



# ALAM

AGROFORESTRY IN LANDSCAPE MOSAICS

Working Paper Series

## Three Communities, Two Corporations, One Forest: Forest Resource Use and Conflict, Mabira Forest, Uganda

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# ALAM

## AGROFORESTRY IN LANDSCAPE MOSAICS

ALAM's Mission: To improve the science and practice of conservation through better understanding of agroforestry and communities in landscapes that comprise agricultural lands, trees, and protected areas.

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**T**he Mabira Forest Reserve in southern Uganda is subject to multiple sources of stress. It is flanked, particularly on the southern and eastern sides, by tea and sugar plantations and factories, and its boundaries are peppered with small communities. In addition to these external sources of pressure, Mabira also includes several enclave communities within the reserve's boundaries (see Map 1).

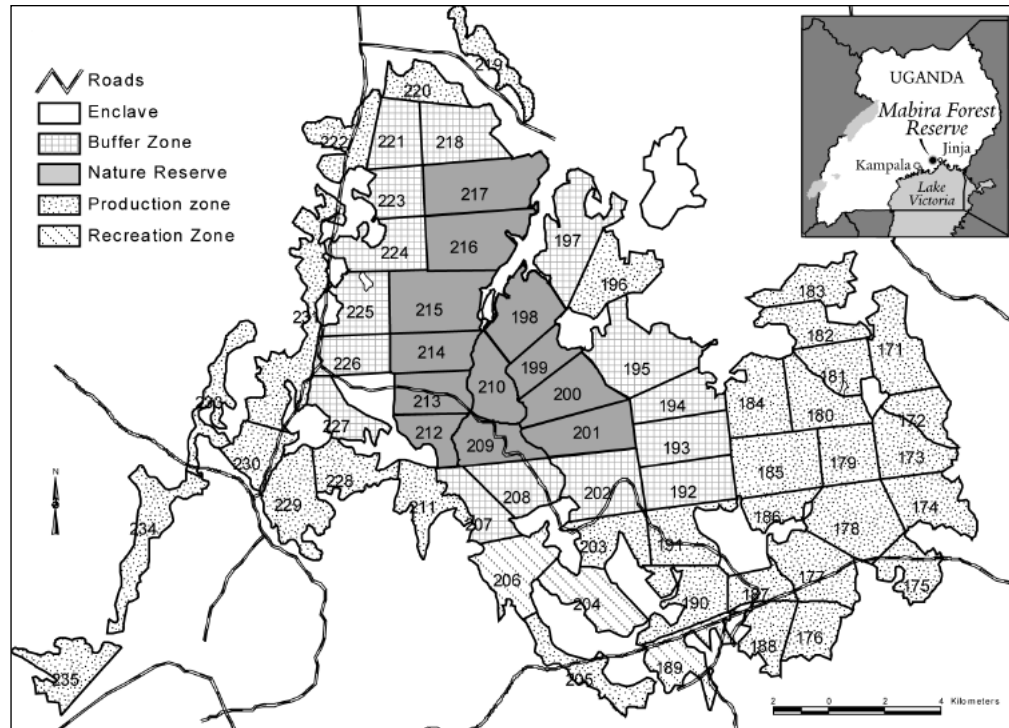
The tea and sugar plantations around Mabira continuously consume forest products such as timber and fuelwood, both for their own operations and for the sustenance of their workers. Several of these estates engage in at least some measure of forestry on their own lands, but it is clear that some of the products they and their workers use are extracted from Mabira. Many residents of the villages surrounding Mabira rely on the tea and sugar estates for employment, yet they often resent the presence and heavy hand of industry in the region.

Villagers rely on forest products, such as fuelwood, fruit, water, and timber for their daily activities, but they often find it difficult to procure these items. Felling of trees for timber or fuelwood is illegal, but forest guards, either due to lack of familiarity with forest law or corruption, often also stop the collection of water, fruit, and dead wood, all of which are legal pursuits.

The interactions between the corporations, communities, and the forest are often quite complex. The aim of this study is to untangle these relations and to gain a clearer picture of the dynamics involved. The research team worked with community members, forest department personnel, and company managers to understand their various needs, concerns, wishes, and future plans. These efforts resulted in an attempt to identify options available to all the stakeholders in order to facilitate more collaborative interactions.

## Research Context

About 30 percent of Uganda is “forested,” and another 48 percent is classified as “other wooded lands” (International Agricultural Centre 2003). The amount of land classified as forested or wooded is declining, however. While the actual rate of forest loss is unclear, authorities agree that deforestation is cause for concern. One estimate places forest loss between 1990 and 1995 at 4.63 percent (International Agricultural Centre 2003). However, the Food and Agriculture Organization of the United Nations (2000) states that between 1990 and 2000, Uganda lost an average of 2 percent of forest cover per year, for a total of approximately 910,000 hectares. Most of the forest loss is thought to be due to conversion of forested land to agriculture, but loss and fragmentation for other reasons is also increasing. For example, extraction of wood for sawn timber increased from 503,000 tons to 610,000 tons between 1996 and 2000 (Uganda Bureau of Statistics 2003). Additionally, 90 percent of Ugandans rely on fuelwood as their predominant, or only, source of energy, amounting to 16 million metric tons of



Map 1. Mabira Forest Reserve, Uganda.

firewood and 4 million metric tons of charcoal used domestically each year (Minister of Water, Lands, and Environment 2002).

The Mabira Forest Reserve is located in the Mukono District of Uganda. Home to 825,000 people in 1992, it continues to be one of the most densely populated districts in the country with 200–230 people/km<sup>2</sup> (Mrema *et al.* 2001). The forest lies along the road between Kampala and Jinja, approximately fifty-four kilometers from Kampala and twenty kilometers from Jinja. The park encompasses 306 km<sup>2</sup>, and ranges from 1070 meters above sea level (masl) to 2600 masl (Mrema *et al.* 2001).

Mabira represents the only occurrence of medium-altitude moist semi-deciduous forest that is protected in Uganda and is also home to numerous rare species (Muramira 2001). Mabira, like other forests in Uganda, is being adversely affected by human activities. Timber harvesting, hunting, and other human activities within the forest reserves are having major ecological effects, including local extinction of species in Uganda (Howard *et al.* 2000). The uniqueness of the setting coupled with the habitat the forest provides for rare species has made Mabira a target for restoration efforts.

The soils in the area adjacent to the forest are so depleted that many farmers acknowledge that they are poorly suited to crop production. Declining soil fertility combined with a population growth rate of 2.8 percent is creating need for new agricultural lands. Researchers predict that settlement in the zone around the forest is already so dense that any further expansion by farmers will result in encroachment on

the forest for agricultural purposes (Mrema *et al.* 2001: 21).

The most prominent commercial pursuits on the outskirts of the Mabira Forest Reserve are sugar and tea growing, harvesting, and processing. Two companies, one producing sugar and one producing tea were chosen for inclusion in this study. One of these companies, Sugar Corporation of Uganda, Limited (SCOUL) is headquartered in Lugazi and employs 6,000 people. The corporation owns roughly 11,800 hectares of land, about 10,000 of which are under sugarcane, and supplements its cane crop by purchasing from outgrowers. In addition to needing combustible materials to process the raw sugarcane, the company requires building materials for its sugar factory and other enterprises. SCOUL operates about fifty-five schools as well as a hospital. Plantation managers have allocated 500-600 hectares to forestry.

The other company included is Uganda Tea Corporation, Limited (UTCL). Its tea-processing factory located at the Kasaku Estate uses only firewood to fuel its boilers. The company presently has about 200 hectares devoted to forestry and plans to increase that amount by fifty hectares when the factory expands. This land supplies approximately 60 percent of the company's need, while the remaining fuelwood used must be purchased.

In order to understand the situation of villagers living on the outskirts of Mabira forest, three villages of different sizes and distances from the forest were chosen for study. The village of Buwuma is the smallest of the three chosen. Consisting of sixty-three households, 268 people, it is completely surrounded by fields of sugarcane. Buwuma lies about 7.5 kilometers from the main road linking Kampala and Jinja. Most of the villagers reside at least several kilometers from Mabira forest.

Kitoola consists of 320 households that include an estimated 1,400-1,500 residents. Mabira surrounds the village on most sides, and the areas not flanked by the forest are used for sugarcane cultivation. As Kitoola is much closer to the main road, about 2.5 kilometers, its residents seem to interact more with people outside the village than do the residents of Buwuma. Living standards also seem generally higher in Kitoola (see details below).

With more than 2,700 residents living in 550 households, Kayanja is the largest village chosen for this study. Kayanja lies right along the main road and developed as a trading center. Two different tea plantations, one of which is the Kasaku Estate, neighbor it. As almost no one from Kayanja works in SCOUL's fields or factory or serves as a sugarcane outgrower, residents of this village are less influenced by the sugar corporation than are those of the other two villages. Mabira forest is approximately 10 km from the village. Kayanja residents enjoy the highest living standard of those in the villages studied.

