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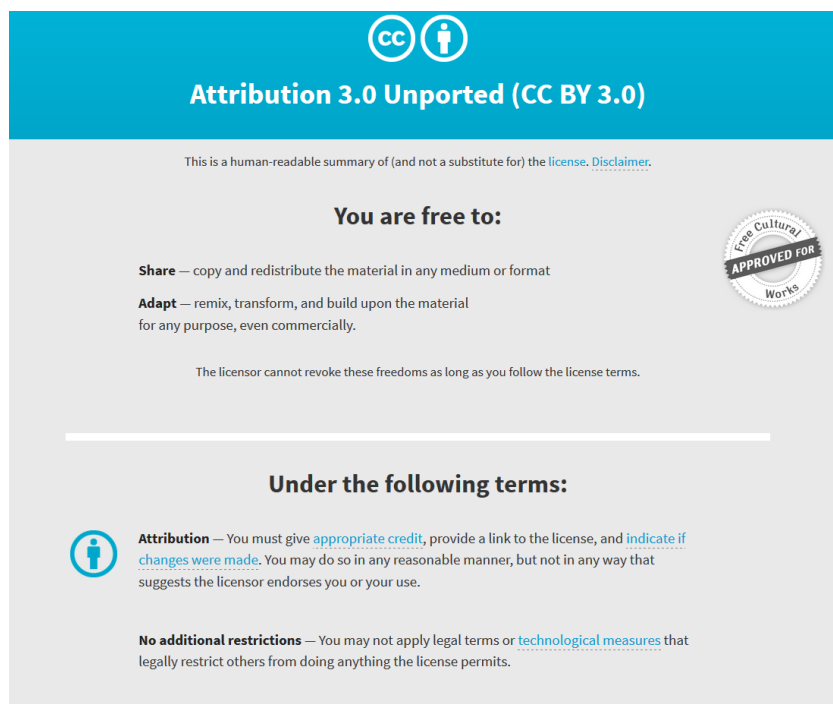
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Threats to Conservation of *Vitellaria paradoxa* subsp. *nilotica* (Shea Butter) Tree in Nakasongola district, Central Uganda

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Abstract

This study assessed the major threats to conservation of the shea butter tree (*Vitellaria paradoxa*) on farms in Buruli sub-region. Data were collected through a household survey, focused group and key informant interviews. Questionnaires data were coded, entered in Statistical Package for Social Scientists (SPSS) computer program and analyzed for major threats to conservation of the shea butter tree in Nakasongola District. Binary logistic regression analysis was used to show how socio-demographic characteristics influenced the willingness of the local people to protect shea butter trees on their farms. While the tree is a source of fruit, oil and charcoal to local communities, factors such as existing tree and land tenure system, termites, lack of planting materials and high poverty levels constrain on-farm shea tree growing. There was a significant association between marital status and willingness of the respondents to plant shea trees ($R=6.614$, $P<0.05$). The existing shea tree populations are entirely wild with great economic potential that needs to be conserved. Regional research programs should aim at mobilizing local communities to carry out interventions such as shea tree germplasm multiplication, assisted tree regeneration and encouraging farmers to protect naturally regenerating trees. This will enhance tree based rehabilitation of the degraded resources, while ensuring environmental sustainability and improved livelihoods. National governments and local and international conservation bodies need to come up with appropriate incentives for promoting on-farm conservation of this very valuable species. Efforts are also needed to propagate shea tree vegetatively and using seed. Failure to intervene will otherwise culminate into complete degradation and loss of shea parkland benefits, leading to 'the tragedy of the commons' not only in Buruli sub region, but also other shea parklands areas in Lango, Teso and West Nile sub regions of Uganda.

Keywords: Shea butter, drylands, conservation, threats.

Introduction

The shea butter tree (*Vitellaria paradoxa* C.F. Gaertn. subsp. *nilotica* (Kotschy) is an indigenous woody plant of savannah parklands¹ and plays an important role in improving household incomes for rural people². Local communities rely on it mainly for fruits, nuts, oil or fats for domestic consumption and cash sales³⁻⁵. The tree remains virtually a wild species with very little agronomic research on shortening its juvenile period before fruiting. Unsustainable exploitation of shea parklands has placed additional pressure on the natural regeneration of the tree⁶.

Although Uganda signed the Convention to Combat Desertification (CCD) in 1994 and ratified it in 1999⁷, there is still massive destruction of indigenous tree species especially for fuel in form of charcoal. Masters and Puga⁸, report that in some areas of Uganda, the *Vitellaria* tree is cut for charcoal making in spite of its economic importance as a source of cooking oil. According to Maxted *et al.*,⁹ on-farm conservation is the sustainable management of genetic diversity of locally developed traditional crop varieties, with associated wild and weedy species of all forms, by farmers within traditional agricultural, horticultural or agri-silvicultural cultivation

systems. It is an approach to in-situ conservation of genetic resources, focussing on conserving cultivated plant species in farmers' fields¹⁰. It is a form of management from which tangible benefits can be accrued. Though not normally planted by farmers given its long juvenile period, regeneration of *Vitellaria paradoxa* species can be facilitated by human management such as covering germinated seeds with mulch and through protection of the shea seedling when clearing land for cultivation¹¹. However, due to the high costs of planting trees, conservation interest should shift to protection and stimulation of natural tree regeneration especially where mother trees are available¹². This paper documents the major threats to conservation of the shea butter tree and the socio demographic factors influencing people's willingness to plant the tree.

