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Responses of Rural Households to the Decline of Woodfuel Collecting Areas: Case Study in an Expanding Sugarcane Area in the Masindi District of Uganda¹



Charles Mugisha

Joyce Bategeka is a 56 years old inhabitant of the village of Kadukulu in the Nyabyeya parish in the Masindi district of Uganda. With her family of 11 members she lives off two acres of land. For firewood she depends on any dry wood she can collect from the pine plantations of the Nyabyeya Forestry College, four kilometres away from her homestead. The supply of firewood from this plantation is of limited quantity and Joyce complains that as a result of this her family often goes to bed in the evenings without a cup of tea.

Only five years ago, Joyce was able to farm on six acres of land and to collect firewood from around her homestead. The conversion of forested land into sugar cane growing areas has left her and a substantial number of other families without adequate farming land and a diminishing source of fuelwood. Joyce says "Our small forests will be over. Kinyara land is now taken over for sugar cane plantation and therefore no firewood. Forests around us are being cleared for food crop cultivation because our land was taken for sugar cane planting."

In Uganda over 87% of the population live in rural areas and rely on biomass for nearly all of their energy requirements.

The availability of biomass fuels largely depends on how land is being utilised. Expansion of commercial agriculture is one of the major factors affecting land use change that can have a large impact on the availability of locations from where local households can collect their woodfuel.

From 1972 to 1986, in the sub-counties of Budongo and Biiso (Masindi district), land abandoned by their owners and left fallow because of the civil war, was used by the local population as fuelwood collecting areas and for subsistence farming. With the return of peace to Uganda, a start was made to re-activate the local sugar estate and many former landlords made use of their legal right to reclaim their land. Most of them started as outgrowers for the sugar estate. The sugar estate facilitated farmers in this way within a 10 kilometre radius of the processing plant. Recently this radius has been extended to 15 kilometres, while a further increase up to 20 kilometres can be anticipated in the near future. This has resulted in a major shift in land use, from subsistence farming and woodfuel collecting into commercial farming. This article describes research carried out in these two sub-counties to investigate the responses of the local households to these land use changes and consequent change in fuelwood collecting areas. The main aim was to investigate and document what Joyce Bategeka and other inhabitants of the area have been experiencing over the last five years: an increased scarcity of wood due to the expanding sugar cane plantations at the cost of local subsistence farming land and woodfuel collecting areas; in order to support policy development that addresses the situation.

Expanding Sugarcane Areas Displace Woodland

Reconnaissance in the study area and interviews with key informants showed clear evidence that the expansion of the sugar cane growing area was realised at the cost of wooded areas and agricultural land. Households have to cope with the loss of fields for growing crops and declining wood resources. Previous research could not be identified that quantified such land use change and its impact on local households, neither for the Masindi district, nor for any other area in Uganda with similar conditions.

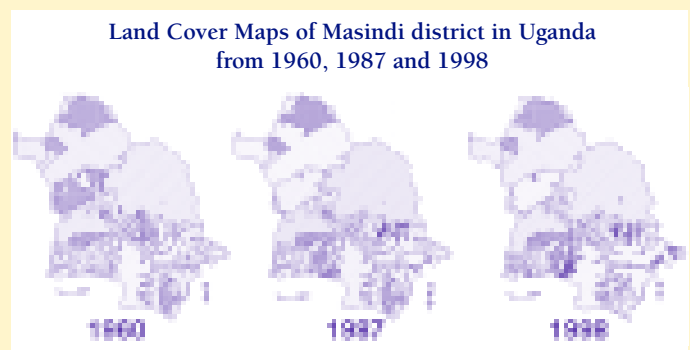
The study described in this article aims to give factual evidence on the large impact that the expansion of commercial farming has on local households and the options to meet their fuel needs. The study had two main components. On the one hand, a land use change analysis was carried out, and on the other a field survey with household interviews was undertaken to investigate the households' responses to the changing situation.

Land use change analysis

To quantify the change in land area used for sugar cane growing, land cover maps from 1960 and 1998 were compared. The 1960 map was reproduced from an existing topographic map of that year. The 1998 land use map was based on the available map of 1996, updated by using a handheld GPS receiver.

Both maps (of 1960 and 1998) were compared using GIS². The major conclusion from this comparison is that the amount of land lost from the categories of woodland and grassland nearly equals the increase in commercial and subsistence farming lands.