## Methods

The villages included in the study were chosen based on proximity to the forest and to a sugar or tea plantation. Each of the villages chosen had previously been a

research site for the World Agroforestry Centre (ICRAF).

In each village, the local chairman was asked to provide a list of households ranked according to income and social status. The families were classified as upper class, middle class, or lower class based on the type of house they have, off-farm income, livestock owned, and whether they own or rent their land. The chairman of each village or another village councilor determined the divisions. As such, they vary from village to village. In the course of the research, detailed accounts of social and economic conditions were elicited for each family by enquiring as to their land and livestock holdings and off-farm employment as well as by directly observing living conditions.

Data from previous ICRAF studies were available for seven households in each village. For this study, twelve households were chosen from each village, four in each wealth category. Of those twelve, six had previously been interviewed by ICRAF, and six were randomly selected from the stratified sampling frame. In some instances, however, the household consisted of a person or persons who no longer resided in the village but still owned land. In such cases, a replacement household was chosen.

In addition to speaking with members of twelve households in each village, the research team spoke with members of the local council, traditional healers, carpenters, community-based organization (CBO) members, youth group members, ministers, and teachers. Beyond the villages, we spoke with forest department officials, representatives from the office of the Forest Secretariat, Forest Resources Research Institute (FORRI) personnel, Sugar Corporation of Uganda, Limited officials, and managers of Uganda Tea Corporation Limited.

Research methods included semi-structured interviews, mapping, listing, and participant observation. Interviewees in the communities were asked to describe the forest and their knowledge and use of forest resources as well as their familiarity with forest law. They were also asked to explain the composition and uses of their gardens and to list the tree species that they use. Informants also explained their relationships with the sugar or tea plantations as well as their views on the companies and their management. Finally community members were asked to explain changes in these subjects over time. Representatives of the sugar and tea plantations and factories were asked about their relationships with the communities, their use of forest products, and their plans for the future. Forest department and FORRI officials provided insight into the changing forest laws and discussed the challenges inherent in managing protected forests in Uganda. Additionally, they described current and planned community outreach projects.

## Villages, Corporations, and the Forest Department

Before discussing possibilities for future collaborations, it is necessary to describe each of the communities and corporations in detail and to discuss the current and future role of the forestry authority in Uganda.

### *Buwuma*

Buwuma, like many small towns, is a close-knit community. It rarely has problems with crime or discord among neighbors. Life in Buwuma does have its challenges, however. The community has one school, but it serves students only up to primary level five and does not offer national exams. There is no building for the school, and classes are held in an outbuilding of the church, in the church sanctuary, and under a mango tree. Additionally, the borehole that provided water for the village has failed, and residents must now journey to the valley to retrieve water. Fetching water is generally the task of a child, but the sea of surrounding sugarcane makes such a chore dangerous for small children. Villagers are fearful that criminals will be able to hide in the sugarcane and harm passersby, and there is a report that in a nearby village, a child was snatched by a witch doctor that was hiding in the cane fields. SCOUL officials report that they usually find one or two bodies in the Mukono District cane fields every year. Additionally, taxis will not come to the village, and motorbikes will not come in the evenings for fear of bandits hiding in the cane.

A SCOUL manager has indicated that his company is aware of the problem of the sugarcane potentially harboring criminals. Each section of cane has a company representative to whom the villagers may voice such concerns. These representatives are authorized to cut back cane in order to widen the roadways and increase visibility. This small harvest is then used in the factory or used as seed stock.

In 1977, when the current local chairman was born, there were eighteen households in Buwuma. When the sugar corporation would bring new workers to the plantations, it would house them in apartment-like rows, called lines, but many would leave and buy land in the area. As a result, Buwuma is composed predominantly of people of non-Baganda ethnic groups from various areas in eastern Africa. The area has also absorbed many refugees from the Democratic Republic of Congo. As reported by the local chairman, the village's composition is roughly as follows: 55 percent Congolese, 25 percent Ugandan (of these, very few are Baganda, the tribe native to the area), 5 percent Kenyan, and 5 percent Tanzanian. He was unable to characterize the remaining 10



*Buwuma village is located in the forested area in the background, with sugarcane in the foreground. Photograph by Meredith Welch Devine.*

percent. The village grew quickly as the sugar operations expanded. By 1985, there were twenty-eight households in the village. Today there are sixty-three.

Farmers in Buwuma have small plots and generally produce below subsistence levels. Most tend their own farms and do not have the resources to hire others to work there. Villagers supplement their crop production by purchasing food from village shopkeepers who buy provisions in the larger towns of Lugazi and Mukono. The inability to produce beyond subsistence levels can largely be attributed to small plot sizes and depleted soils.

In order to improve soil fertility, many Buwuma farmers, including almost all of those with whom we spoke, undertake a variety of enhancement measures. Slightly more than half of these farmers choose to practice crop rotation, sometimes in conjunction with applying cow manure, but often as the only measure. Slightly less than half reported using cow manure, and never as the sole source of enhancement. Only two farmers indicated that they practice fallowing, and these only leave the land fallow for two years before recommencing planting. Lastly, almost half of the farmers reported planting trees to increase soil fertility. *Ficus (mutuba,*<sup>1</sup> *Ficus natalensis)* was the most commonly mentioned species, while jambolan (*jambula, Syzygium cuminii*), *Calliandra (calliandra, Calliandra calothyrsus)*, and fig (*mukokoowe, Ficus ovata*) are also used. This use of trees may be in part a result of previous ICRAF visits to the village.

In 2003 most of the villagers in Buwuma worked for SCOUL. Laborers in the plantations made about 1,700 shillings (approximately 85 cents) per day, though those that put in extra hours or work very quickly made more.<sup>2</sup> There is appreciation for the jobs that the plantation provides, but many villagers felt that the wages are too low for the work that they do. They have also indicated that they are seldom paid on time. A villager may work for two months and only be paid for one. They continue working for SCOUL because they have no other employment options near the village.

Those who grow sugarcane for sale to SCOUL have similar complaints. Other than selling a few canes apiece to individuals who pass by, SCOUL is the only outlet for their cane, yet waiting for payment can be difficult. Many farmers have said that the money sometimes takes two to three months to reach them.

Women in Buwuma have also complained of discrimination on the part of SCOUL employees. Several were fired, in two sets of layoffs, and told it was because the corporation no longer wished to have women as employees in the fields. High-ranking managers within SCOUL denied that anyone was systematically laid off due to gender, but acknowledged that these women could have been the victims of abuse by their supervisor.

Those villagers who do not work for SCOUL tend their own farms, have small village shops, or work as fishermen. The fishermen spend most of their time on Lake Victoria, returning to Buwuma for three weeks after each month spent fishing. The fishermen are not paid a guaranteed wage, and go out two to a boat. For the day's use of the boat, the owner requires payment of twenty fish. The excess catch is divided

<sup>1</sup> On the first mention of a tree species, its English name is given, followed by the Luganda and botanical names. Subsequent references will be made only by the English name.

<sup>2</sup> In 2003 one U.S. dollar was roughly equivalent to 2,000 shillings.



*Housing for SCOUL plantation workers, known as “lines.” Photograph by Meredith Welch Devine.*

between the owner and the two fishers. For example, if a team catches thirty-two fish, the first twenty go to the boat owner. The remaining twelve are split as follows: six for the boat owner, three for each fisher. The fisher sells his or her portion of the catch upon returning to shore. Due to this arrangement, many fishers have days when they receive no pay for a full day’s work.

Residents of Buwuma live several kilometers from the Mabira Forest Reserve. Thus, they have little direct experience with this forest. Many residents do not, however, have the on-farm tree resources necessary to meet their fuelwood requirements, and in addition to purchasing firewood and charcoal, villagers harvest wood from a nearby private forest patch. While most villagers expressed interest in the future of the forest patch, acknowledging that it provides fuelwood and rain, several believed that it was more of a burden than an asset. These residents voiced concerns about monkeys and wild rats coming from the forest to destroy their crops and said that villagers would be in a better position if the forest was cut and they were allowed to plant crops.

The majority of trees on Buwuma farms are used as a food source. Fruit trees used include avocado (*ovakedo*, *Persea americana*), mango (*muyembe*, *Mangifera indica*), guava (*epeera*, *Psidium guajava*), jackfruit (*fene*, *Artocarpus heterophyllus*), palm (*lukindu*, *Phoenix reclinata*), and jambolan. Several trees, such as *Ficus* and *Markhamia* (*musambya*, *Markhamia lutea*), are used for firewood. *Ficus*, *Calliandra*, fig, and jambolan are used to increase soil fertility.

