

Utilisation and conservation of shea butter trees (*Vitellaria paradoxa*) in and around Aloi Internally Displaced Persons' Camps in Lira district, northern Uganda

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Abstract

Influence of internal displacement on utilisation and conservation of shea butter trees was studied in Aloi sub-county, Moroto County, Lira district between 2007 and 2008. Sixty respondents were randomly selected and interviewed. These were sampled from villages distributed in eight parishes. Results indicate that shea tree products are highly valued as source of edible oil that is also sold in local markets for income, edible fruits and building materials. Conservation of shea trees has been unfortunately hampered by insecurity and internal displacement of the local population. Most shea trees were cut for charcoal that was sold to meet peoples' basic needs. Pruning, lopping, weeding, intercropping shea with other shade tolerant crops, tending and protection against fire are the major methods of shea tree management and conservation being practiced by the local people. Majority of the respondents were willing to plant and manage shea trees on their farms, home gardens, roadsides and parkland if planting materials were available. The IDPs camps need to be decongested so that pressure on shea parkland can be reduced. Local shea products producers need market information to enhance their incomes.

Key words: Market information, parkland, shea, *Vitellaria paradoxa*

Résumé

L'influence du déplacement interne sur l'utilisation et la conservation des arbres à karité a été étudiée dans le sous-comté d'Aloi, Comte de Moroto, district de Lira entre 2007 et 2008. Soixante répondants ont été choisis au hasard et interrogés. Ceux-ci ont été échantillonnés dans les villages répartis dans huit paroisses. Les résultats indiquent que les produits du karité sont très appréciés comme source d'huile comestible qui est également vendue sur les marchés locaux

pour les revenus, les fruits comestibles et les matériaux de construction. La conservation des arbres de karité a été malheureusement entravée par l'insécurité et le déplacement interne de la population locale. La plupart des arbres de karité ont été coupés pour le charbon de bois qui a été vendu pour répondre aux besoins fondamentaux des populations. L'élagage, l'émondage, le désherbage, la culture intercalaire de karité avec d'autres cultures tolérant l'ombre, l'entretien et la protection contre l'incendie sont les principales méthodes de gestion de l'arbre de karité et de la conservation pratiquée par les populations locales. La majorité des répondants étaient prêts à planter et gérer les arbres de karité dans leurs exploitations agricoles, les jardins potagers, les bords de la route et les parcs si le matériel de plantation était disponible. Les camps des déplacés internes doivent être dépeuplés de telle sorte que la pression sur le parc de karité puisse être réduite. Les producteurs locaux des produits de karité ont besoin d'information sur le marché pour améliorer leurs revenus.

Mots clés: Information sur le marché, parcs, karité, *Vitellaria paradoxa*

Background

Shea tree (*Vitellaria paradoxa*) is a fruit tree indigenous to the semi-arid and sub-humid savannas of sub-Saharan Africa. The tree is highly valued throughout the region for its numerous and diverse products/services (Hall *et al.*, 1996; Diallo and Abibou, 2002; Okullo, 2004). Long ago, farmers in the shea parkland preserved this valuable resource by nurturing shea and other valuable trees in their farming system (Bonkougou, 2004). Conservation of valuable tree species used to be taken care of by farmers through integrating with annual crops.

This practice worked well in traditional societies in northern Uganda (Masters, 2006). However, the civil war that broke out in 1986 in the region forced people into Internally Displaced Persons (IDPs) camps. These camps have very low levels of economic activity (Ogenga, 2000). The displacement resulted into communities engaging in small-scale agriculture and retail businesses near camps, while others encroached on the natural environment by cutting important tree species like shea trees for charcoal (Ferris *et al.*, 2004).

Tree cutting for charcoal and other uses have devastated major indigenous tree species in and around the IDPs camps with undocumented conservation threats. Because of its value and

varied uses, shea trees remain a major target for the displaced communities in and around the IDPs camps. The specific objectives of this study were to (i) assess the uses of shea trees and their relationship to internal displacement, (ii) examine traditional management and local conservation knowledge of shea trees and (iii) assess community attitudes towards planting and management of shea trees on farm and in the wild.

Materials and Methods

This study was carried out in Aloi Sub-county, Lira District located in northern Uganda, between latitudes 121°N', 242°N' and longitude 3251°E' and 3415°E. Sixty respondents were randomly sampled from 8 parishes and interviewed using questionnaires. Socio-economic characteristics of the respondents, uses, traditional conservation practices and effect of displacement on shea tree utilisation and conservation were documented. Data were analysed to generate statistical summaries.

Results

Shea tree uses and local conservation strategies around the IDPs camps. Ninety percent of the respondents were farmers and all the respondents (100%) reported that butter/oil was the major product obtained from the shea tree. Other products included fruits, charcoal, firewood, poles, beehives, mortar and gum (Table 1). More than half said that they ate fresh shea fruits, produced charcoal for sale, and used firewood from shea trees for cooking while 27% indicated that they got poles for construction (Table 1).

