More effective natural resource management: using democratically elected, decentralised government structures in Uganda

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As forest and plantation reserves decline, the demand for tree products and services steadily increases in the densely populated south-western highlands of Uganda. Farmers are willing to grow trees on their farms but, as is typical in the highlands of Central Africa, on a small farm of less than 1 ha the farmer cannot set aside an area specifically for trees. Integrating trees into the farming system can provide important benefits to the farmer and the environment.

Two types of problem inhibit wider adoption of agroforestry:

- Knowledge and skills about agroforestry innovations are lacking, as are tree seeds and seedlings.
- Some of the problems for which agroforestry is a possible solution must be handled co-operatively by the community rather than by the household (Garrity 2000). This is particularly the case for managing watershed resources in areas with non-consolidated, fragmented farms, which are common in south-western Uganda.

Successful and sustainable community-based approaches to managing watershed resources, of which agroforestry is an important component, share a number of requirements (Cooper and Denning 2000; Garrity 2000):

- Management approaches, as well as the proposed innovations, should be demand driven.
- A set of suitable innovations, such as agroforestry practices, and their key inputs, such as germplasm, needs to be available.
- Efficient community organisations facilitate working together and resolving conflicts.
- Scaling-up efforts need to be co-ordinated and facilitated.
- A 'minimum external input strategy' needs to be put in place.

While farmers and local organisations are quite capable of developing and fine-tuning innovations, they benefit greatly from being exposed to new approaches and technologies. All the other factors listed can be substantially promoted through efficient local governments, as shown in this case study from south-western Uganda.

In this paper, we describe hands-on experience with community-led management of a watershed in Kabale District, and we identify what we consider to be the important components of a successful strategy. We estimate that in Kabale District alone, more than 120,000 km of contour hedgerows will be required for soil conservation. At an average rate of 3000 seedlings per kilometre of hedgerow, this means about 360 million seedlings. The scope of this task makes intervening in the traditional project mode too slow and expensive. We argue that farmers and local government councils must lead jointly in this task if it is to be achieved cost effectively and in reasonable time. Democratic decentralisation of government functions appears to be a key policy factor that is enabling successful watershed management.

The study area

The study was conducted in the 970 ha Katagata watershed in Bubare and Harmurwa Subcounties of Kabale District, which lies approximately between latitudes 1°S and 1°30'S, and longitudes 29°18'E and 30°9'E. The district is mountainous, with altitudes ranging from 1220 to 2500 m (Rwabwoogo 1997). The topography is rugged, characterised by broken mountains, scattered Rift Valley lakes, deeply incised river valleys, steep convex slopes of 10–60°, and gentle slopes of 5–10° adjacent to reclaimed papyrus swamps.

The watershed, in common with about 70 per cent of the land in the district, is covered with ferralitic sandy clay loams (Harrop 1960). Clay loams developed from phyllites predominate on the slopes, while silty clay and peat developed from peaty clay alluvium occur in the valleys. More than 50 years ago, farmers began developing bench terraces along the contours of the hills, and these are now a common feature in Kabale District farming systems.

Kabale District has a temperate climate with bimodal rainfall, averaging 1000–1500 mm annually. Mean maximum and minimum temperatures are 23°C and 10°C, respectively (Department of Meteorology 1997). Although the area is mountainous, the favourable climate and the originally fertile soils coupled with historical factors have led to high population densities of about 246 people per km^2 (Rwabwoogo 1997).

Smallholder agriculture is based on annual crops of sorghum, bean, and potato. Goats, sheep, and cattle are common, with upcoming dairy production based on fertile pastures at the valley bottoms and zero-grazing units.

The Katagata watershed is typical of the district. It covers 9.7 km² (about 0.5 per cent of the district) and comprises eight villages, two parishes, and two subcounties (see Figure 1).

