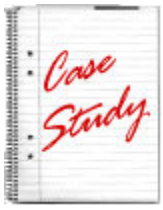
home

Solutions Site Case Study
Agriculture Table of Contents

Research and development of the shea tree and its products

Location:

Bole, Ghana



Summary:

Research by the Cocoa Research Institute of Ghana (CRIG) into the cultivation and processing of shea nuts as an alternative to cocoa products.

Problem Overview:

Ghana is a developing country with a low-income economy where over 80% of the population lives in abject poverty. The natural resources, especially the mineral resources such as the gold, diamond, bauxite, manganese etc. of the country are concentrated in the mid-southern regions. Because of the uneven distribution of these resources, all development such as industry, roads, electricity, potable water, schools and hospitals has been concentrated in these regions. Only a few settlements had electricity in the northern sector until the Rawlings government embarked on extensive nation-wide electrification in 1989.

The imbalances in the distribution of development were due in part to the nature of colonisation that took place in the 17th century and in part to the political dispensation that prevailed in the country after independence. The northern sector of the country covers approximately 2/3 of the country's land space and has virtually no natural endowment. This sector was therefore left out in all development activity, including basic infrastructure provision. Exacerbating this situation, the area lies in the dry Sudan and Sahelian savannahs where rainfall is incredibly low, erratic and unpredictable. The people here are subsistence farmers who depend on rain-fed agriculture for the production of food crops. The crops they produce are mainly yam, cassava, maize, rice, beans (cowpea), groundnuts, cotton and recently cashew. Part of the crops harvested is sold in the markets to generate income to meet individual domestic financial needs. The bulk of the farm crop is used to meet household food needs. Cropping is also seasonal since it depends on rainfall. There is only one season of rainfall in this region and so cropping is once a year. Also, the incomes are very seasonal and once a year. Consequently, the populations here are extremely poor and women are particularly worse off because they are the ones responsible for domestic protein supply. When men go to the farms they bring in food crops for consumption while women have to supply meat and other family needs from their personal funds.

The combined effect of the interplay of the above factors is frequent food shortages, poverty amongst the women, disease and rapid depopulation of the area. Young people, including young women, drift to the southern sector in search of better living conditions and jobs. This mass movement of people from the north to the south has caused most of public facilities to breakdown and has given rise to serious demographic problems both for the northern and the southern regions of the country and has also resulted in severe economic disparities between the northern and southern populations. As an appropriate response to the plights of the women in northern Ghana, both governmental and non-governmental organizations began to look for local resources that could be developed to generate income for the women.

The shea tree, whose fruits were already used by the women to generate substantial income to support their domestic needs, was therefore the most ideal candidate to rely upon. The importance of the shea tree in Ghana's economy became even more significant with the need to find substitutes for cocoa in the confectionery and cocoa butter industry in the early 1970s. This led to the establishment CRIG sub-station in 1976 at the northern town of Bole, by the Ghana Cocoa Marketing Board (GCMB), in collaboration with the CRIG. It also contributed to the formation of the Non-Formal Education Division (NFED) of the ministry of education and the 31st December Women's Moment in an effort to empower rural women in Ghana, which succeeded in organizing the women into co-operative societies or community based women's groups in the three regions of northern Ghana. These organizations provide the co-operative societies with loan and credit facilities at very moderate rates payable on an extended period to enable individuals to cope with repayment terms. This initiative has, in the medium-term, alleviated poverty amongst the rural women and, in the long-term, provides continuous employment opportunities for rural women and young people.

The research station, apart from providing job opportunities for researchers, has provided avenues for increased production of shea nut yields. Consequently, shea nut output, for both export and local consumption, has increased tremendously over the last ten years.