An intermediate map for 1987 was also produced based on answers received during the interviews. The purpose of this map was to visualise the process of expanding sugarcane-growing areas. The three maps together show that the major land use changes have taken place within the last decade.



1. This article is based on research by ITC MSc alumnus Charles Mugisha. The results of his research are described in: Mugisha, C.H. (1999). Impact of land use change on fuel wood collecting areas: application of remote sensing and GIS. A case study for Budongo and Biiso sub-counties Masindi district Uganda.

2. Geographic Information System

Responses of the local population

The area under study lies between the protected Budongo Forest Reserve and the sugar estate. Villages in this area can be grouped into three different regions:

- 1) the area next to the sugarcane fields
- 2) the area adjacent to the protected forest
- 3) the area between areas 1 and 2.

From each region, one village was selected in which household interviews were conducted to investigate the current and past situations regarding the source of biomass energy used. The villages of Kabango, Nyabyeya and Nyantonzi were selected as representing areas (1), (2), and (3) respectively.

These three villages were assumed to be representative of the area in which they are located. The households to be interviewed were selected through simple random sampling. A list of the taxpayers was used to get a first indication of the number of households in the villages. These lists were, however, not suitable for basing the household selection on, as they tend to ignore small female-headed households. Therefore, prior to selecting households to be interviewed, these lists were updated with the help of the village leaders.

A team comprising of the researcher and a female translator able to speak the local languages conducted the interviews. Table 1 gives an overview of the results of the household interview conducted in July 1998, describing the current and past situations in the surveyed villages.

Region	Village	Year	Natural Woodlands	Private Farms	Private Fallow Lands	Protected Riverine Forest	Sugarcane Cleared Area	Average Distance (in km)
1	Kabango	1998	12	46	19	19	12	1.5
		1960	46	31	23	0	-	1.0
2	Nyabyeya	1998	4	0	15	89	0	1.1
		1960	41	4	0	30	-	0.6
3	Nyantonzi	1998	48	48	0	44	0	1.9
		1960	56	36	16	4	-	1.6

Table 1: Percentage of respondents collecting woodfuel from specific land use types in 1960 and 1998. (Note that respondents may collect from more than one area.)

The village in the first region (Kabango) showed very clear evidence of wood scarcities. As shown in the table, women used to collect their fuelwood mainly from natural woodlands, which have now been converted into sugar cane growing areas. At the time of the survey, nearly 50% of the households in region 1 were buying charcoal from traders who used wood from land being cleared as preparation for sugarcane growing. This source is temporary and will cease to exist within a couple of years when all the potential sugar cane growing area has been cleared.

The charcoal traders sell the charcoal in large bags, creating new sources of income for the wealthier women who are able to buy these large bags and resell them in smaller quantities. A positive side effect, although small, of charcoal being bought from traders is that women and children spend less time collecting wood.

The village near to the protected forest (Nyabyeya) shows a change in fuelwood collecting areas from natural woodlands to protected forest resources. Analysis indicates that the original woodland fuelwood collecting area is now used for subsistence farming. As a result, local women were forced to collect their fuelwood from elsewhere, involving greater walking distances. The

only nearby source is the protected forest. Access to this resource is still permitted, but in light of the developments in other regions of Uganda, government policies might alter this situation.

The third village (Nyantonzi), in the intermediate area, also shows a greatly increased dependence on the protected forest reserve, but unexpectedly does not make use of the cleared sugarcane area. This is probably due to the high demand for wood from the cleared areas by villages closer to these areas, leaving nothing for Nyantonzi.

Protecting Forests; Ensuring Fuelwood Supplies

The data collected in this study show clear evidence of a rapid expansion of the sugarcane growing area. As a result, local households near the sugarcane estate have had to find new areas from which to collect their wood. Women in the households are worst affected. In 87% of the surveyed households, women are responsible for wood collection and they are the first who have to deal with the decline in available agricultural land.

Currently, local woodfuel demand can be met by using wood from land cleared in preparation for sugarcane growing. This supply is however not sustainable. In order to facilitate local wood energy planning, more research will be needed to quantify the demand for wood by the local people and the available biomass in the area.

The local population is increasingly aware of the worsening situation. Several families have started planting trees on their land, although, as one of the interviewed women explained "There will be

problems in the future as it takes so long for the trees to mature. The one I am using I heard was planted in 1970, and these trees that are now being planted may be of use only in the year 2030."