Table 1. Products obtained from shea butter tree and their uses N (=60).

Products	%
Butter oil	100.0
Fruits	70.0
Charcoal	62.1
Firewood	51.7
Poles	28.3
Others (beehives, mortar, gum, wood	08.3
Uses of shea products	
Frying food	100
Eaten as fruits	82.0
Nuts and Oil sold for money	73.4
Firewood for cooking	52.0
Building material	27.0

Due to internal displacement, 98% of the respondents reported that shea butter/oil production had declined while others indicated that fruits were not being collected. They also reported that many shea trees were being cut down for charcoal production, poles of shea trees had been cut for building huts in camps and also more shea trees had been cut to provide firewood for cooking respectively (Table 2). We found that internal displacement had serious impact on individual uses of shea products. Collection of shea nuts and butter/oil production had reduced. Respondents reported that fruits were rotting and being destroyed by fire (Table 2).

Table 2. Impact on availability and use of shea product (N=60).

Products	%
Butter oil	
Reduction in shea nuts collection	97.0
Reduced shea butter/oil production	68.3
Produced normally in other places	02.0
Fruits	
Fruits were not picked	80.0
Fruits destroyed by fire	25.0
Firewood	
Only collected around the camps	93.3
Firewood collection not affected	61.7
No firewood collection from village out side camps	28.3
Charcoal	
Increased cutting of shea trees for charcoal	90.0
Few trees burnt for charcoal	70.0
Charcoal production not affected by displacement	20.0
Poles	
Accelerated cutting of shea trees for building poles	97.0
Poles cutting was not affected	30.0

The majority of respondents said that they managed and protected shea trees. They reported that they weeded young shea seedlings, protected them against fire, cut down off dead branches and spared them while opening farmland. Respondents also reported that they pruned and lopped those growing on

farmland planted crops that were compatible with shea shade. They also reported mulching shea trees on farms (Table 3).

Attitude of community towards planting and management of shea trees. Eighty five percent of the respondents felt that shea could be planted in the parklands, while others reported that shea trees should be planted on compounds as shade tree, integrated on farms with crops, planted along boundaries and along roadside respectively. The majority (90%) reported that they planted shea tree seeds, seedlings and managed coppices (Table 4). Over 70% of the respondents wanted to plant shea trees for butter/oil, fruits, domestic shade, firewood/cooking and boundary demarcation (Table 4).

Table 3. Traditional management and conservation knowledge of shea trees (N=60).

Traditional knowledge	%
Weeded around growing shea seedlings	98.3
Protected young shea against fire	88.3
Cut/trimmed old and dead branches down	85.0
Spared shea trees while opening farmland	78.3
Pruned shea trees	73.3
Lopped shea tree branches	52.0
Planted crops that are compatible with shade	47.0
Left grasses around shea trees (mulch)	07.0

Threats and opportunities for conservation and management of shea trees. Cutting shea trees for charcoal was the major threat to conservation and management of shea trees. Other threats include wild bush fire, harvesting of shea trees for firewood/charcoal, clearance of land for cultivation, harvest of shea poles as building materials, cutting down shea trees for mortar and inadequate awareness on the conservation methods and use of shea logs in brick burning (Table 5).

Opportunities suggested by the respondents for conserving the shea trees included replanting shea trees, controlling bush fire during dry seasons by encouraging early burning, weeding around regenerating shea seedlings, planting shea seedlings, applying rules and regulations to curb cutting shea trees, planting alternative tree species for charcoal, and compulsory caring for young shea trees (Table 6).

Discussion

Products obtained from shea butter trees. The most preferred products obtained by the community from Shea butter

Table 4. Community attitudes towards planting and management of shea on farm and woodland (N=60).

Attitude	%
Areas for planting	
In parklands	85.0
On compound	32.0
Farms	30.0
Along boundary	28.3
Along road side	02.0
Ways of planting	
Seedlings	90.0
Seeds	63.3
Purpose for planting	
For butter oil	74.0
For fruits	18.3
For shade	07.0
For firewood	05.0
Boundary demarcation	05.0
For poles	03.3
For charcoal	02.0
As wind break	02.0

Table 5. Threats to conservation and management of shea trees (N=60).

Threats	%
Cutting of shea trees for charcoal burning	90.0
Frequent bush fire	73.3
Cutting of shea trees for firewood	70.0
Clearance of land for cultivation	43.3
Harvesting shea trees for building poles	38.3
Cutting of shea trees for crafts (mortar)	05.0
Inadequacy of awareness	03.3
Using shea logs for brick making	00.2

Table 6. Opportunities to minimize threats to conservation and management of shea trees (N=60).