Background:

Summary:

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. 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 Ghana, the Cocoa Research Institute of Ghana (CRIG) initiated scientific research into the cultivation and processing of shea nuts. This led to the creation of a subsidiary research station of the CRIG in 1976 at Bole, Northern Ghana. The sole responsibility of this substation is to research into the ecology and biology of the shea tree with the aim of improving its yield. This article surveys the shea industry in Ghana as a whole and looks at the various aspects of butter production, from the point of fruit collection, through to marketing the product and uses. A little of the shea tree biology is included and the distribution of the shea tree in Africa is described, including the various environmental and ecological conditions under which the shea tree thrives. A description of the morphology and physiognomy of the tree is given for those who have not seen it. The collection of the nut and the process of extraction of the butter in Ghana are described. I have included salient information on the shea in neighbouring sub-Saharan African countries. A review is made of the problems facing the shea industry in general.

The shea tree, formerly Butryospermum paradoxum, is now called Vitellaria paradoxa. Many vernacular names are used for Vitellaria, which is a reflection of its extensive range of occurrence – nearly 5,000km from Senegal (west) to Uganda (east) across the African Continent. The nomenclature history and synonymy of the shea tree followed a very tortuous evolution since the oldest specimen was first collected by Mungo Park on May 26, 1797 before eventually arriving at the name vitellaria with subspecies paradoxa and nilotica. It usually grows to an average height of about 15m with profuse branches and a thick waxy and deeply fissured bark that makes it fire resistant. The shea tree grows naturally in the wild in the dry Savannah belt of West Africa from Senegal in the west to Sudan in the east, and onto the foothills of the Ethiopian highlands. It 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. In Ghana

(FAO, 1988a), it occurs extensively in the Guinea savannah and less abundantly in the Sudan Savannah. The shea tree occurs over almost the entire area of Northern Ghana, over about 77,670 square kilometers in Western Dagomba, Southern Mamprusi, Western Gonja, Lawra, Tumu, Wa and Nanumba with Eastern Gonja having the densest stands. There is sparse shea tree cover found in Brong-Ahafo, Ashanti, and the Eastern and Volta regions in the south of the country.

Considerable volumes of literature exist on the ecology of the shea tree including its yield, especially by (Coull, 1928; Hill, 1930; & Dalzeil, 1937). According to these authors, the trees are ravaged by annual bush-fires that usually burn the undergrowth and cause stunted growth of the trees in the wild. Under these conditions, the trees attain heights of only 6.1 meters and girths of about 61cm. However, under protected conditions (e.g. on cultivated lands and on the fringes of settlements) the trees can reach heights of about 15 meters and girths of 175cm. The trees grow slowly from seeds, taking about 30 years to reach maturity (Dalziel, 1937), but limiting or stressful conditions such as bush-fires and harsh weather can reduce this. The shea tree has no capacity for vegetative regeneration and can only be propagated by seed.

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. The trees begin to bear fruits at maturity and start flowering by early November, with picking or gathering lasting from April to August every year. When the shea fruits ripen, they fall under their own weight to the floor and are gathered by hand. The fruit, which is green in color, has a fleshy edible pulp, which 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, 1988b), reports that B vitamins are also present. The sugar content varies from 3-6%, equally distributed between glucose, fructose and sucrose.

Basically an occupation for rural women and children, 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 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. The fruit is also an important source of food for many organisms, including birds and bats. In northern Ghana the fruits contribute to food security, particularly for the rural poor, especially since their ripening coincides with the lean season of food production. The decline in cocoa production in the early 70s necessitated the maximization of the economic exploitation of the vast cocoa resources and the search for substitutes. The Ghana Cocoa Marketing Board (GCMB) in collaboration with the CRIG therefore took on the responsibility to conduct scientific research into the cultivation and processing of shea nuts. The result of this effort was the establishment of a branch of CRIG at Bole, Northern Ghana, in 1976, whose primary concern was to research shea production including improvement in tree yields and variety, and conservation.

1.0 GATHERING

In Ghana women pick shea fruits from their husbands’ plots, and the oldest wife regulates the activity and is responsible for the allocation of farmlands of husband among wives in polygamous marriages (Grigsby & Force, 1993). Fallow or abandoned plots are destined for the wives of the previous owners, whilst uncultivated plots are open to all women. Pickers wake early in the morning and trek up to 15km, then carry the loads back in head pans of 20-25kg (sometimes over 40kg). Hazards include scorpions and snakes,

especially beyond cultivated areas (Schrechenberg, 1996).