Buwuma villagers have expressed interest in growing trees to meet their fuel needs. Finding fuelwood in the bushes is becoming increasingly difficult, and purchasing wood and charcoal is expensive. One bundle of firewood usually costs about 1,500 shillings due to the additional transport needed to bring it to the village. A large family uses two bundles per day, while a small family may be able to make a bundle last for two days. When income is only 1,700 shillings per day, purchasing fuelwood represents a major financial burden. Thus far, some farmers have begun planting trees for firewood, but many others have said they do not have the money to purchase planting material or do not know where to get it. Though a few villagers reported planting trees

from cuttings or getting seedlings from the forestry office in Najjembe, only two reported transplanting trees and none said that they had planted fruit trees from seeds found within fruits they purchased or otherwise acquired. Not knowing where to find planting material was the single largest reported constraint to tree planting, reported by more than half of the farmers. Other responses included not having room in their gardens or inability to plant trees because the land they farm is rented.

Buwuma villagers have also expressed an interest in planting more fruit trees for both home consumption and commercial purposes. Almost every farmer showed strong interest in planting *Moringa* (*moringa*, *Moringa oleifera*). There seems to be a widespread belief that *Moringa* will end poverty in the community, due to rising commercial interest in *Moringa* for medicinal uses. Most villagers use *Moringa* for its medicinal properties in their own homes, and there are traders who visit the village to purchase *Moringa* for markets further afield. Villagers have also witnessed dramatic improvements in livelihoods for those who have cultivated vanilla, and hope that *Moringa* will be the next ‘poverty-ending’ crop.

### ***Kitoola***

In the late nineteenth century, members of the Basoga tribe that served as the king’s drummers settled on a hill near the present-day site of Kitoola. These people brought tributes and taxes to the king, Muteesa I, and deposited them with his trusted officer Ibrahim Sempa Basudde. Residents of the area began to call Basudde “Mutoola,” a name that derives from the fact that he was allowed to keep a portion of the tribute before it was passed along to the king. Basudde continued to be of great service to the king, helping with the defense of Baganda and in tribal wars. In return, he received a gift of eight square miles of forest and farmland. As newcomers entered the area, Basudde gave them land on which to settle and grow crops, and the town of Kitoola (a translation comparable to “of Mutoola”) grew up around him.

In time, Basudde left Kitoola and moved to Kampala. In 1927, his son, Kalanzi Kigongo, inherited the land and began growing cotton. Shortly thereafter, the first Mr. Mehta came to the area. He settled on a hill called Kawoolo and began searching for areas in which to produce molasses. Mehta’s associate Yakobo Kivumbi visited Kigongo, Mutoola II, to negotiate a lease to grow sugarcane. Yakobo and Mutoola II agreed on a forty-nine year lease. In time, the lease grew to 934 acres. Though the Baganda in the area did work for Mr. Mehta, much as in Buwuma, they could not fulfill his labor requirements and he began bringing in workers from many other areas. Mehta’s SCOUT steadily increased its landholdings, approaching landowners for new leases even today.

Even with the influx of workers, Kitoola remained relatively small until the 1980s. Since that time it has grown steadily. Though there is a substantial amount of land ownership, many residents farm rented land.

Livelihoods are more diverse in Kitoola than in Buwuma. Most of the villagers

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that work for SCOUL are those that are considered to be settlers. They generally have a lower standard of living than those engaged in other pursuits such as owning a shop, running a restaurant, or serving as a driver.

Several farmers in Kitoola plant sugarcane to sell to SCOUL. Outgrowing sugarcane involves the following steps:

- The farmer must make contact with the officials from the sugar corporation
- He or she must then acquire planting material (if the farmer cannot purchase the planting material, it is given on credit by the company)
- SCOUL officials inspect the land the farmer wishes to use for planting
- At harvest time, SCOUL officials return to inspect the yield and measure the quantity
- The farmer can harvest and transport the sugarcane on his or her own or the factory can send workers for these tasks (if they must send laborers, it is then deducted from the payment amount, as is the amount due for planting materials)

Though outgrowers are better financially situated than simple laborers, they too expressed frustration with the endless cycle of debt due to extremely low payments and the high cost of materials. SCOUL's current lease with Kajubi Mutoola, Mutoola IV, pays 4,500 shillings per acre per year, but amounts differ among landowners. There is no association of landowners to collectively bargain on lease payments, and even informal discussion is quietly discouraged by the corporation.

While some farmers are discontinuing their leases with SCOUL, others have found it difficult to do so. One farmer indicated that she has repeatedly asked to terminate her lease, but that the company simply replied that it still needed her land and that she could raise the amount she charged but they would not leave. While this farmer would rather plant her own crops than lease to SCOUL, she does prefer leasing to SCOUL over leasing to another farmer. SCOUL may take several months to pay, but she says a villager may not pay at all.

Some farmers who grow sugarcane commercially do not use SCOUL as their outlet. Several farmers in Kitoola simply sell their cane to passersby, indicating that this is more profitable. While they do not sell the same volume that they might sell to SCOUL, prices are more favorable. SCOUL purchases one metric ton of sugarcane for 25,000 shillings, and a farmer can sell an individual cane, two kilograms, for 100 shillings, or 50,000 shillings per ton.

Many farmers in Kitoola profit tangentially from the presence of the sugarcane plantations. As workers pass by their farms and market stands, villagers are able to sell excess crops and earn money. They also benefit from the schools that SCOUL has constructed. Many villagers have expressed that these schools are affordable for most residents, and anyone may attend regardless of affiliation with the corporation.

Of the farmers we spoke with, only two indicated that they sell the produce from their gardens. None of the farmers said that they plan to sell their produce, only doing so when there is a surplus above the amount required for home consumption. About

<sup>3</sup> The fibrous material left when the juice is squeezed from sugarcane.

one-third of the farmers complained of low or declining soil fertility; one explained that the soil was poor because the previous owner had spread bagass<sup>3</sup> on the garden plot. Of the remaining farmers, only one replied that the soil was fertile, while the others did not mention it as a factor.

Farmers in Kitoola seem to have knowledge of several different methods for increasing soil fertility. All of the farmers with whom we spoke indicated that they practice crop rotation. Applying cow dung is also a popular soil amendment in Kitoola. One farmer also uses companion planting strategies and mulching to improve crop yields.

*Ficus* is popular among Kitoola farmers due to its many uses. Improving soil fertility was the most frequently cited use of *Ficus*, though farmers also reported using it for timber and firewood. *Calliandra* was also regularly mentioned. Farmers using trees for timber rely heavily on both *Markhamia* and *Maesopsis* (*musizi*, *Maesopsis emnii*), while furniture makers in the area reported using iroko (*muwule*, *Milicia excelsa*), African rubber tree (*nkago*, *Funtumia elastica* or *africana*), *Maesopsis*, and *mukebo*,<sup>4</sup> much of it coming from Mabira forest. Other trees were used for their fruit, and only one farmer reported that he did not use trees or tree products at all.

<sup>4</sup> This is the Luganda name. We were unable to find the English or Latin name for this tree.

When asked what they are allowed to take from Mabira forest, the vast majority of Kitoola farmers with whom we spoke replied “nothing.” One said that the freshwater springs are all in the forest and that villagers are only allowed to retrieve water. Another said that, after getting the LC<sub>3</sub><sup>5</sup> involved, they are allowed to pick up fallen dead wood and that, due to the efforts of an unknown non-governmental organization (NGO),<sup>6</sup> they are allowed to collect vines and other non-timber products for basket-making. The majority of the respondents replied that if they do go into the forest, which all but one said they do, they are very fearful and must go at night or on Sunday to avoid arrest. If stopped by forest department staff, their axes are taken, they are asked for money, and some reported having been beaten, even if only picking up fallen wood. One older woman said that if she were caught in the forest she would probably be let go because of her age. She does not get her wood from the forest, however, partly because she has heard gunshots she believes are from forest department employees.<sup>7</sup>

<sup>5</sup> Locally elected offices are organized in a five-tier hierarchy: the village (LC<sub>1</sub>), the ward/parish (LC<sub>2</sub>), the division (LC<sub>3</sub>), the municipality (LC<sub>4</sub>), and the district (LC<sub>5</sub>) (Grant 2002).

<sup>6</sup> Farmers were unable to remember the name or any defining characteristics of this organization.

<sup>7</sup> Officially, forest department staff are unarmed.

Almost all of the farmers reported that they believe the laws governing forest use are good. They have all been told that the forest brings rain, and they feel that if people were allowed unlimited access to the forest that it would soon be gone. However, they feel that it is the timber and charcoal industries that are putting the most pressure on the forest. They feel that they should be allowed in to pick fallen wood from the forest floor and to cut dead wood.

Slightly more than half of the farmers interviewed indicated that they grow enough or almost enough firewood to meet their needs on their own lands. Several reported burning dead coffee plants, maize husks, bean husks, and cassava stems to supplement their fuelwood production. Those who do not have trees on their own



*Children from Kitoola going to get water from a spring in Mabira forest. Photograph by Meredith Welch Devine.*

land that can be used for fuelwood must either harvest it from Mabira, get it from charitable neighbors, or purchase it. In Kitoola, a small bundle of firewood costs about 1,000 shillings. The largest marketers of firewood seem to be SCOUL workers supplementing their incomes. Several different farmers reported that these workers go into Mabira in groups of thirty to forty and emerge with immense loads of wood that they then sell at a high price. Villagers seem to find the price justified, however, citing the risks that these workers are taking by entering the forest.