The policy framework

Local governments have become particularly important in Uganda since the mid-1980s when 'resistance councils' were established to help stabilise the country's security after more than a decade of civil unrest. In 1997, the Local Governments Act of Uganda (Republic of Uganda 1997) initiated an ambitious and much broader decentralisation programme. Government functions were strengthened not only in Uganda's districts, but also at lower administrative levels (see Figure 1). Fiscal responsibility as well as legislative power has been decentralised. For example, the subcounty collects from every adult male a graduated tax and retains 65 per cent of it. The remaining 35 per cent is shared among the county councils (5 per cent), parishes (5 per cent), and village councils (25 per cent). Levies and fees as well as allocations of unconditional and conditional grants from central government add to the budgets of sub-counties and districts. This gives lower levels of administration, beginning with the subcounty, and a quite substantial budget, which may surpass US$100,000 even for a rural subcounty. Equally important is that by retaining much of the local taxes and fees, the local admini-stration becomes directly answerable to its constituency.

The provisions for local government elections guarantee widespread representation at the various councils and include quotas by gender, so that at least one-third of the councillors must be women (see Figure 1).

The Local Governments Act specifies functions and services that a district council can devolve to subcounty councils (LC 3) (Section 31 [4] Local Governments Act, Republic of Uganda 1997). For managing natural resources, these include:

- providing agricultural ancillary field services, such as extension;
- controlling soil erosion and protecting local wetlands;

Figure 1: Uganda's district administrative structure

Functions	Local councils	Level
Local government • Exercises all political and executive powers • Provides services • Ensures implementation of government policy and compliance with it • Plans for the district • Enacts district laws • Monitors performance of government employees • Levies, charges, and collects fees and taxes • Formulates, approves, and executes district budgets	LC 5	**District** Composed of 3–5 counties
Administrative unit • Advises district officers and area member of parliament • Resolves problems and disputes • Monitors delivery of services	LC 4	**County** Composed of 3–5 subcounties
Local government • Enacts by-laws • Approves subcounty budget • Monitors performance of government employees • Levies, charges, and collects fees and taxes • Formulates, approves, and executes subcounty budgets	LC 3	**Subcounty** Composed of 3–10 parishes
Administrative unit • Assists in maintaining law, order, and security • Initiates, encourages, supports, and participates in self-help projects • Serves as communication channel • Monitors the administration and projects	LC 2	**Parish** Composed of 3–10 villages
Administrative unit • Assists in maintaining law, order, and security • Initiates, encourages, supports, and participates in self-help projects • Recommends persons for local defence units • Serves as communication channel with government • Monitors the administration and projects • Makes by-laws • Imposes service fees	LC 1	**Village** Composed of 5–50 households

- taking measures to prohibit, restrict, prevent, regulate or abate destruction of grass, forest, or bush by fire, including the requisition of able-bodied males to extinguish such fires and to cut fire-breaks and generally protect the local environment;
- providing measures to prevent and contain food shortages, including relief work, the provision of seed, and the storage of foodstuffs.

All of these functions and services are relevant to adopting agroforestry innovations in the community. While many councillors are aware of these provisions, they often ask for technical support in order to translate them into action. Others need to be made more aware of the usefulness of a community-based approach as well as the legal backing and the obligations they have. A number of programmes are in place to improve the capability of local councils. All levels of local government have the specific task of advising higher levels of government and can thereby influence policy.

An interesting example of such community action is emerging in Kabale District in south-western Uganda, where farmers in the Katagata river catchment of Bubare and Hamurwa Subcounties (LC 3) have moved forward to begin managing a critical watershed in which soil erosion and related sedimentation are serious problems (Raussen 2000).

Demand-driven approach

A crucial pre-requisite for successful community action appears to be a common understanding that an important problem exists and that communities are willing to invest resources to tackle it. During the exceptionally heavy El Niño rains of 1997–8, farmers of Kyantobi village at the lower end of the Katagata river catchment experienced problems of erosion in the fields on the steep slopes and flooding and sedimentation on their best valley-bottom soils. This erosion during heavy rainfall leads to massive loss of fertile topsoil on the slopes; destruction of crops, particularly at the valley bottoms; and deposits of infertile sand and at times even large stones on the fertile valley-bottom soils. Although the causes of these problems usually lie in the upper parts of a watershed, the immediate impact is highest in the lower parts.

For help to deal with the problems, representatives from the village at the lower end of the watershed contacted the Agroforestry Research and Development Project jointly implemented by the Forestry

Resources Research Institute and the International Centre for Research in Agroforestry (ICRAF).

