shea (not characteristics of the eastern subspecies *nilotica*) results from one or more of the step in post harvest processing, and that modifying these steps could reduce or prevent it (Lovett,2004). In recent years, product certification according to quality criteria has been considered one avenue by which the value of Shea products may be raised for the benefit of primary producers (Walter et al 2003; Lovett 2004). To this end, reinforcing the economic value of the Shea-butter tree through expanded markets, the Shea Project will receive an enthusiastic response from participating farmers, who have become serious about protection of Shea woodland - and serious as well about production of the finest quality Shea-butter at a premium price. In addition, assisting farmers in the area of processing and marketing of Shea nut and butter will not only attract more income to the farmers but will also increase the nation's revenue from its sale in the international market.

#### **CONCLUSION**

It is obvious from the evidences on the economic and environmental importance of Shea tree deduced so far, that when this tree is given a special consideration, the economy of the north and certainly the entire country will receive a major boost of unimaginable proportions from domestic consumption and in the international market. This



will also provide practical, market-based incentives for the sustainable management and conservation of the Shea resources. Perhaps the greatest potential in this respect lies in the commercial development of Shea products from naturally occurring species with ready market value. The industry not only provides food, raw materials, income, it also provides employment for the growth of the nation. While the Economic, environmental and other benefits of Shea tree is undoubtedly clear, there is need to protect the tree against destruction. Nigeria being the largest producer of Shea in West Africa; prospects for sustainable economic profit for the citizens and the country as a whole on Shea products will remain uncertain if strategies are not developed through research to bring about technological progressiveness to boost the productivity of farmers. The establishment of Shea tree plantations will not only add to the total economic GDP of the country but will invariably check the speeding rate of desertification in the country and it will also make a positive impact on the income of the citizens as well as the diet of the people thereby, contributing to the standard of living of not only the farmers but the entire population. It is a big challenge, and Nigeria as a nation can live up to it. It is worth investing in that area, as the country is not short of scientists who are eager and willing to deploy their expertise in that regard. In order for the development of Shea products trade to result in tangible improvement in sustainable management of the Shea resources in the country, partnership between rural producers, national policy – makers, the private sector and international industry is inevitable and some portion of the benefits must be

channelled in to better management of the Shea industry.

### **Recommendations**

Shea is among the economic tree crops grown in Central and Northern Nigeria, the industry has the potentials to provide food, raw material, income and employment to millions of Nigerians. Government could make these possible if more energy is harnessed into domesticating the very slow growth of the Shea tree species through the development of modern propagation techniques, which reduces periods of juvenility. Credit facilities when given to the farmers also, will boost their productivity to meet up with the domestic consumption and for export. Mechanized processing centre is needed for the application of new processing techniques not only to ease the drudgery involve in traditional method of processing but to also boost production and ensure higher quality butter that will attract better price from both local and international markets. The government can also ease the difficulties involved in the evacuation of Shea nuts from the wild through the provision of accessible roads and means of transportation. Provision of standard markets and facilities, stable market price, product certification and quality control of Shea product will not only provide employments and alleviate poverty amongst farmers in the provision of substantial income to support their basic needs; the Shea industry will also boost the economy of nation. The awareness of the need for the conservation of natural plant populations must be created to encourage the local communities to conserve the Shea trees for future exploitation of its resources.

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