Only a few farmers indicated that they had considered growing and selling firewood. Many said that they do not currently have enough to sell, that they do not have room to plant more trees, or that they do not have the money to purchase more planting material. One farmer indicated that she had attempted to grow firewood to sell, but their garden is a fifteen to twenty minute walk from the house and difficult to supervise. After she and her husband cut the wood, they would leave it in the garden to dry, and it would be stolen before it was ready to sell.

### ***Kayanja***

Kayanja grew up as a trading center. Connected by two main roads, it was an ideal place for workers from neighboring tea plantations to come for provisions and was easily accessible to people from other villages. Natural resources also made Kayanja an attractive place to settle. The village site boasts seven year-round wells and once had a large iron ore deposit, providing material for a booming trade in war materials such as spears and knives. In the 1890s, spear-making was a lucrative occupation in most areas of Uganda.

According to the local chairman, most of the residents of Kayanja work for one of the tea estates, Kasaku or Nakalasa, or at Ssezibwa, which grows sugar, coffee, and vanilla. A few Kayanja residents work in other industries or are employed by the nearby Namagunga School, but many more are solely farmers. The average plot size, as reported by the chairman, is two to three acres. The largest plot in Kayanja is his and is six acres. The average plot size of those we interviewed was slightly more than an acre and a half.

<sup>8</sup> *Matooke is a local banana variety used as a staple food.*

Farmers in Kayanja are currently having difficulties with several crops. After about a five-year dip in productivity, the cassava is now recovering, due in part to the introduction of a new variety, and now the *matooke* is fading.<sup>8</sup> One farmer reported using pesticides on her *matooke* with favorable results. Several others believed it was simply that the soil was depleted or that the *matooke* plants were too old. These farmers sometimes uproot and replant the *matooke*. Almost every farmer plants cassava, *matooke*, and sweet potatoes. Many farmers supplement these crops by planting maize, beans, and yams. Most of the crop production is solely for home consumption, with excess being sold if there is a surplus. None of the farmers interviewed plant with the intention of selling crops.

There are a variety of methods that Kayanja farmers use to try to preserve or increase soil fertility. Only one farmer reported using chemical fertilizers, but nine said that they use natural fertilizers such as cow manure and homemade compost. Nine out of the twelve farmers interviewed indicate that they use fallowing, though none of these farmers leave the area fallow for more than two to three years. These farmers have said that the first crops after the fallow yield well, but production steadily declines each planting thereafter. Fewer than half of the farmers reported practicing crop rotation or mulching. Only one indicated that he planted trees for soil fertility. Though most of the farmers said they learned these techniques from their parents or neighbors, one had learned from an agricultural extension officer and one was taught at Lugazi secondary school. Slightly more than half of the farmers interviewed said that their crops were faring well, others cited problems with soil depletion, pests, and soil acidity.

Several farmers in the area have begun growing *Moringa* and vanilla (*vanilla*, *Vanilla planifolia*). One farmer who was considered “poor” when talked to by ICRAF in 2001 is now one of the wealthiest men in the village. He planted vanilla after visiting with representatives from the NGO UNIVEN and now receives 60,000 shillings per kilo sold. Many in the village have noticed his success and would like to do the same. *Moringa* is also touted as the next big boon for Ugandan farmers. Vendors bring by seedlings they claim to be *Moringa*, though there is some skepticism as to their authenticity, and new nurseries are being created regularly.

In the 1950s and 1960s, Kasaku imported much of its labor from other areas of Uganda. Farmers in Kayanja were doing well. Crops were giving high yields and coffee was a thriving cash crop. In the late 1980s, less labor was imported. Pests destroyed much of the coffee crop and yields declined dramatically. Local farmers began to seek employment with the tea corporations.

No Kasaku employees were included in our sample for Kayanja. As a result, the research team made a concerted effort to find an employee to interview about conditions in the fields and in the factory. However, shifts at Kasaku are very long, and we were unable to contact a current employee during our time in the village. We were, however, able to speak with relatives of employees and a past employee.

Shifts in the fields and factory are at least eight hours, and employees are expected

### Three Communities, Two Corporations, One Forest

to work six days per week. The average worker earns 20,000-25,000 shillings per month. It was also reported that workers are often not paid on time, but the company does have a school and health clinic available to workers and a company store with subsidized provisions may be open soon.

There is a running joke in the village that men who work at Kasaku are unable to maintain families. Some villagers say this is because they just do not spend enough time at home, while others say that the dew on the tea leaves in the morning is very cold and often makes people sick, sometimes causing infertility. Working in the fields is also dangerous because snakes often reside among the plants. Any worker who finds and kills a snake is paid an additional 5,000 shillings.

At its closest point, the Mabira Forest Reserve is about ten kilometers from Kayanja. During the reign of Idi Amin, forest protection was minimal, and Mabira was a major source of timber for export to Kenya and for domestic consumption in Kampala. Iroko was all but extirpated from the forest, and mahogany (*mahogani*, *Khaya anthoecae*) disappeared about five years ago. Due to increased surveillance by forest department personnel, timber harvesters now find it difficult to export timber from Mabira. Most of the timber pressure on the forest now comes from surrounding villages, and most of the extraction is done at night.

Kayanja residents also use Mabira for medicinal herbs. Though some still travel to the forest when they require herbs, many have transplanted trees and shrubs to their own farms. Both of the herbalists with whom we spoke said that though they can still find the herbs they need for their medicines, it has become more difficult.

Most of the farmers in Kayanja are not intimately familiar with Mabira. Due to distance, most never visit the forest. These farmers recognize that Mabira helps with rain, and some added that it helps with cooling breezes, but few were concerned with its health. They believe that the forest is faring well, and many think that it is acceptable for someone whose crops have failed to cut timber from Mabira in order to have some form of income.

Several villagers do go to Mabira to cut trees for firewood and charcoal. In order to avoid detection and to be able to harvest more, freshly cut wood is not taken from the forest. It is cut and left to dry for three weeks, at which time the harvester returns and collects the now dry wood. Dry wood is much lighter, and if stopped with it one may avoid arrest. Forest department officials generally pinch off a bit of bark to determine whether the wood being taken was cut from a living tree or a dead one.

Firewood is a constant necessity in Kayanja. Though a few stores and homes have electricity, the vast majority of residents rely on wood and charcoal. Electricity is considered to be too expensive and many villagers feel that it is too dangerous to have electricity in the home. One-third of the farmers with whom we spoke buy firewood to supplement what they can grow in the garden. One-fourth reported that they do not use any wood from their gardens and must purchase it all. Two farmers said they use the nearby forest, owned by the Namagunga School, for wood. The remainder indicated

that they only rarely purchase wood or charcoal, relying predominantly on their gardens for fuelwood. None of the farmers sell firewood from his or her garden.

The Namagunga School has between fourteen and seventeen wooded acres, from which it allows Kayanja residents to harvest medicinal plants and dead wood. Most of the residents of Kayanja are more concerned about the continued health of this forest patch than they are about the health of Mabira. Many stated that because they are not allowed to use the resources of Mabira forest they do not care about its health. However, one herbalist with whom we spoke is very concerned about the future of all forested areas near her, including Mabira, and advocates for protection and better management of the reserve. She told us

Whenever they cut a tree there I cry. I know the medicines are being lost and the spirit that possesses me and helps me find my medicines comes from the forest. In Mabira, they are finishing the forest. The problem is that the forest guardians are the ones selling the trees. They stop locals from going there and taking timber, but they sell it themselves. The close forest patch is owned and protected by Namagunga . . . the health of this forest is much better than Mabira. They care for the trees, fertilize, and dig. I wish they took care of Mabira. I wish people around me would do as I have done and bring trees to their gardens. It does not take long to grow a small forest around you.

Illegal logging is indeed a persistent problem in Mabira. In Kayanja there is a thriving carpentry trade with wood harvested from Mabira. However, the new forest laws that will soon be put into place as well as the restructuring of the forest department into the National Forestry Authority are designed in part to address this issue. This will be discussed further in a later section.

Fewer than half of the farmers interviewed had planted trees on their lands. They did use wild trees already growing there, but usually only for firewood and shade. Plantings were largely done to bring in fruit trees. Avocados, jackfruit, and mango were prominent. Half of the farmers that had planted trees reported removing undesired species such as *Ficus* in order to plant more fruit trees. One farmer who had not yet planted trees indicated that she had plans to do so in the near future.

Part of the impetus to plant avocado has come from the influence of a commercial interest. Farmers stated that a plant would soon be opening that would process avocado. Villagers were encouraged to plant the trees, and some planted as many as 100 seedlings. However, the seedlings are now dying, and the farmers are faced with the prospect of lost revenue they had planned on receiving as well as having wasted acreage for an entire growing season.