In northern Burkina Faso, land rights are acquired through relatives tending previously cultivated land or spontaneous clearing, but also by requesting uncultivated plots from the village Chief. In Mali, every one in the village is allowed to collect from crop fields, regardless of who owns them (Gakou et al., 1994).

1.1 VILLAGE PROCESSING

After gathering, shea nuts are par-boiled and sun-dried before storing in order to prepare the nuts for shelling. The shelling process involves the removal of the hard shell protecting the kernel. The kernel is the part that is of interest to the shea butter maker. After shelling, the oil-containing portion is thoroughly sun-dried for 3-5 days and a final baking process completely dehydrates it. The essence of the baking process is to concentrate the oil in the kernel, after which the nut can be stored for several years without danger of spoilage. The baking or roasting of the nut is also necessary to cause latex coagulation. The shea butter processing procedure is quite tedious and time consuming. From collection of the shea fruits through to the production of the final product, 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.

1.2 IMPROVED VILLAGE PROCESSING

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.

The Dagomba women of Ghana were among the first to initiate the mechanization of the butter extraction process. They adapted a corn mill to grind roasted shea nuts. Other inventions include a kneading machine, grinders, a hydraulic hand press, solar dryers (locally made wooden drying machines), and a heater and mixer. Some of these inventions have achieved extraction efficiencies of 60% to 85%. An added advantage associated with using solar dryers, for example, is that they check the activity of Aspergillus fungi and Euphenestia caufella larvae, even during long-term storage.

2.0 TREATMENT

The shea fruits gathered from wild contain a lot of materials whose removal is required in order that the oil can be extracted from the kernel. Pre-treatment of the fruits is therefore necessary to render suitable for the oil extraction process.

2.1 DE-PULPING

De-pulping is the removal of the fleshy mesocarp. Initial fermentation facilitates this process. Also initial boiling or burying the fruits enhances the fermentation process.

2.2 DRYING OF NUTS

Sun drying for 5-10 days reduces the moisture content to about 15-30%. The drying process takes several days at temperatures below 50℃ and 4-5days at a temperature of 50℃, leaving the moisture content of the kernel at between 6-7% (Greenwood, 1929). The drying process facilitates de-husking, which is the process employed to remove the hard shell or coat covering endoderm containing the oil.

2.3 DE-HUSKING

A variety of methods are used to remove the husks. These include trampling (Salunkhe et al., 1992), pounding using a mortar and pestle, and cracking between two stones.

3.0 THE BUTTER EXTRACTION PROCESS

The first stage of butter extraction involves grinding the baked kernel into a powdery material or flour, which is then mixed with warm or lukewarm water. The resulting semi-solid mixture is then stirred continuously or kneaded into a paste. The paste is allowed to stand, with the oil floating on top of the supernatant and decanted periodically, leaving a brown solid residue devoid of oil (basically an amorphous matrix), which settles to the bottom. This residue, however, has only very little or no economic value.

The extraction process, which is the final stage of oil production, involves a series of step-wise activities to yield the final oil product and the following are the activities involved.

3.1 DRYING AND SMOKING OF KERNELS

Inactivation of enzymes responsible for the build-up of fatty acids is achieved through drying or baking of the karite kernel and, in addition, it prevents the growth of fungi (e.g. Aspergillus sp.). The moisture content in the kernel must be less than 7%, for safe storage. At moisture content of about 7%, the kernel could be stored for up to 2 years. The baking process must be controlled in such a way as to prevent charring of the kernel, a condition that reduces the fat content.

3.2 POUNDING AND GRINDING

Pounding and grinding is done in large wooden mortars, between a stone and an iron bar, or using a stone and a wooden roller. The product may be heated either during or after this process.

3.3 MIXING WITH WATER, TREATING, KNEADING AND CHURNING

Kneading is the most crucial step in determining the quality of the shea butter finally produced. Its success depends on the recognition of changes in temperature, consistency and appearance. These qualities can only be assessed correctly with experience.