Possible interventions may be triggered by the increasing scarcity of woodfuels, and by the re-activation of improved stoves programmes in the area. The Nyabyeya Forestry College in Masindi could play a pivotal role in this by integrating the promotion and utilisation of their "pekope-stove" as part of their educational programme.

To solve future fuelwood problems and to conserve the protected Budongo forest it is recommended that fuelwood plantations be established as a buffer between the forest and the villages. Indigenous fast growing species that can be coppiced, as already planted by farmers around their homesteads, could be planted in participatory forest management projects using the degraded areas around the Budongo forest. As fuelwood provision in the study area is mainly the responsibility of women, they should be the main focus when considering such fuelwood plantations.

A rapidly accessible new source of woodfuel for local people could be the small patches of eucalyptus planted by Kinyara on their estate in areas not suitable for sugarcane. Originally these trees were planted to discourage illegal homes being built on the land. Using them as woodfuel would give them a more positive function.

Furthermore, government policies have to be formulated that compel companies involved in wood depletion to contribute directly to the replenishment of wood resources. ■

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Cheikh Sanogo

A Tale of Two Women and their Charcoal Technology: A case from Mali



Margaret Skutsch

Not long ago firewood was the most important energy source for urban households in Mali but recently this has given way to charcoal, despite the fact that cooking with charcoal is twice as expensive.

In Bamako, the capital city, the proportion of households using charcoal as their main source of energy for cooking has grown from 3% in 1978, 11% in 1989, 18% in 1995 to more than 60% now. Charcoal consumption is growing at about 20 % per year while the consumption of wood is falling by 10% per year. There are many reasons for this “charcoal transition”, it seems that women appreciate the qualities of charcoal. This is possibly related to (1) their desire for modernisation; (2) the changes of habitation (dense population in the cities means kitchen space may be reduced); (3) convenience and speed of cooking. Of course, as population grows, demand for charcoal also increases.

While charcoal is used by women for cooking in many countries in the region, charcoal making is generally thought to be a male-dominated profession in Africa. In Mali, however, women are involved in both production and consumption, thus both at the beginning and at the end of the long chain of the charcoal business. More than 60% of charcoal producers are woman in the production area that supplies Bamako, and the same tendency can be observed around other large cities (e.g.

Ségou, Mopti, Kayes, Sikasso, Koutiala). The growing demand for charcoal is actually providing rural women with increased opportunities for income generation. But, as in other countries in Africa, charcoal production using traditional methods is inefficient and wasteful of forest resources.

Under the *Stratégie* Energie Domestique, a project financed by the Netherlands, the ‘Cellule Combustibles Ligneux’ (within the Department of Forests, National Directorate on Conservation of Nature) is working with groups of women to try to introduce the Casamance kiln. This is an adaptation of the local traditional earth mound kiln using an external chimney made of steel drums, and which requires the stacking of the wood in a parabolic form in order to improve gas circulation (figure 1). The efficiency of this technology has been measured by the project as 29% in comparison with traditional methods that achieve between 11% and 15%. The cost of

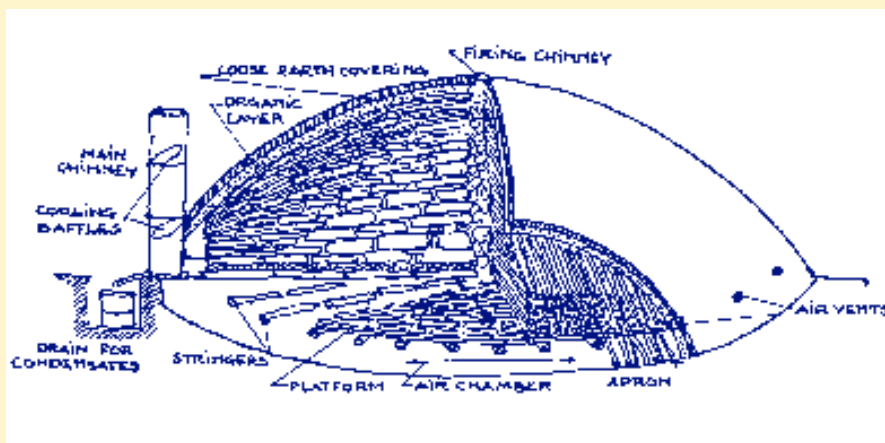


Figure 1: The Casamance kiln, an improved version of the earthen kiln using a chimney.