Many farmers in Kayanja have used seeds from fruits purchased for consumption to plant their trees. Transplanting material from other gardens or swamps is also popular. Farmers sometimes purchase *Moringa* seedlings from traveling vendors, though they have reported low success rates, and travel to nurseries in Lugazi and Mukono for planting material. Farmers have indicated interest in planting *Markhamia*, avocado, jackfruit, and *Moringa*. Almost all know where they can get planting materials, but



*A typical garden. Matooke is dominant, with coffee and several varieties of potatoes also present. Photograph by Meredith Welch Devine.*

money is sometimes a constraint. A few farmers reported that they do not have enough land available to plant trees: “If we have many trees in the garden, we will starve”. “I have very little land. It is not worthwhile for me to plant trees. I need food as well.” Others have said that even though their land is rented, if they talked with the landowner they would be allowed to plant trees.

One farmer has begun plans to capitalize on the current demand for *Moringa*. He has planted a nursery of about 2000 seeds. He plans to plant and raise 1000 himself and to make the others available for sale at a price of 500 shillings per tree. His farm is easily accessible to most Kayanja residents and could provide a good source of planting material in the future.

While farmers are willing to plant fruit trees, they are somewhat more reluctant to plant trees for firewood or timber. Poverty plays a central role in this hesitance. Planting a crop will provide relief in two to three months, and even a fruit tree may begin to be of assistance in three years. For a tree to be economically used for timber, however, it may take ten to fifteen years of growth. Firewood may be ready for home use in a shorter time, but if it is to be sold and used as a source of income it must mature for a length of time similar to that of timber. Time to maturity will vary by species and planting conditions.

One villager, recognized in Kayanja as an expert on trees and the forest indicated that there are things that could be done to promote tree-growing. He believes that with assistance and a change in the laws, progress can be made.

If forest officials give villagers fast growing trees like *nkago* (African rubber tree) and *musizi* (*Maesopsis emnii*) and do not give them rules for trees on their own land, it may work. As the villager explained, “currently those officials harass you even if you cut trees on your own land – any tree. They can arrest you for making charcoal on your own land with your own trees. They beat you up, take your bicycle, make you pay.”

His remark also points to another problem with tree-growing and harvesting on private lands. On private property, the forest department only has control of the sixty-five “reserved species.” He feels that unless a villager is cutting a reserved tree, he or she should be able to harvest trees or make charcoal at his or her discretion. This

comment shows both unfamiliarity with the law and possible abuse by forest department officials.

Another villager, a highly respected man in the community, stressed that projects to encourage tree-planting should not be undertaken without first getting to know the community. In order to create the most benefit, he felt that development initiatives must address something that is wanted in the village and have appropriate procedures for achieving results. Each village will have its own needs and strengths and challenges, and community members should have input in development projects meant to help them. He summarized his argument saying

Nothing can be implemented when a person is hungry. The government needs to come to the grassroots level and see what people need; do capacity building; ask what people are interested in; give money for projects. People here are willing to work. They have committee groups here to promote this or the other. They need guidance and support.

### ***Sugar Corporation of Uganda, Limited***

Sugar Corporation of Uganda (SCOUL), Limited was founded in 1924. During Idi Amin's time, the Indian owners were expelled from the country, and the factory was destroyed. It was rebuilt in 1988 and resumed production. Last year, 160,000 tons of sugar were produced in Uganda, and this year the number is expected to rise to 180,000 tons. Ugandans consume 210,000 tons of sugar per year. SCOUL managers interpret this discrepancy as a sign that they can safely and profitably expand production, and are now in the process of doing so.

The company and its associated businesses have almost 10,000 employees, 6,000 in the cane fields and factory alone.<sup>9</sup> The sugar factory operates 240 days per year, and almost all jobs are done manually. Most of the company's workers live on the main campus, and others are situated in lines<sup>10</sup> closer to the fields they work.

Many farmers had praise for SCOUL, saying that the company helped them with inexpensive schools, an opportunity to earn money, and a sugar supply. Even these, however, indicated that the corporation was also a significant hardship. Workers rarely earn enough money to sustain themselves and must cope by working in the gardens of other farmers, cutting wood in the forest, and getting items on credit from local shops.

Managers at SCOUL are making a concerted effort on the public relations front. Rather than evicting farmers who cut cane to plant crops, they have now adopted the tactic of "sensitization." Officials hold meetings in the offending villages, and managers report that they sometimes offer jobs and housing to those who have planted crops in the cane fields. The corporation is also providing Lugazi with a new borehole, as well as land for a tank to store the water.

High-ranking officials within the corporation have expressed willingness to aid SCOUL workers in securing alternate fuels for cooking. The factory boilers run on bagass, the fibrous material that remains after all the juice is pressed from sugarcane.

<sup>9</sup> Other pursuits on the Lugazi campus include dairy farming, rose growing, and vegetable farming.

<sup>10</sup> This is the common name for the apartment-like row houses built by the company.



*Sugarcane brought to the SCOUL factory for processing. Photograph by Meredith Welch Devine.*

Currently, there is an excess of bagass, and it is simply spread back onto the cane fields. One official suggested that perhaps this bagass could be made into cakes and given to the workers to burn for cooking. While this would certainly help relieve the pressures workers put on Mabira for their fuel needs, it still leaves the larger issue of the necessity of supplemental income unaddressed. Being paid below a living wage, these workers cut trees for timber and firewood from the forest to earn enough money to subsist.

SCOUL itself is a heavy consumer of forest products. Though the boilers do largely run on bagass now, there are still many applications that necessitate the use of wood. The corporation uses poles for building and for telephone lines, timber for constructing houses and lines, and wood for fuel at the schools it oversees.

Company officials have designated 500-600 hectares for SCOUL's plantation operations, with an expected allocation of 50 percent for firewood, 25 percent for timber, and 25 percent for poles. Trees are only planted in areas that are unsuitable for sugarcane. SCOUL is currently able to meet its firewood requirements, but will not be able to do so in the future without becoming more systematic regarding reforestation. Company managers are currently planning for expanding and systematizing the forestry operations and plan to have completed plantings by late 2004 or early 2005. SCOUL officials are seeking expertise in tree planting, with specific questions as to how many workers would be required, what species to use, and the extent to which intercropping can be allowed. Villagers and SCOUL workers are currently planting among the trees or clearing trees for cultivation in some areas, and though it is unauthorized, it is largely ignored.

SCOUL managers are also considering planting a company bean crop within the cane fields. To be compatible with the sugarcane, the interplanted crop must be leguminous. Starting with a smaller area and building, SCOUL plans to eventually reach 1000 hectares of intercropped cane. The company feeds its employees lunch and sometimes breakfast and would use the beans for that purpose. Before the intercropping can be undertaken, however, SCOUL must build the facilities to process and store the

beans, and concerns with herbicide use must be addressed. The herbicides used on the sugarcane fields would be detrimental to the bean crops.

### ***Uganda Tea Corporation, Limited – Kasaku Estate***

The Uganda Tea Corporation, Limited (UTCL) employs 2,600 people in its fields and factory. The corporation runs several small schools, as well as an emergency health clinic and a family planning clinic. While most of the workers reside on the campus, many do live in surrounding villages.

Like SCOUL, UTCL also suffered an interruption in business during the rule of Idi Amin. Upon the return of its Indian proprietors, the tea plantation was rehabilitated, and a new factory operates all but forty days of the year. It is capable of producing 3.5 million kilograms of tea per year, but is in the process of being expanded to a capacity of five million kilograms per year. The completion date is expected to be early 2004.

The furnaces consume in excess of 16,000 kilograms of wood per day, 5.25 million kilograms per year. As new lands are acquired, they are evaluated first for suitability to tea production. If the soils, geology, and topography are appropriate, tea is planted. If they are not, the land is put into tree production. Currently, UTCL has 200 hectares dedicated to forestry. This allocation is sufficient to supply about 60 percent of the factory's fuelwood needs. There are plans to add another fifty hectares of forestry as the factory expands its processing capacity. Thus far, UTCL has focused on planting eucalyptus because it is easy to propagate, easy to grow, and the wood is relatively well-suited to the application. In the future, however, the company would like to incorporate other species.

The remaining 40 percent of Kasaku's fuelwood is obtained from vendors in the surrounding communities. The company buys by the ton and usually only buys hardwood species. Some of this wood comes from private farms, and the Kayanja chairman indicates that several people have, when desperate, cut down producing fruit trees to sell to UTCL. Being concerned about the ability of these people to meet their future food needs as well as the ecological consequences, he alerted the chairman of the division (LC<sub>3</sub>) and asked him to implement an education program teaching people not to fell fruit trees for fuelwood.

Villagers in Kayanja overwhelmingly reported that the fuelwood sold to Kasaku is predominantly felled in Mabira forest. This season, UTCL paid 20,000 shillings for each metric ton of wood purchased. While no farmers seem to be systematic suppliers, many will sell wood to the factory for a one-time profit.