3.4 FLOATING, WASHING AND REFINING

Small amounts of dough are worked with fingers in cold water. This vigorous mixing breaks the emulsion, causing a grey, oily scum to rise. In Ghana, adding the juice of Ceratotheca (a small savanna plant) to the boiling pot accelerates the rate of separation of the butter. The juice promotes flocculation of the suspension and hastens sedimentation of the heavier non-oil residue. The oil is skimmed and washed repeatedly in a basin with clean water to eliminate residues and is then made into balls. Melting and boiling the solid fat in a pot until it is clear and bubbly clarifies the butter. The fat is then poured into a basin where it is left to solidify.

USES OF SHEA BUTTER

The shea nut serves as the main source of livelihood for the rural women and children who are engaged in its gathering. Shea butter is the main edible oil for the people of northern Ghana, being the most important source of fatty acids and glycerol in their diet. It is an unguent for the skin. 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, as a pan-releasing agent in bread baking and as a lubricant for donkey carts. Its by-products, the brown solid that is left after extracting the oil and the hard protective shell, are used as a water-proofing 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 (Marchand, 1988). In a traditional setting, shea butter of poor quality is used as an illuminant (or fuel, in lamps or as candles).

TRADITIONAL PRODUCTS.

Oil has played an important part in the local economies in west and central sub-Saharan Africa for centuries. It is reported that the initial traditional roles have not changed significantly since 1830, when the French explorer Roger Caillie described them during his trek across West Africa. 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, 1981b).

OTHER TRADITIONAL USES OF SHEA BUTTER

As a cosmetic, it is used as a moisturizer, for dressing hair (Dalziel, 1937, 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 (Vuillet, 1911; Bonkoungou, 1987) and to massage pregnant women and small children (Marchand, 1988).

Having a high melting point of between (32-45℃) an d being close to body temperature are attributes that make it particularly suitable as a base for ointments and medicines (Bonkoungou, 1987). 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). It is used as "white oil" to anoint the dead in Niger (Castinal, 1945), and is placed in traditional ritual shrines.

Refuse water from production of shea butter is used as a termite repellent (Dalziel, 1937). 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 (Pereira, 1983; Owusu-Manu, 1991).

TRADITIONAL "NON-BUTTER" USES

The shea tree is sacred to many ethnic groups and plays an important role in religious ceremonies (Vuillet, 1911; Millee, 1984).

FLOWERS, FRUIT AND NUTS

Some ethnic groups make the flowers into edible fritters (Chevalier, 1949). The fruit pulp, being a valuable food source, is also taken for its slightly laxative properties (Soladoye et al., 1989). Although not widespread, shea nut cake is used for cattle feed (Salunkhe and Desai, 1986), and also eaten raw by children (Faegri, 1966; Farinu, 1986). 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 (Greenwood, 1929; Marchand, 1988) and as a substitute for kerosene when lighting firewood (Wallance-Bruce, 1995). The husks reportedly make a good mulch and fertiliser (FAO, 1988b), and are also used as fuel on three stone fires.

FOLIAGE

Leaves are used as medicine to treat stomachache in children (Millee, 1984). A decoction of young leaves is used as a vapor bath for headaches in Ghana. The leaves in water form a frothy opalescent liquid, with which the patient's head is bathed. 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). When a woman goes into labor, branches may be hung in the doorway of her hut to protect the newborn baby. Branches may also be used for covering the dead prior to their burial (Agbahungba & Depommier, 1989).

ROOTS

The roots are used as chewing sticks in Nigeria, most commonly in savannah areas (Isawumi, 1978). Roots and root bark are ground to a paste and taken orally to cure jaundice (Ampofo, 1983). These are also used for treatment of diarrhoea and stomachache (Millee, 1984). Mixed with tobacco, the roots are used as a poison by the Jukun of northern Nigeria. Chronic sores in horses are treated with boiled and pounded root bark (Dalziel, 1937).