Opportunities	%
Replanting shea on farm and parklands	98.3
Controlling bush fire	88.3
Weeding around shea to avoid fire	85.0
Planting young shea seedlings	78.3
Strict laws/by laws on protection of shea trees	75.0
Planting alternative tree species for charcoal	72.0
Restricting cutting shea trees	43.3
Compulsory caring for young growing shea trees	35.0
Avoiding setting unnecessary fire in dry season	32.0
Regulatory cutting of dead shea trees for fuel	08.3
Awareness creation	03.3

tree are butter/oil, fruits, nuts, firewood, charcoal, poles and wood for craft works. Shea butter/oil has been the main vegetable oil used for frying food and also sold in local markets to generate income for the households (Ferris *et al.*, 2004). The oil is extracted locally by roasting the dried nuts, pounding into a paste, mixing with water and boiling. It is then skimmed off and held in a separate container. Besides being used in cooking, the shea oil can also be used for smearing newborn babies and making traditional soap (Masters, 2006).

Traditionally, shea fruits are valued as a major source of nutritious edible fruits especially among children and women. Children and women go around shea trees that have fruited in that season with containers and pick the fruits that are eaten fresh and the nuts sun-dried and later processed into oil/butter (Ferris *et al.*, 2004). Shea fruits provide an essential part of the diets for the children and women in the parklands. . Fruits are especially valuable during famine and times of food scarcity.

After drying, the kernels are cracked using a stone to obtain the nuts which are then dried for about one to two weeks and are transported to the nearby market for sale usually by either male or female household head to obtain cash. The income is usually used to buy small household items like salts, paraffin and food (Ferris *et al.*, 2004). In situation where nuts are not sold or bought, normally it is processed into shea oil which is then taken back to the market for sale or the nuts are stored and used domestically.

Firewood is one of the most important products the community obtains from shea trees in Aloi sub-county. Firewood is the cheapest and most easily available source of fuel among the displaced persons. Traditionally, the community depended on other tree species and shea tree was basically conserved for its fruits. In situation where the community would harvest shea trees for firewood, it would be the dried or dead branches in most cases. However, the practice of cutting down shea trees to obtain wood fuel in form of firewood for cooking is a recent development. According to use of the product by gender, most women use firewood in boiling water, preparing daily meals, brewing local beer and for sale to generate cash for supplementing household incomes.

In order to cope with the poverty among the displaced persons, charcoal production from shea tree species is reported to be

the most important product the communities obtain from shea trees. Poverty forced many people to cut down shea trees for charcoal as the only source of income since the displaced persons could no longer access agricultural land for cultivation (Masters, 2006). In terms of importance by gender, male respondents are the most producers of charcoal. As shea trees are reported to produce the best quality charcoal compared to other tree species (Masters, 2006), charcoal burning has accounted for the large disappearance of shea trees in most parts of the study parishes.

Shea trees also provide building poles. These poles are usually used along other tree species in the construction of huts. The poles are frequently used in the construction of roofs for the huts or in the provision of support to the roof. The timber or wood is also used for local handicrafts such as stools, pestles, and mortars and beehives. In addition, large tree boles are used to build local canoes (Ferris, 2003). With displacement the use of poles for construction of camps has led to great reduction in the shea trees in the area.

Impact of internal displacement on various products of shea trees. Shea butter/oil has been affected by the insurgency that concentrated people into IDPs camps. Displacement affected shea butter oil production in the entire area as there are now low collections of shea nuts. Between 2003 and 2005, the war intensified and most people did not collect or pick shea nuts; thus affecting the general butter/oil production. Due to the fear that women and children would either be taken captive or killed in the process of picking shea fruits during harvest, shea oil production declined tremendously during the period. In the same vain most shea fruits would only rot without being picked.

Despite the above, the shea trees near camps from which fruits would have been collected had been cut down to obtain wood fuel in form of charcoal and firewood. The war that caused people to settle in IDPs camps had aggravated the rate at which mature and fruiting shea trees were cut down. According to UNEP (2007), livelihoods are directly affected through decreased access of land, and inadequate access to natural resources. As a result of exclusion, displacement always causes over exploitation of the available biodiversity such as forest within the vicinity of the concentrated communities (IRIN, 2006).

Since most people in the camps could not access agricultural land for cultivation to sustain their families, the act of cutting shea trees for charcoal has led to serious environmental problem in the area. The entire population now depends on harvesting of the natural vegetation such as cutting shea trees for wood fuel. This means that, if the act of cutting important tree species, such as shea continues uncontrolled, the community in the near future will totally forego the most consumptive values from them. Traditionally, the community used to depend on other indigenous tree species for their wood fuel demand other than shea tree which were basically conserved for their fruits. However, the escalated insurgency that spread in the region and forced people in to IDPs camps, made them to resort to cutting shea trees down to obtain wood fuel in form of firewood and charcoal for sale.