Material and Methods

This study was carried out in Nakasongola District located in Buruli sub region in Central Uganda (figure-1). The district forms part of the rangeland ecosystem stretching from south western Uganda to the North eastern part of the country, popularly referred to as the cattle corridor.

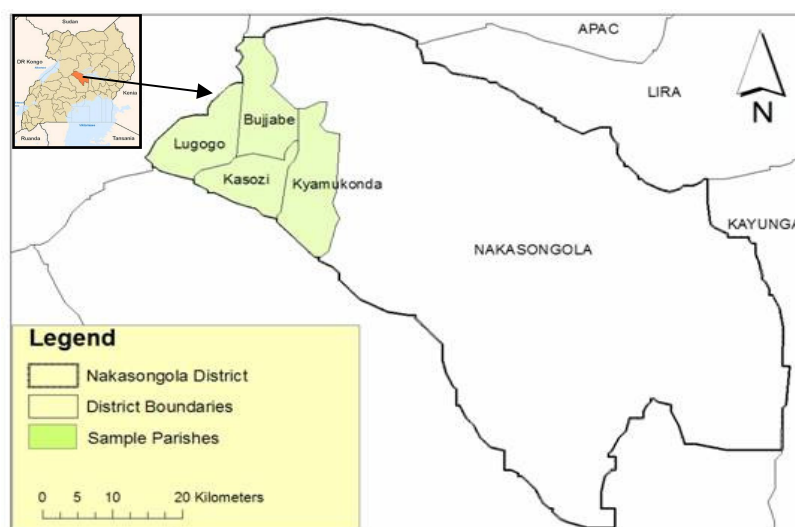


Figure-1
 Study area, Nakasongola district, Central Uganda

This study was designed to collect information from households in four (4) parishes (Lugogo, Bujabe, Kasozi and Kyamukonda) where the shea butter tree exists. Structured questionnaires were used to collect data from 60 households. The study design was based on the assumption that each household is normally distributed and internally homogenous. Socio-economic data was checked for consistency, coded, and entered in Statistical Package for Social Scientists (SPSS version 16.0) computer programme for analysis. Binary logistic regression analysis¹³ was used to show how socio- demographic characteristics influence local people’s willingness to plant *V. paradoxa* on their farms.

Results and Discussion

Threats to conservation of shea in Nakasongola: The highly reported threats to conservation of mature shea trees in Nakasongola were Charcoal burning and the present land tenure system (table-1). Other threats included bush fires, prolonged droughts, rapid human population growth and overstocking. The regeneration of shea seedlings was mainly threatened by prolonged dry spells, trampling by the large herds of cattle and termites.

Extensive degradation of parklands occurs along livestock routes, watering points, hill tops and areas where charcoal burning is mainly practiced^{14,15}. The combination of human population growth, traditional nomadic sentiments of overstocking and invasion by agricultural and ranching settlers has resulted into over utilisation and irreversible damage of Nakasongola parklands. The area under grassland in Nakasongola has declined from 78,100ha to just 40,182 ha due to overstocking of livestock, regular bush fires and burning of charcoal¹⁶. Charcoal burning is the biggest threat to shea conservation in Nakasongola District (table-1). A study

conducted on the Lake Kyoga Basin Catchments area⁸ indicates that close to 50% of the grasslands (including the parklands) in Nakasongola district greatly disappeared between 1990 and 2004, largely due to the activities of pastoralists and charcoal burners. According to Roques *et al.*,¹⁷ the effects of frequent fires, drought and high grazing or browsing pressures always result in low shrub densities as has also been found by this study.

Table- 1
 Threats to local conservation of mature shea trees and seedlings

Threats to local conservation of mature shea trees	Percent
Charcoal burning	81.7
Land / tree tenure	76.7
Overstocking	68.3
Bush fires	66.7
Prolonged drought periods	63.3
Rapid human population growth	56.7
Threats to regenerating shea seedlings	
Termites	85.0
Prolonged droughts	78.3
Trampling by large herds of cattle	68.3

Land and tree tenure system is also one of the factors discouraging local people from planting shea trees on farms (table-1). Nakasongola district faces persistent problems of absentee landlords, while a lot of the agricultural production is on land that is informally accessed leaving crop farmers and tree planters with limited security of land tenure. The local people here have continued to live in relative insecurity and fear of what decision the largely absentee landlords would take and the consequences to them if the land was sold or reclaimed. Currently, Nakasongola district is facing a drastic change in land management where formally communal grazing lands are being fenced off and turned into private lands. This has the

consequence of limiting grazing areas, yet farmers have inadequate knowledge on agroforestry practices^{18,19} capable of renewing and regenerating natural vegetation including shea trees.