### ***National Forestry Authority***

Forest law in Uganda is in a state of change. The forest department is being dissolved, and a new entity, the National Forestry Authority, is being created. This change was initiated by the Forest Secretariat, and is designed to address many of the problems that were observed with the current structure. The new agency will be

mandated to run as a profitable business, and by cutting positions and increasing pay, its creators hope to curb corruption and assemble a staff that is invested in its work.

Beginning in 1996, the Intergovernmental Panel on Forests and the Intergovernmental Forum on Forests on behalf of the UN Commission on Sustainable Development began consulting agencies, organizations, and individuals to ascertain views on Ugandan forest policy. The results of this process were presented in September of 1999, and subsequently the draft was discussed at four regional workshops. A policy working group including representatives from NGOs and relevant government ministries oversaw the consultation and drafting process. The resulting document, *The Uganda Forestry Policy*, is intended to address the needs of all forest user groups and stakeholders (Ministry of Water, Lands, and Environment 2001).

This Forestry Policy asserts that those involved arrived at a collective vision for 2025 of a “Prosperous People, Harmonious Nation, Beautiful Country” (Ministry of Water, Lands, and Environment 2001: Foreword). The first principle listed in the policy is addressing the goal of poverty eradication. “Establishing new forest resources” and “rehabilitating degraded areas” are also listed as goals, and the policy states that there will be “a wider range of types of ownership, access and management of forest resources” (Ministry of Water, Lands, and Environment 2001: Foreword). Additionally, the policy states that agroforestry will be embraced: “The government will promote and support farm forestry in order to boost land productivity, increase farm incomes, alleviate pressures on natural forests, and improve food security” (Ministry of Water, Lands, and Environment 2001:19). The policy hints at possible funding for forestry initiatives, mentioning international funds for biodiversity conservation as well as carbon credits. It further proposes the creation of a “national consultative forum” to allow any interested parties to “contribute to a regular debate on the forest sector, to improve sector coordination and inform national priorities” (Ministry of Water, Lands, and Environment 2001: 25).

Following the completion of the Forestry Policy, a National Forest Plan was drafted to provide a framework for developing the forest sector. It outlines short, medium, and long-term goals and sets priorities for addressing issues (Ministry of Water, Lands, and Environment 2001, 2002). The objectives of the National Forest Plan are threefold: (1) poverty eradication, (2) economic growth, and (3) sustainable resource management. Success will be measure in terms of contribution to the four pillars of the Poverty Eradication Action Plan: (1) economic growth and transformation, (2) good governance and security, (3) ability of the poor to raise incomes, (4) improving the quality of life of the poor (Minister of Water, Lands, and Environment 2002: xiii-xiv). One of the facts presented in the plan that is highly relevant to this study, is that in the year 2000, Uganda moved into a “net national fuelwood deficit” (Minister of Water, Lands, and Environment 2002: 6). With demand exceeding legitimate supply, it is inevitable the protected forests are being tapped to provide this fuel.

The National Forestry and Tree Planting Bill was passed in 2002 and signed into

law on 24 June 2003. However, as of this writing, the guidelines and rules for implementing the law had not yet been finalized, leaving its practical impact difficult to predict. Even so, two features bear mentioning. First, the statement of the bill's objective is an important starting point: "To provide for the conservation, sustainable management and development of forests for the benefit of the people of Uganda; to provide for the enhancement of the productive capacity of forests; to consolidate the law relating to the forest sector, and to provide for other connected matters" (2002: 1). Second, the bill has a provision allowing for legal action against entities that might be harming the environment: "In furtherance of the Constitutional right to a clean and healthy environment, the bill provides for the right of any person to bring an action in court against another person for actions or omissions likely to have a significant impact on the environment" (2002: 1).

Currently, the most striking issue regarding the forest department is the paucity of information that villagers have on laws that affect them. This lack of information appears to be a result of many factors. Land and tree tenure laws as well as forest laws are often only recorded in written format, and they are often only in English. Many of the farmers in the rural villages speak only local languages. Furthermore, information is often only available at selected locations, and villagers either do not know where to find it or do not have the means to reach these locations. Future plans for distribution of information do not seem to adequately address this issue. Forest department staff plan to make pamphlets on forest law available at the forest center in Najjembe, but it is not clear that they will be available in multiple languages, and it does not appear that they have plans in place for alerting villagers to the availability of these pamphlets. Improving communication and knowledge flows is of utmost importance to protecting Uganda's forests and enhancing farmer livelihoods.

Extension services will be provided differently under the new National Forestry Authority (NFA). They will be delivered only on-demand, and the NFA hopes to divest much of the responsibility for providing these services to the private sector or to NGOs. The NFA will provide some extension services, but they will largely be on a fee-for-service basis. The rate structure, as well as a definition of cases in which services may be provided free of charge, will be outlined after the appointment of the head of the NFA. It appears as though the NFA will only be able to provide these services in instances where they are designed to reduce pressure on a protected area.

Potential funding is addressed in all of the new forestry documents. While the Forestry Policy only mentions carbon credits and biodiversity protection funds in passing, the National Forest Plan highlights the intention to create a Plantation Development Fund to provide economic incentives for tree planting (Minister of Water, Lands, and Environment 2001, 2002). It also describes the Local Government Development Program (LGDP) that was created as part of the Local Governments Act of 1997. This program is designed to decentralize development budgeting and support to local governments. Funds are distributed through the Local Development Grant and

the Capacity Building Grant, and currently thirty-one districts and thirteen municipalities are receiving this aid. Sub-counties and local governments are given incentives for satisfactory service delivery and are penalized if standards are not met. The Local Government Development Program (LGDP), created in 1998 and 1999, forms a significant portion of the budget of the Ugandan government. The National Forest Plan attempts to garner access to Poverty Action Fund (PAF) funding for forestry initiatives due to their possible impact on poverty eradication. The Plan for the Modernization of Agriculture (PMA) also holds some possibilities for future funding. The PMA grant is intended to be distributed through the LGDP system “within an incentive framework that promotes participatory and environmentally sustainable planning and good governance. This increasing decentralization aims to empower farmers to address their non-sectoral challenges and capitalize on on-farm and non-farm opportunities that arise, and for local governments to improve efficiency of service delivery” (Minister of Water, Lands, and Environment 2002: 22). Funding is also available through a grant scheme from the National Agricultural Advisory Services (NAADS). As future extension services will only be provided on demand, part of the goal of this grant is to “enable farmers to identify and pursue opportunities to increase their own productivity and incomes in a sustainable manner” (Minister of Water, Lands, and Environment 2002: 24). The NAADS grant will allow farmers to purchase such advisory services and help establish farmer groups and fora. The release of funds will be triggered by the plans of the farmer groups aggregated through the forums and submitted to the Ministry of Finance, Planning, and Economic Development (MFPED) through the NAADS Secretariat (Minister of Water, Lands, and Environment 2002: 25).

The new forestry laws are designed so that local people will benefit from forest reserves in their areas. In many forests, however, this is already the case. The Mabira Forest Reserve is currently providing monetary and other tangible benefits to the communities that surround it. Money from ecotourism has been used to buy books for many schools, including the Buwuma School, and to buy concrete and steel for Saint Luke’s School in Kitoola. Unfortunately, however, many villagers are unaware of this return. Many have said that Mabira costs them money without providing any benefits other than increased rain.

## Discussion

In a search of the current literature on agroforestry and sustainable development, Ashley and Spainhower (2002) found that there are two general hypotheses driving initiation of agroforestry in buffer zones. First, if buffer zones are managed using agroforestry to provide products and services to populations adjacent to parks and reserves they will be less likely to encroach upon park boundaries for extractive activities. Second, it has been posited that agroforestry techniques applied in on-farm activities will increase production and provide greater incomes, negating the need for extraction within the park. However, not only has there been little assessment of the

success or failure of agroforestry in relation to these objectives, there has not been adequate analysis of confounding factors that agroforestry implementers face in communities (Ashley and Spainhower 2002; Russell 2003b).

One of the results of this study is an understanding that increasing tree planting on farms may be difficult for many reasons. Extreme poverty leads many in the villages studied to conclude that tree-planting is not a worthwhile pursuit. While they acknowledged that trees could provide both fuel and income in the future, farmers repeatedly pointed out that crops could do both of these much sooner. Without examples, they are reluctant to believe that trees will appreciably improve their futures, and some villagers frankly admitted that they would rather take steps that will better their own lives rather than those of their children. Even though these men were only in their early thirties, they doubted they would be alive to reap the benefits of trees maturing ten to fifteen years in the future.

Furthermore, off-farm activities are more important in decision-making regarding trees than was previously supposed. The combination of long hours and low wages in both the tea and sugar estates drives many villagers to seek additional income that can be realized quickly. Thus, they turn to the forest. Employees of SCOUL and UTCL can use Mabira forest to harvest timber and fuelwood, and to fell trees to make charcoal or to burn bricks. This practice will be difficult to end without addressing the inadequacies of the wages paid.