The internal displacement also promoted harvesting of building poles for huts in the IDPs camps. Since most people depended on the available tree species around the camps to meet their construction demands; any available tree species were cut regardless of their consumptive/use value to obtain the poles for building shelter. Inevitably, shea trees being the most commonly distributed species by then within Aloi sub-county, suffered the same fate. According to UNEP (2006), a number of impacts, such as cutting trees for poles to construct shelters and fuel, are immediately visible and tend to dominate the areas around IDPs camps.

As people concentrate in camps a wide range of natural resources are usually used by the IDPs and refugees for various purposes. For example, it has also been reported elsewhere that wooden poles can be gathered for construction purposes as well as resale around the IDPs. Such demand, coupled with the high population density can transform landscapes around the vicinity of the IDPs camps which was formerly covered by natural vegetation (UNEP, 2006).

Traditional management and conservation knowledge of shea trees. The local community in Aloi sub-county traditionally manage and conserve shea trees on farms and parklands through pruning branches, integrating shea trees with other annual crops, weeding around the tree, cutting dead branches to allow new ones to sprout, sparing shea trees when opening agricultural land and protecting young shea seedling against fire and browsing animals. Among the local community

in Aloi sub-county, only occasionally are old shea trees pruned in order to rejuvenate an aging parkland area or those growing in farms and dried branches that are past yielding age, presumably to reduce the impact on crops.

Sometimes, when multiple coppices shoot arise from cut branches, they are thinned in order to allow or favor the growth of a single main stem that would bear fruits. Lovett *et al.*, (2006) reported that pruning has been the most practiced traditional technique for management of fruit trees in West Africa. The crowns of indigenous tree species within some parishes show evidence of pruning as a management option adopted by the local community in the area.

Lopping/pollarding has been basically a management options for shea and mango trees growing on-farms (Okullo & Waithum, 2007; Obua, 2002). In this area, shea trees are lopped or pollarded, not in systematic way but spontaneously according to needs, such as demand for poles or timber for craftwork (Table 3). Farmers always lopped in order to remove dead branches, reduce the crown size and to increase on shea fruit production. Similarly in West Africa, farmers would lop and pollard trees on farms for needs such as medicine and timber (Boffa, 1999)

Most respondents also reported that they always intercrop shea trees with shade resistant crops like millet, sorghum, peas, beans and ginger (Table 3). This has been done mainly on the shea trees growing on-farms. The practice has tended to protect shea trees intercropped with other crops from being indiscriminately cut for charcoal. In northern Uganda, farmers always manage indigenous shea woodland through integrating preferred indigenous tree species with annual crops on farms (Okullo *et al.*, 2004).

Another management and conservation options identified within Aloi sub-county among farmers include greater protection for regenerating seedlings on-farms (Table 3). On cultivated land/farms, where fields are periodically cleared, areas around regenerating shea seedlings are cleared, dug over and mulched by gathering dried grasses around on seasonal basis to rejuvenate their growth. This has also been the best management and conservation option applied by farmers in Burkina Faso where young shea seedling growing on-farms have not only

been conserved and protected against fire, but also even mulch to get better yield (Bayala *et al.* 2004; Diallo, 2006).

Over 98% of the respondents reported that, scattered shea trees on-farms are usually subjected to formal management and conservation options such as sparing growing seedlings when opening and cultivating land, weeding around, and protecting the growing seedling against fire. This positive management and careful tending of the regenerating trees could enhance the productivity and abundance of the trees on-farms and the entire shea parkland (Obua, 2002; Okullo and Waithum, 2007).

Attitudes towards planting and management of shea butter trees. The respondents were willing to plant and manage shea trees on farm, around home compound, along boundaries, roadside and parkland if only provided with early maturing planting materials. This shows that majority of the people in Aloi sub-county have positive views about planting and management of shea trees both on farms and in the parkland. According to Obua (2002), shea trees are very important tree species to the community and the issue related to planting and management is a very important aspect.

Majority of the respondents were willing to plant and manage shea tree for its oil and fruits. This is so because the shea oil commands high value in people's diet within the area. The fact that most respondents were also willing to integrate shea trees on farm with crops (such as millet, sorghum, beans, peas and ginger that can tolerate shade); shows that, the local people generally have positive attitude towards planting and management of this particular tree species in the area. In fact willing farmers were nurturing growing shea seedlings on their farms. In some communities by-laws for planting and management of shea trees such as every household must at least plant two shea trees per year and once got cutting the mature shea tree one is liable for six month penalty in jail are being enforced.

Acknowledgement

We thank the local communities in Aloi Sub-county, Lira District for their support in this study. We are grateful for financial support from AFORNET for this study.

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