BARK

Infusions of the bark have shown to have selective anti-microbial properties, as being effective against Sarcina lutha and Staphylococcus mureas but not mycobacterium phlei (Malcolm & Sofowora, 1969). Macerated with the bark of Ceiba pentandra, and salt, bark infusions have been used to treat cattle with worms in the Tenda region of Senegal and Guinea (Ferry et al., 1974). The infusions have been used to treat leprosy in Guinea Bissau (Dalziel, 1937) and for gastric problems (Booth and Wickens, 1988) as well as for diarrhoea or dysentery (Soladoye et al., 1989). A bark decoction is used in the Cote d'Ivoire in baths and therapeutic sitz-baths to facilitate delivery of women in labour, and is drunk to encourage lactation after delivery (Abbiw, 1990; Soladoye et al., 1989; Louppe, 1994). However, in northern Nigeria such a concoction is said to be lethal, (Dalziel, 1937).

A bark infusion is used as an eyewash to neutralise the venom of the spitting cobra (Soladoye et al 1989) and also, in Ghana, as a footbath to help extract jiggers. Greenwood (1929) noted that the stripping of bark for medicinal purposes may have a severe impact on the health of shea trees and may even be fatal. The wood is only used when individual trees are not valued for butter production. The 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). In Burkina Faso, Bobo musicians use it to repair cracked drums and punctured drumheads (Millee, 1984). It contains only 15-25% of carotene and, therefore, is not suitable for the manufacture of rubber (André, 1947a,b).

MISTLETOE

Millee (1984) comments that Tapinanthus globiterns, one of the shea tree's most common parasitic plants, has many medicinal purposes but gives no details. It is also used extensively in apiculture.

INDUSTRIAL USES

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.

Shea butter has several industrial applications, but the majority of kernels (approximately 95%) provide an important raw material for Cocoa Butter Replacers (CBRs), and are used for manufacturing chocolate and other confectionery. Minor uses include cosmetics and pharmaceuticals. The export market for CBRs is shared by Unilever (UK), Arhus (Denmark), Fuji Itoh and Kaneka-Mitsubishi (Japan) and Karlsham (Sweden). A detailed account of general physical properties and composition of fatty acids (%) of shea butter is presented in Hall et al., 1996.

OTHER USES

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 (Fleury, 1981; Eromosele & Otitolaye, 1994). The need to identify additional sources of feed, to expand the animal industry for protein supply in Ghana, led to research into the potential for greater use of agro-based industrial by-products, such as Shea Nut Cake (SNC), in the formulation of animal feeds (Fleury, 1981; Hall et al., 1996).

IMPLEMENTATION STATUS

Research activities have focused on increasing fruit yield per hectare of land. Studies in the early 1920s were geared towards the development of an export trade in shea nuts and hence concentrated on the logistics of distribution. Efforts were therefore concentrated on increasing and improving upon the existing infrastructure by building railways in the mid-regions of the country.

Research and field trials on many plots, under different spacing regimes, have indicated that the optimum spacing of shea trees for hastening maturity and improving yield per hectare is 10 x 10 meters. This represents an equivalent plant population of 100 trees per hectare or 4 trees per acre. Another method adopted by the CRIG sub-station in Bole, with the aim of increasing productivity, is transplantation from polythene bags. This method increases the initial growth rate and shortens the length of the period between germination and transplantation. The station adopted a bio-zyme that stimulates vegetative growth and promotes early maturation. The station has also tested a surrogate grafting method, resulting in the production of new varieties of early and high yielding trees. The method involves choosing only high yielding trees, selectively cutting branches of 2 – 6cm in girth and removing 1.5 – 2.0cm sections of the bark off the branches, leaving the woody tissue. The cutting is done 6 – 15cm from the top of the branches. The sections are then covered with small quantities of a mixture of moistened soil and palm fiber (which act as a root support medium) contained in a polythene bag and secured carefully

in place with a binding tape. This allows rapid sprouting and improves yield considerably.

With considerable success, the research station has investigated vegetative propagation using high-yielding trees. Branches of girths between 2 – 3cm in diameter of these high-yielding trees were cut and immersed in water until the wounds heal and outgrowths develop. These outgrowths are then planted on prepared soils and allowed to sprout under intensive care. Field observations show that plants produced through this technique grow faster and have a potential of fruiting earlier than those germinated from seeds. Since trees from such vegetative propagation are smaller in size than those growing from seeds, the optimum spacing for the vegetatively propagated trees is 7 x 7 meters, to allow for higher number of trees per hectare, and higher initial and overall fruit/seed yields (Dakwa, 1985; Frimpong & Adomako, 1987; Tawiah, 1994; Yidana, 1994).