The realities of information flow also play an extremely large role in shaping behavior in regards to use of trees in the forest and on farms. Laws are often only printed in official government publications and only in English, which is extremely problematic for villagers who speak only the local language and may be unable to read or write even that. We consistently encountered lack of knowledge of laws regarding tree tenure in all three villages.<sup>11</sup> Though tenure laws now look favorably upon the rights of tenants to plant trees, respondents repeatedly indicated that it is illegal to plant trees on rented land. Though some farmers said their landlord was reasonable and that he or she could probably be persuaded to allow tree-planting, only one interviewee thought it was legal to plant trees on rented land without first gaining explicit permission from the landowner. In the past, according to a forest department official, villagers were discouraged from planting trees because they provided habitat for the tsetse fly. More recently, landlords were allowed to harvest any tree planted by their tenants. Both of these factors may contribute to the continued belief that farmers are unable to plant trees on rented land.

Knowledge of forest law is equally sketchy. Many villagers would be happy to learn that they are, indeed, allowed to collect fallen dead wood. However, even if the legal standing of the tenant/forest user is secure, it may be unwise to advise such a person to proceed with planting or harvesting trees. The farmer may not have adequate recourse to redress any wrongs committed by his or her landlord or forestry official, and the risk of the loss that might be sustained may outweigh the potential benefits of

<sup>11</sup>*Land* tenure, at least in this part of Uganda, seems to be more secure than in other African nations. The issue of *tree* tenure seems to be of more importance, given its lack of security.



*Brick burning is one of the ways villagers use forest resources to provide a cash income. Photograph by Meredith Welch Devine.*

tree planting.

Another potential complication lies in the discrepancy between whom the new forestry policies would like to help and whom they may be able to help. While much of the rhetoric espouses improving living standards for the “poorest of the poor,” many of the proposed actions include various farm forestry schemes, which are largely unavailable to that group of people defined specifically for their lack of access to land (Minister of Water, Lands, and Environment 2001, 2002; Government of Uganda 2002). NGOs focusing on agroforestry may find it difficult to garner government funds designated for helping this sector of the population because their approach often effectively excludes them.

In consideration of all these factors, a comprehensive plan for reducing pressure on the Mabira Forest Reserve and for increasing income and standards of living must take into account these many variables. Such a plan would need to address: trade offs in the garden when crop space is sacrificed for trees, wages earned off-farm, and information creation and distribution. Such challenges do not receive adequate attention in the agroforestry literature (Ashley and Spainhower 2002, Russell 2003b).

## Options for Stakeholders

In considering future options for forest user groups and stakeholders surrounding Mabira, it is extremely important to realize that the suitability of each solution will vary according to the community. Characteristics and histories of each community must be taken into account when deciding which options are most feasible. For example, one village might be well-suited to managing a community woodlot, whereas in another, it might be more prudent to allocate the forestry operations to a number of individuals.

Possibilities for improving quality of life in the villages exist on many levels and many may be complementary. Strategies can be grouped into the following four broad categories: NFA outreach, village/corporation relations, legal strategies, village initiatives.

## 1. *NFA Outreach*

As discussed previously, the new National Forestry Authority will put little emphasis on extension services. Services provided by the agency will be on-demand and fee-for-service, and plans include encouraging NGOs to assume most of the burden of extension work. However, there is room, and a strong need, for the NFA to make a concerted effort to reach farmers in the Mukono District. These services could certainly satisfy the NFA criterion of being aimed at reducing pressure on a protected forest. There are two main outreach initiatives the NFA could undertake to improve forest security in the district: educational programs and information dissemination.

**Educational programs:** There is need for education on a variety of topics. Simply teaching farmers about land and tree tenure laws and the ecological importance of forests could encourage more tree-planting on private lands and less reliance on trees from Mabira. Likewise, courses on alternatives to fuelwood use and techniques that minimize fuel use could make a significant impact in a country where such a high percentage of energy comes from tree sources. Finally, education on forest laws could help stop abuses by forestry personnel.

**Information dissemination:** It is extremely important that farmers be provided information in a format that they can understand. Currently, if a farmer wants to understand a law regarding the forest, he or she could ask forest department personnel, whom they often do not trust, or could travel to Kampala, request government documents and read the law in English. Many of the farmers in the district can neither afford transportation nor read English. Pamphlets on forest law should be made available in local languages and give to each of the village chairmen, and public service announcements, such as those made regarding crops, should be aired on radio stations for those who cannot read.

Implementing the above suggestions may be difficult due to resource scarcity within the NFA. The new organization may have neither the money nor the personnel to conduct courses and distribute information. Furthermore, it may be difficult to induce farmers to attend education sessions.

## 2. *Village/Corporation Relations*

Both Sugar Corporation of Uganda, Limited (SCOUL) and Uganda Tea Corporation, Limited (UTCL) have shown an interest in improving relations between themselves and the surrounding communities. Previously these efforts have included providing schools, health clinics, and drilling water holes. Additional measures could be undertaken by the corporations that might both improve relations and ease pressure on the forest reserve.

**Provision of bagass:** High-ranking managers within SCOUL have indicated that there is currently an excess of bagass remaining after the cane is crushed. Though they use bagass as a fuel in the SCOUL boilers, there is still a large amount that is spread back on the cane fields for mulch. Bagass can be made into cakes that can be used as a

domestic fuel source. SCOUL could provide these cakes to its workers for their own use or to sell for supplemental income.

**Planting forest plots for workers:** SCOUL currently owns approximately 11,800 hectares. It is possible that some of this land, perhaps tracts that are less suitable to cane production or those closest to workers' quarters, could be planted with trees for the use of the workers. By providing a close and free wood source, the corporation could help reduce pressure on Mabira and possibly even help with poverty alleviation. In addition to improving relations with workers and communities, such an initiative could be beneficial for the company's broader public relations.

There could be significant difficulties to overcome, however. There are currently no forestry initiatives in Uganda except for the Sowlog Grant Scheme. This is a one-time grant and is meant for timber production. There is a minimum of 20 hectares per year, 100 hectares total. More initiatives may be available in the near future with the implementation of the new forestry bill, but SCOUL may not be willing to forgo the profits that could be produced if this land were used for its own purposes.

**Farmers as fuelwood outgrowers:** Uganda Tea Corporation, Limited has expressed cautious interest in the idea of having farmers serve as outgrowers. In addition to improved livelihoods and community relations, the proposition has many advantages including: possible reforestation of agricultural areas; a guaranteed source of wood for UTCL for many years to come regardless of forest regulation; and security for UTCL in that company managers would know it is not contributing to the illegal harvesting of the forest. Furthermore, if the program does not work and the company faced a fuelwood shortage, UTCL would be able to convert to boilers running on furnace oil in about one month at a cost of approximately \$20,000, a prospect that officials do not find daunting.

The disadvantages to such a program, however, are also numerous. There is currently no shortage of firewood on the market, leaving little financial incentive for starting an outgrowing program. Furthermore, it may be expensive for UTCL to supply its own firewood. This program would require the company to provide technical assistance and to closely monitor its growers. Additionally, even with supervision UTCL might have less control over the quality and quantity of wood produced than the wood it purchases.

There are also difficulties with planning for fuel so far in advance. UTCL is only able to plan for the next ten years of its fuel needs. Currently, electricity and solar power are prohibitively expensive, but their costs may drop in the future. Additionally, if a large oil reserve that has been found in western Africa meets its potential, the price of oil may make it more attractive than firewood. Finally, if stringent pollution laws are enacted, the factory may be forced to turn to an alternate source of fuel. Even if wood is retained as the fuel of choice, UTCL might contract for too little or too much wood, either leaving the factory manager in a position where he must find more wood or leaving farmers without a market for their product.

Farmers may also be reluctant to enter into such a partnership. Three years ago, SCOUL over-contracted outgrowers for its sugarcane. The factory was unable to absorb all of the cane produced, and Mukono farmers are now suspicious of such initiatives. There are currently 2000 farmers serving as outgrowers for tea for UTCL, indicating that there is at least some willingness to form partnerships; however, the elders of one community expressed intense distrust for the Indian owners and managers of UTCL. They indicated that if it were asking them to work with a *muzungu* (white person), they would do so without hesitation, but insisted that partnering with the Indians required extreme caution.

If a program were implemented by which farmers could be fuelwood outgrowers, there are many forms it could take. Individual farmers could become outgrowers. Cooperatives of farmers, such as Buwuma's youth group, could become outgrowers. Communities could establish plots and use the proceeds for schools or development projects or for anything else upon which the villagers agree. Furthermore, farmers or communities could plant trees that have uses other than firewood and thereby reap additional benefits. For example, if eucalyptus were planted, the oil could be harvested from the leaves and the tree then felled for wood.