A report by Kamugisha and Stahl²⁰ indicates that the intensity of fire in an area is often increased when there are cattle keepers. Pastoralists in Nakasongola district usually burn all the pasture with the hope that new grass would grow. The occurrences of severe bush fires in this area thus generally kill small trees more adversely than large ones¹. Although fire can be an effective management tool if applied correctly and early enough, it tends to encourage emergence of fire tolerant species which may not be suitable for pastures. As a result, indigenous species in Nakasongola shea parkland are giving way to Acacia species. This is so because Acacia species are more resistant to drought, fire, and browsing²¹.

Termites are wide spread in Nakasongola district (figure-2) and are considered to be one of the primary causes of environmental degradation in the district²². The reduction of forage trees has led to an invasion of termites, which attack people's gardens, tree plantations, especially at the seedling stage, further reducing the ground vegetation cover. The loss of vegetation due to termites' attack intensifies in the dry season when there is limited moisture in the soil¹⁶. The moisture stress reduces the available alternative vegetation on which termites could feed and they instead attack shea and other tree regenerating seedlings, thereby discouraging the growing of trees in Nakasongola district.

Willingness to plant shea trees in Nakasongola: While the influence of marital status on the willingness of the respondents to plant shea tree was highly significant (R=6.614, P<0.05), the influence of age, period of stay, household size, education level, and occupation of the respondents was not significant (table- 2). Logistic regression analysis of the socio economic characteristics versus people's willingness to plant shea showed a significant relationship between marital status, land ownership and local people's willingness to plant shea on their farms. The marginal change on willingness to plant shea trees as a result of marital status is 0.217 (table- 2). This implies that if a respondent is married, his/her probability of planting shea increases by 21.7%. Other factors such as age, period of stay, household size, education level and occupation of the

respondent do not influence people's willingness to plant shea trees. It means that the local people would not be influenced by these factors in order to be able to plant shea and other indigenous trees. Therefore, any tree planting program in the region should consider factors such as marital status and land ownership before its implementation in the area.



Figure-2
 Shea coppices sprouting on a stump attacked by termites

Interventions to control threats to conservation of shea trees: According to Panayotou and Ashton²³ destructive harvesting of most indigenous trees is a failure of governments to recognise the importance of Non Timber Forest Products (NTFPs) and thus allowing a costly and irreversible destruction of these valuable resources. All the necessary interventions suggested by the local people require the government and Non Government Organisations (NGOs) to play the frontline role in the conservation of shea⁷ and other indigenous trees in the district. However this should be done carefully considering the tribal heterogeneity among the local people as each ethnic group always has conflicting values it attaches to shea. For example, whereas the Langi in Nakasongola value shea for its fruit and butter, the Baruli value the shea tree as the best charcoal tree species.

Table -2
 Logistic regression of socio economic characteristics influencing willingness to plant shea

Variable	R	Odd ratio	Probability level	Significance
Age	0.024	0.919	0.878	ns
Sex	0.036	0.891	0.079	ns
Period of stay	0.024	1.106	0.877	ns
Household size	0.917	0.595	0.338	ns
Marital status	6.614	0.217	0.010	**
Education level	0.867	0.671	0.352	ns
Land ownership	0.625	0.214	0.050	**
Occupation	1.013	0.828	0.314	ns

ns = not significant ** = significant

Similarly, Barrow²⁴ explains a scenario in Senegal where a government decree designed to protect the Baobab tree raised tensions between local Peul herders and Wollof farming communities. In this area, the Wollof owned the land on which the baobab trees grew while the Peul traditional cattle keepers were allowed to collect the baobab leaves to feed their livestock. When the government announced a reward for anyone misusing the baobab tree, some Wollof farmers began to deny Peul herders access to trees and even reported them to the local authorities. Here two separate communities, each with legitimate claims of access to the forest resources, clashed over the baobab use as a result of probably well-intentioned, but uninformed government regulatory interventions. In such cases, respective governments should formulate policies that cater for the conflicting values within the local communities. If this is not done, it is probable that all efforts aimed at conserving important indigenous trees such as shea would be jeopardised.

Conclusion

There is a lot of pressure on naturally regenerating shea trees in Nakasongola shea parklands. Therefore, conservation efforts should be emphasized on-farm. Although local communities are generally aware of the importance of managing shea parklands jointly to provide common needs, there is need to address some of the controversial issues and conflicts present. For example, communal grazing is fast reducing as land owners fence off their portions. Even if shea tree planting has a valuable role in conserving the tree, this can only occur in the context of real local community participation, where the need is locally perceived and not imposed. Similarly, while training may be an important means to increase national capacity for interdisciplinary research involved in on-farm conservation, it should also be carried out in a participatory manner if the shea tree is to be conserved.

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