

Under-exploited woodland resources: The case study of indigenous fruit trees in Kiryandongo- Masindi District, Uganda

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Abstract Woodland fruit trees have enormous potential in contributing to the nutrition and cash economy of the rural poor. Unfortunately, these resources are disappearing at an alarming rate. This study was therefore, conducted to (i) assess the status of the indigenous fruit trees in the woodlands of Kiryandongo (ii) document perception, preferences and values of indigenous fruit trees by the local people and (iii) assess the proportion of farmland under indigenous fruit tree cover. The data were obtained through household interviews with the use of semi-structured questionnaires. An inventory of woodland fruit trees and farm walks were also conducted to gauge the fruit tree diversity and proportion of farmland under indigenous fruit trees respectively. Questionnaire responses were analyzed using the statistical package for social scientists (SPSS). Majority (89%) of the respondents said that indigenous fruit trees should be protected and or conserved. *Tamarindus indica*, *Borassus aethiopicum* and *Phoenix reclinata* were the most preferred species. Fruit trees were valued mainly for fuelwood and soil fertility improvement. The average proportion of farmland under fruit tree cover was very small (24%). The major threats to indigenous fruit tree conservation were agriculture, fuelwood and population increases. There is a need for awareness among farmers in order to increase the proportion of farmland under indigenous fruit trees.

Key words: Diversity, farm tree cover, farmers' preferences, local knowledge, tree diversity, Uganda

Résumé Les arbres fruitiers des régions boisées ont une potentialité énorme dans la contribution à la nutrition et à l'économie monétaire des pauvres dans le monde rural. Malheureusement, ces ressources sont entrain de disparaître à un taux alarmant. Cette étude était cependant conduite pour (i) évaluer le statut des arbres fruitiers locaux dans les régions boisées de Kiryandongo (ii) faire la documentation de la perception, les préférences et les valeurs des arbres fruitiers locaux par le peuple local et (iii) évaluer la proportion de la terre de ferme sous couvert des arbres fruitiers locaux. Les données étaient obtenues à travers les interviews des foyers avec l'utilisation d'un questionnaire semi structuré. Un inventaire des arbres fruitiers des régions boisées et de distance de fermes étaient aussi évalués pour jauger la diversité et la proportion des arbres fruitiers des régions des fermes champs, respectivement sous les arbres fruitiers locaux. Les questionnaire-réponses étaient analysés en utilisant des éléments de statistiques pour les scientifiques sociales (SPSS). La majorité (89%) de ceux-là qui ont répondu a dit que les arbres fruitiers locaux devaient être protégés et conservés. *Tamarindus indica*, *Borassus aethiopicum* et *Phoenix reclinata* étaient les plus préférées des espèces. Les arbres fruitiers étaient estimés principalement pour l'amélioration de combustible de bois et de la fertilité du sol. La moyenne proportionnelle de champs fermes sous couvert des arbres fruitiers était petit (24%). La menace majeure à la conservation des arbres fruitiers locaux était l'agriculture, le bois combustible et l'augmentation de la population. Il y a un besoin pour la sensibilisation entre les fermiers pour pouvoir augmenter la proportion des champs fermes sous les arbres fruitiers locaux.

Mots clés: Diversité, ferme couvert d'arbres, préférence des fermiers, la connaissance locale, la diversité des arbres, Ouganda

Introduction

Throughout Sub-Saharan Africa, land resources are deteriorating at an accelerated pace. A complex matrix of factors has produced the current crisis. The interaction between uncontrollable external factors, such as drought, and human abuse prevents formerly effective productive systems from satisfying the needs of the population (Muok and Owuor, 2000). Increased pressure on land has led to overgrazed areas, diminished soil fertility, deteriorated soil structure and increased soil erosion. Added to this cycle are the effects of excessive tree cutting, over-exploitation for timber and fuelwood and expansion of agricultural land into marginal areas (Muok *et al.*, 1998). Though overgrazing, over cultivation, over cutting of woodlands and deforestation have led to environmental degradation.

The effect of degradation is frequent crop failure and famine in the drylands, erosion of genetic resources and poor food security. There is need to introduce alternative sources of nutrition to supplement the currently grown agricultural crops. One question that needs to be answered is, do appropriate and viable alternatives exist? Researchers have been turning their attention to a whole new range of tropical trees and shrubs that produce delicious fruit and other products, but vast majority of these are wild or undomesticated. The potential of these species has not been fully realised and they have largely been overlooked. The aims of this study were to (i) assess the status of the indigenous fruit trees in the woodlands of Kiryandongo (ii) document farmers' perception, preferences and values of indigenous fruit trees and (iii) assessing the proportion of farmland under indigenous fruit tree cover.