### 3. *Legal Strategies*

Farmers in Mukono District could undertake a few legal measures to improve their living conditions. These measures, however, could prove difficult to organize and may be divisive. Though potentially very effective, they should be considered with extreme caution.

**Suing for environmental damage:** The most recent forestry bill includes a provision allowing for legal action against those that harm the environment. By bringing suit against such an actor, villagers could stop environmentally harmful practices and send a strong message that they will not tolerate such abuses in their district.

However, the bill specifically provides for the right of a *person* to bring action against another *person*, it may not allow for individuals or communities suing corporations or governmental entities. It is too soon to tell how the rules will be written and what exactly will be possible. Additionally, initiating legal action against individuals in a small community could be very divisive. Furthermore, suing a corporation that employs a significant proportion of the community may jeopardize livelihoods.

**Collective bargaining:** Farmers who grow sugarcane for SCOUL rarely have contact with other outgrowers. As a result, though prices paid vary, they are consistently low. If farmers could join together to form an entity capable of collective bargaining, they might succeed in raising prices and making them more uniform. Even a less formal arrangement whereby farmers shared with each other information on rents received might give individual farmers more bargaining power.

By asserting themselves, though, farmers may find themselves without a buyer for

their sugarcane. It seems unlikely that SCOUL would be able to terminate contracts with all of its current suppliers, given its complaints about not being able to find enough land, however, if the company had sufficient incentive, it could transport cane from other districts or simply move its factory.

### 4. *Village Initiatives*

Initiatives that can be implemented solely in the villages may be the easiest to begin. Even something as simple as a monthly discussion group within a village may lead to better understanding of growing techniques and tree uses. With a little help, villagers could even apply for some of the new grants established by the forestry bill.

**Discussion groups:** Discussion groups in the villages we studied could focus on topics such as seedling procurement, pest control, fertilization, which species to plant, harvesting techniques, and tree uses. Many farmers in the villages are excellent sources of knowledge, but rarely share the information without being asked. Most of these local experts are willing to talk with others, but it does not occur to them to organize a meeting for such a purpose. The local chairman of each village could identify experts on various topics and organize village meetings to discuss them. After the formal presentation, there could be a discussion in which other farmers could add their opinions. Alternately, the groups could be simply a discussion with no set speaker or leader.

**Community woodlots:** When the NFA is established, there will be technological assistance and guidelines for growing charcoal plantations on private land. Villagers could take advantage of this new service to establish community woodlots. There are a variety of ways such an initiative could be organized, the form best decided in consultation with the community. The woodlot could provide free fuel to community members, proceeds could be used for schools and other projects, or woodlots could be managed privately.

Possible drawbacks stem from the long time to maturity for trees and inexperience with managing woodlots. Communities may have difficulty with the technical aspects of managing a plantation if they are not able to access extension services. Additionally, interest in the plantation may wane in the time it takes for the trees to mature.

**Grant applications:** Finally, communities could apply for one or more of the grants outlined in the National Forest Plan. These grants could bring funds for agroforestry into the community.

It is still unclear what the application process for these grants will be. It is possible that they may be long and involved or that they must be filled out in English. If this is the case, villagers may require assistance to apply.

## Conclusion

Without guards and laws there would be no forest. The only way to fix it is if people in the villages have enough to eat and a source of income, then they wouldn't depend so much on the forest, and also you must give people trees to plant so they have their own firewood. –Kayanja villager

Drawing generalized conclusions from these three very different communities can be quite difficult. One lesson for conservation practitioners is clear, however. Little can be done to effectively alter forest usage patterns if broader livelihood issues are not addressed. One must take into account the many different factors that influence natural resource use in order to adequately address a situation in which they are being depleted. A holistic approach in this situation might include government legislation setting a minimum wage (or negotiation with the corporations involved to do the same), environmental education, assistance with tree planting, education on tree uses, and assistance with finding markets for tree products. Mandates for government agencies include poverty alleviation with environmental protection, and it seems that this combined approach, in addition to being the most just and equitable, may also be the most effective. The extent to which development can cause further degradation is hotly contested in the literature and would need to be taken into account during the planning stages of any large-scale intervention.

It is also important to emphasize that despite efforts to find an approach that is widely applicable, success in coupling conservation and agroforestry may require plans tailored to individual communities for some time to come. Since management plans are usually based on global models they often lack in local applicability or built-in structural agility that is so necessary in dealing with on the ground complexity, leading, in many cases, to their failure. The results of this study support that conclusion and point to the need to consider the idiosyncrasies of each community before applying blanket solutions.

## Appendices

### Appendix 1. Recent National Policy and Legal Changes Affecting Uganda's Forest Sector

- 1994 The National Environment Management Policy for Uganda
- 1995 Constitution of the Republic of Uganda
- 1995 The National Environment Statute
- 1995 The Water Statute
- 1995 The National Policy for the Conservation and Management of Wetland Resources
- 1996 The Uganda Wildlife Statute
- 1997 The Local Governments Act
- 1997 The Gender Policy
- 1998 The Land Act
- 1998 The Forest Reserves Order
- 1999 The Uganda Wildlife Policy
- 1999 The National Water Policy

(Adapted from Ministry of Water, Lands, and Environment 2001)

Appendix 2. Trees and Their Uses

ENGLISH	LUGANDA	LATIN	USE REPORTED	USE 2	USE 3	PLANTED OR WILD	COMMENTS
unk.	<i>mitumbwe</i>	unk.	timber			wild	
unk.	<i>mumuli</i>	<i>Holoptelea grandis</i>	timber			wild	
African celtis	<i>lufugo</i>	<i>Celtis mildbraedii</i>	timber			wild	fast growing
African rubber tree	<i>nkago</i>	<i>Funtumia (elastica or africana)</i>	timber	firewood		both	fast growing
albizia	<i>red mngo</i>	unk.	timber			wild	fast growing
antiaris	<i>kirundu</i>	<i>Antiaris toxicaria</i>	timber			wild	
avocado	<i>ovakedo</i>	<i>Persea Americana</i>	food	Shade		planted	
ben-oil tree	<i>moringa</i>	<i>Moringa oleifera</i>	medicine			planted	
bitter almond	<i>ntasee</i>	<i>Prunus africana</i>	timber			wild	
calliandra	<i>kaitisambuzi</i>	<i>Calliandra calothyrsus</i>	soil fertility	firewood		both	
croton	<i>musogasoga</i>	<i>Croton macrostachyus</i>	soil fertility			both	
ficus	<i>mutuba</i>	<i>Ficus natalensis</i>	firewood	bark cloth	soil fertility	planted	
fig	<i>mukokoowe</i>	<i>Ficus ovata</i>	shade	firewood	soil fertility	both	
forest newtonia	<i>mpewere</i>	<i>Newtonia buchananii</i>	timber			wild	
guava	<i>epera</i>	<i>Psidium guajava</i>	food	firewood		both	
iroko	<i>muwule</i>	<i>Milicia excelsa</i>	timber			predominantly wild	finished in the forest
jackfruit	<i>fene</i>	<i>Artocarpus heterophyllus</i>	food	Shade		planted	
jambolan	<i>jambula</i>	<i>Syzigium cumini</i>	food			predominantly wild	
mahogany	<i>mahogani</i>	<i>Khaya anthoecae</i>	timber			wild	finished in the forest

Note: Latin and Lugandan names prepared by B.M. Katumba, World Agroforestry Centre. Unk. = unknown

Appendix 2 continued

ENGLISH	LUGANDA	LATIN	USE REPORTED	USE 2	USE 3	PLANTED OR WILD	COMMENTS
mango	<i>myuembe</i>	<i>Mangifera indica</i>	food	shade		planted	
markhamia	<i>musambya</i>	<i>Markhamia lutea</i>	firewood	timber	medicine	both	
palm	<i>lukindu</i>	<i>Phoenix reclinata</i>	food	Oil		planted	
pawpaw	<i>papaali</i>	<i>Carica papaya</i>	fruit	Shade		planted	
purgig nut	<i>birowa</i>	<i>Jatropha curcas</i>	supporting vines			both	
silk tree	<i>rubizia</i>	<i>Albizia chinensis</i>	shade	firewood		both	
tallow (?)	<i>musasa</i>	<i>Sapium ellipticum</i>	firewood			predominantly wild	
umbrella tree	<i>musizi</i>	<i>Maesopsis emmii</i>	timber			both	fast growing
white star apple	<i>nkalati</i>	<i>Chrysophyllum albidium</i>	timber			wild	

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## ADDITIONAL TITLES IN THIS SERIES

- Ashley, Rebecca. 2004. *Conservation Through Use: Identifying Indigenous Forest Species for Agroforestry and Biodiversity Conservation on Farmland Surrounding Bwindi Impenetrable National Park in Kabale, Uganda*. Agroforestry in Landscape Mosaics Working Paper Series. World Agroforestry Centre, Yale University Tropical Resources Institute, and The University of Georgia.
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