Natural regeneration is the single most important and commonly used procedure by the research station to increase productivity in recent times. Field observation has revealed that on lands protected from bush fires, with minimal use of heavy equipment (e.g. ploughing with tractors), numerous young shea trees sprout from existing old stumps. Where farmers, bush fires, or browsing animals do not destroy these, they grow rapidly into mature trees, producing fruits after only seven years instead of the normal 12 to 15 years (Yidana, 1994). Farmers have been educated accordingly, and evidence indicates that they are relying on this knowledge and practice to produce early maturing shea plantations. Plant populations of 400 trees per hectare can be achieved by this conservation technique.

Through applied research, the station also found that introducing grazing animals into shea tree plantations improves shea nut yields. The station has therefore designed and initiated extension programs to educate farmers on the use of a combination of these techniques to achieve greater yields. Since the establishment of the research station at Bole in northern Ghana, there have been increased shea nut yields per capita per annum. Another positive management option adopted by the station was careful tending to enhance the productivity of parkland trees and the greater protection of naturally regenerating seedlings to enrich ageing parkland, which avoids the burden of nursery costs and problems associated with planting out.

Systematic measures considered were:

- The felling of dead or diseased trees;
- Maintaining a weed-free circle as a firebreak around each tree;
- Application of manure to the base of young trees to stimulate growth; and
- Pruning of mature trees

Pruning can be used also to achieve control of parasite plants such as Tapinanthus sp. The efforts of the research station have led to increased crop yield and total annual collection output.

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Feedback and Questionnaire:

We'd like to know your opinion on the value and usefulness of this case study. Please take a few moments to fill out the questionnaire below (all fields are optional).

Your name:	
Your E-mail address:	
Country:	
Questions, comments, suggestions:	

Please rate the case study on the following criteria:

		Poor	Fair	Good
Usefulness:		○	○	○
Presentation:		○	○	○
Completeness:		○	○	○
Replicability:		○	○	○

Do you know of any initiatives similar to those discussed?	

Send Clear

top of page

Shea butter is a natural herbal extract. It is known for its effective skin care and its rich content of stearic, oleic acids and natural vitamin E. Shea butter is reputable for its:

- High moisturizing properties which protect the skin from dryness and sunburn;
- Treatment of chapped lips and feet, skin abrasions and blemishes; high nutritive qualities including vitamins A, D, E, F; wonderful pharmaceutical properties;
- Versatility in home use in food and direct skin application;
- use in the cosmetic industry to make premium creams, lotions, bath soaps and skin care products;
- Use in the manufacture of margarine and especially in the manufacture of chocolates and confectionery as it is an excellent substitue for Cocoa butter.

Shea butter is vastly used by:

- Premium Cosmetic manufactures in making bath soaps, shampoos, hair conditioners, bath oils, massage products, body creams and lotions, lip balm and skin products;
- Cosmetic and food ingredient distributors;
- Pharmaceutical laboratories in making pharmaceutical products;
- Food and confectionery manufacturers making chocolates, margarine and bakeries.

Making Shea butter

Shea nut is a trading commodity and typically, women dominate the trade. Making traditional shea butter is labour intensive. Women toil for long hours in the wild in harsh weather, braving rainstorms and temperatures as high as 45 degrees F to pick Shea nuts. The nuts are shelled, dried, stored over several months. Traditional Shea butter is extracted from Shea nuts and typically involves the following stages:

- Shea nuts are contained in pods or shells;
- Shells or pods cracked open by hand thus releasing nuts or kernels;
- Nuts are dried to remove moisture;
- Dried nuts are crushed and roasted;
- Roasted nuts are ground to paste to facilitate oil extraction;
- Nut paste with gradual adding of warm water is kneaded vigorously by hand until oil in coagulated form separate from the water;
- Released oil in coagulated form is whisked out. Water containing nut sediments is discarded;
- Coagulated Shea butter containing traces of nut paste is placed to steam kettles or boiling pots;
- Coagulated Shea butter paste is heated in Kettles at high heat to release Shea oil;
- Shea oil is skimmed and stored to solidify into Shea butter.