Methodology

Study area. This study was conducted in Kiryandongo Sub-county located 40 kilometers North of Masindi town. The Sub-county is made of three parishes namely Kicwabugingo, Kikube and Kitwara. The soils in the area are generally fertile and are predominantly ferrallitic and rhodic. The minimum and maximum temperature ranges are 17-20°C and 28-29°C, respectively. The rainfall is bimodal with peaks occurring during March/May and August/November. The average annual rainfall is 1200 mm. Large areas of original wooded savanna have been taken over by farming and grazing. The woodland reserve has been degraded by tree harvesting for fuel requirements and at present consists of bush vegetation.

A total of 45 respondents were selected randomly for this survey using a combination of stratified and systematic sampling procedure. The area was stratified into according to the parishes and respondents from each parish were selected systematically for the interview. The number of respondents selected from each parish was 15. A semi-structured questionnaire was designed to capture information on indigenous fruit tree species. On-farm walks were conducted in Kicwabugingo parish. Ten farms were randomly sampled and surveyed. The aim of the farm walk was to observe and record indigenous fruit trees on the farms and assess by eye the proportion of farmland under fruit tree cultivation. Preference matrix ranking was used to generate a species priority list of indigenous fruit trees preferred by the local people. Each respondent was asked to indicate 10 species in order of preference. The highest priority species out of ten was assigned 10 points, 9 points to the second highest and the lowest ranked species assigned 1 point. The points for each species were summed across all respondents. The species were then prioritised according to the total points scored. SPSS was used to analyze the questionnaire responses.

Results and discussion

Perception, preferences and values of indigenous fruit trees. A wide range of indigenous wild trees were identified as sources of edible fruits. Majority (89%) of the people interviewed said that these trees should either be protected or conserved (Table 1). The most preferred species was *Tamarindus indica* followed by *Borassus aethiopicum* and *Phoenix reclinata* (Table 2). This preference reflects farmers' consumption tastes and may have been influenced by social factors such as ease of access to these indigenous fruits. According to Okafor (1988), indigenous fruits contribute significantly to diets of rural households as they have high nutritional value and are rich in vitamins and minerals. In this study, over 50% of respondents said their families depend on indigenous fruits trees for food at time of food shortage and that indigenous fruit trees are a good source of income (Table 1). All respondents reported that indigenous fruit trees are good sources of fuelwood and soil fertility improvement. This is not surprising since according to Otiye (1998), about 90% of Uganda's population relies on

fuelwood as source of energy for domestic work. Other people valued these fruit trees for their medicinal properties. In fact *Vitex doniana* was highly preferred for its medicinal properties.

The average proportion of farmland under indigenous fruit tree cover was low (24% ± 5) (Table 3). There were only three farms with fruit tree cover greater than or equal to 30% of the total farmland area. The low proportion of farmland under tree cover implies that a lot has to be done if farmers are to meaningfully integrate indigenous fruit trees in their farming systems. There is, therefore, a need to layout clear strategies on how to increase the proportion of farmland under indigenous fruit trees in the sub-county. Studies by Maghembe and Seyani (1991) clearly indicate that indigenous fruit trees found in cropland are selectively retained when farmers clear new land. There is limited evidence of farmers actually planting

Table 1. Farmers' perception and values of indigenous fruit trees (N=45).

Variable	% response
<i>What do you think indigenous fruits?</i>	
Should be protected or conserved	89
No need to plant them	11
<i>Values of indigenous fruit trees</i>	
Fuelwood	100
Soil fertility improvement	100
Medicinal	98
Poles	93
Shade	93
Timber	91
Erosion control	91
Food	52
Source of income	50
Fodder	41

Table 2. List of farmers' priority indigenous fruit tree species (in order of importance)

Indigenous fruit trees	Weight	Rank
<i>Tamarindus indica</i>	390	1
<i>Borassus aethiopicum</i>	333	2
<i>Phoenix reclinata</i>	264	3
<i>Grewia mollis</i>	175	4
<i>Vitex doniana</i>	132	5
<i>Vangueria apiculata</i>	100	6
<i>Parkia filicoidea</i>	68	7
<i>Carissa edulis</i>	57	8
<i>Ricinodendron neudelotii</i>	54	9
<i>Chrysophyllum albidum</i>	54	9
<i>Canarium schweinfurthii</i>	48	10
<i>Piliostigma thonningii</i>	48	10
<i>Kigelia Africana</i>	36	11
<i>Strychnos innocula</i>	33	12
<i>Tetrapleura tetraptera</i>	30	13
<i>Elaeis guineensis</i>	26	14
<i>Balanites aegyptiaca</i>	26	14
<i>Chrysophyllum gorungossanum</i>	25	15
<i>Eugenia capensis</i>	21	16

Proportion of farmland under indigenous fruit tree cover.

these fruit trees, as they do not have adequate knowledge of establishment techniques.

them to open land for crop production. Population increase and wildfires are other important threats (Table 4).

Conservation status and threats to indigenous fruit tree species.