Natural unrefined wholesome sheabutter

Shea Butter is produced from shea nuts obtained from the Shea nut tree. These trees grow in the nature/wild and are not cultivated. In fact most of the terrain on which shea trees grow has never been developed. As a result, no applied chemicals, pesticides, fertilizers, toxic or harzardous substances come in contact with thes trees. And therefore not part of the production of the production function.

Supporting the use of non-forest products, that is, Shea butter, contributes in the conservation of africa's wooded area, wild life, ecosystem and overall environment protection. Our locally made Shea butter is truly natural, wholesome and free of man made applied chemicals.

By tradition, no individual can own a Shea nut tree even if the tree is on the individual's property. It is a taboo. It is forbidden to cut or cause damage to a sheanut tree. The tree belongs to all. The Shea tree is perceived to be the lifeline of the people. Shea butter, milled

from the Shea nut, is used for cooking, for cosmetic purposes - body lotions, soapmaking, hair products; for medicinal use to address skin conditions, etc.

The people of Northern Ghana live in symbiotic relationship or in harmony with the Shea tree in nature. There is very little room for environmental abuse. The Shea tree and Shea butter is viewed by the natives to be their lifeline.

Making it count - New opportunities for Ghana's traditional Shea Butter Producers

In the towns and villages around Tamale in northern Ghana, the way of life is subsistence farming. To boost their meagre incomes, women traditionally engage in a number of activities including making and selling Shea butter. Like cash crop farming, income from the Shea butter business is hardly enough to keep the women who are involved in it above subsistence lines. But in this semi-arid part of northern Ghana, Shea butter production occurs year round and as such provides significant support for the community. Without the income, meager as it is, life would be much worse.

The Shea butter produced in northern Ghanaian communities is organic and hand-made, using age-old traditional methods. The production process does NOT utilize chemicals or solvents.

Shea butter is edible organic oil extracted from Shea nuts of the Shea nut tree which grows in the natural habitat and is uncultivated. Shea butter is used in pharmaceuticals and mainly in food preparations, margarine, chocolate and often, in making premium beauty products. The long held secret of what makes women look eternally young points to none other than the mystical «Shea butter».

The Shea nut tree is an integral part of the lives of the people who live in the sub-Sahara region of West Africa. Traditionally, the Sheanut tree belongs to the entire community and cannot be owned by individuals even when found on private property. For centuries, the Shea nut tree has helped conserve the ecosystems in Africa's semi-arid regions. And over time, the sheanut trade has been critical in generating and fostering economic growth in some of the poorest regions of sub-Saharan West Africa. Often when everything else fails, the Shea nut tree is there to provide succour and relief.

Local production of Shea butter provides families more income earning opportunities to improve their communities.

Fair Trade

Typical of most primary products originating from Africa, Shea nuts and Shea butter are failing to deliver meaningful local employment and decent income for the communities that produce them. Once thought to be a possible engine of economic growth, local handmade Shea butter barely provides subsistence income to these communities.

It is estimated that over 95 percent of picked Shea nuts in Africa is exported to oils mills in industrialized countries of the West to make shea butter for the manufacture of countless beauty products that make profits for the companies. But the women whose hardwork produce the nuts often have little to show for it.

As a local producer/supplier, we at SAL utilize shea nuts to make Shea butter in the areas or communities in which the nuts are picked. Our supplies include production from members of internationally renowned NGO's at Fair Trade prices. We share the view that Shea butter producers/suppliers should commit investment capital in Shea nut producing communities to attain and maintain local production of high quality Shea butter for international businesses. Furthermore, SAL also believes that serious effort should be made to ensure that some of investment is made locally to provide better jobs and income - as we do in Tamale, Ghana. This kind of investment distinguishes development oriented manufacturers interested in «Enhanced Fair Trade» from those interested in only increasing their profits.