The population of the 9 most preferred indigenous fruit tree species is decreasing in Kiryandongo sub-county (Fig. 1). Such a decrease poses a great challenge to any effort geared towards cultivation of indigenous fruit trees, as the wild populations would be the major source of planting materials. Clearing land for agriculture is the major threat to the conservation and or protection of indigenous fruit trees in the woodland. This problem seems to be universal as reported by Campbell (1987) that farmers often do not attach much value to indigenous tree resources and therefore prefer to clear

Conclusions

Based on the research objectives of this study, the following conclusions can be drawn from:

- i. *Tamarindus indica*, *Borassus aethiopium* and *Phoenix reclinata* were the most preferred indigenous fruit trees by the local people in Kiryadongo sub-county.
- ii. Many farmers valued indigenous fruit trees for fuelwood and soil fertility improvement.
- iii. The average proportion of farmland under fruit tree cover was very small.

Table 3. Proportion of farmland under indigenous fruit tree cover.

Farm number	Area under tree cover (%) SE ± 5
1	20
2	20
3	30
4	20
5	20
6	40
7	20
8	20
9	20
10	30
Average	24 (± 5)

Table 4. Threats to conservation of indigenous fruit trees (N =45).

Threat	% response
Agriculture	38
Fuelwood harvesting	29
Population increase	27
Fire attack	20
Pests and diseases	16
Settlement	11
Animal grazing	9

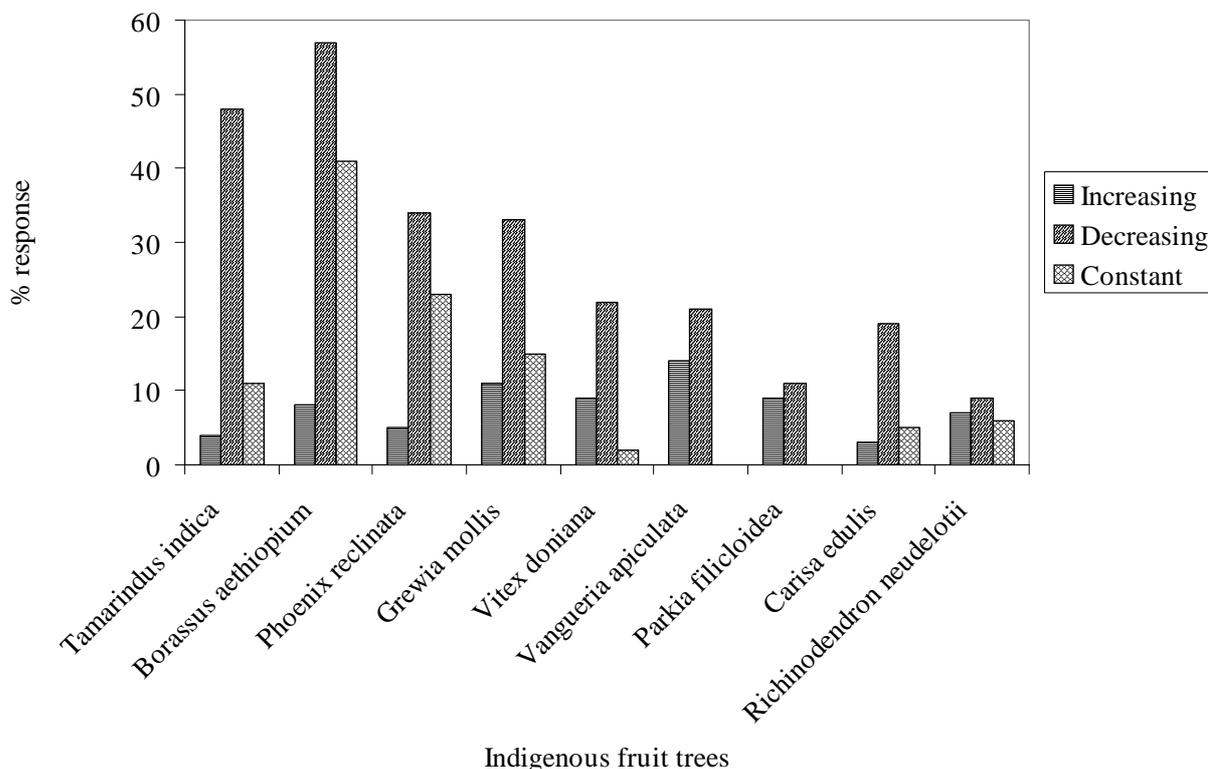


Figure 1. Conservation status of indigenous fruit trees in Kiryandongo sub-county.

- iv. The major threats to indigenous fruit tree conservation were agriculture, fuelwood and population increases.

Recommendation

- i. The priority species that were identified should be promoted for planting by farmers in the sub-county.
- ii. There is need for farmer training to demonstrate the advantages of cultivating indigenous fruit trees in order to contribute to food security in the sub-county.
- iii. A nursery to raise seedlings for planting by farmers in the area should be established.

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