When agroforestry dissemination staff visited the watershed, it became obvious to project staff and farmers alike that any effective measures to help control the problems of runoff would require community action throughout the watershed. This is particularly so since farmers' fields are fragmented, and erosion control in a single field on a given slope would not have any significant effect. Project staff made it clear that the project could help with training and materials for soil conservation but that local leaders would have to organise the key element for success – community action. The villagers readily accepted this condition. Community arrangements are already common for grazing regulations to protect crops and planted trees and to prevent fires. Community action is possible because local authorities can make suitable arrangements and village and subcounty councils can set and implement by-laws. Furthermore, local governments can help identify community needs and organise discussions on possible solutions. Higher levels of local government assist lower levels to initiate contacts with relevant organisations that may help in implementing projects. This means that a system is in place for bottom-up planning of projects.

Available agroforestry innovations

Obviously, community action requires suitable innovations. Often these may be available locally and may only require modification. However, research institutes can often provide further inputs to this process by:

- advising farmers on how to set up tests to explore the best adaptation of the innovations; and by
- introducing innovations to the farmers. For example, in the study area it is common to leave strips of natural vegetation at the terrace risers. However, these strips are not sufficiently stable to withstand the impact of runoff during heavy rainfall. Through their village council (LC 1), the Kyantobi farmers selected delegates who were taken by the project staff on a one-day study tour to on-station and on-farm research sites. This exposure led them immediately to identify contour hedgerows as the most suitable innovation for alleviating the erosion problems. These hedges provide not only adequate soil and water conservation services (Cooper *et al.* 1996)

but also products such as high-quality dairy fodder, stakes for climbing beans, and fuelwood.

Usually, more than one best-bet innovation is required for farmers to experiment with and adapt. These may be specific to various farming conditions in the area. This possibility of trying things out for themselves is also necessary to keep farmers' enthusiasm high.

How do farmers find agroforestry innovations? One of the most successful means for giving farmers informed choice and to promote innovations is exchange tours to visit farmers already using them. Here again, local councils can be helpful in choosing suitable participants, making logistical arrangements, and perhaps covering part of the costs such as by providing transport or food. During such tours, farmers from Kyantobi village identified other agroforestry innovations that they also wanted to try on their farms:

- *Boundary planting* with upperstorey trees (for example, *Grevillea robusta* and *Alnus acuminata*) to produce much-required poles and timber without foregoing much of the productive cropland.
- *Rotational woodlots* on degraded land for fuelwood and stake production while at the same time improving the soil (AFRENA–Uganda 2000).
- *Fruit trees* for home consumption of fruit, particularly the newly introduced deciduous trees (apple, pear, plum), which can produce crops in the highlands and generate cash in urban markets in lower-lying areas (AFRENA–Uganda 2000).

Community organisations

Why are effective community organisations so important for disseminating agroforestry information and systems cost-effectively and successfully?

Most dissemination about agroforestry is currently done in a project mode. Much effort is required to establish suitable structures for the process, which may include forming dissemination groups, resolving agroforestry-related disputes in the community, and posting extension officers in the target areas.

Working through established community groups allows the development organisation to concentrate on what it is best at: providing training and the few necessary materials. It also allows the local council to concentrate on its strengths: planning, mobilising the community,

facilitating joint efforts, and resolving conflicts. These functions are important, particularly if one considers how much time and funds development organisations, as outsiders, usually invest to provide these services. Democratically elected village or parish councillors are respected and well-placed to fulfil these functions more cost-effectively.

Local communities, as they plan, often benefit from the technical backup that development organisations can provide. In our case study, for example, villagers much appreciated the participatory mapping exercise, both for its team building and for its usefulness as a tool for planning natural resource management. Farmers met in the field and mapped a whole slope. To their own surprise, it was not always easy to identify the owners of fields (over 40 on one slope). They then determined the measures required for soil conservation. Based on their map (see Figure 2), the dissemination staff found it simple to calculate the length of the contour hedges and the number of seedlings that each farmer would need (see Table 1). This approach is an important improvement over the common practice in which projects determine a rather abstract target for nursery production (often based on donor rather than farmer demand). In the case study, each farmer could now decide the number of seasons required to raise the seedlings and whether to do this individually or with a group of fellow farmers. We expect this approach to have a strong motivational effect on the farmers.

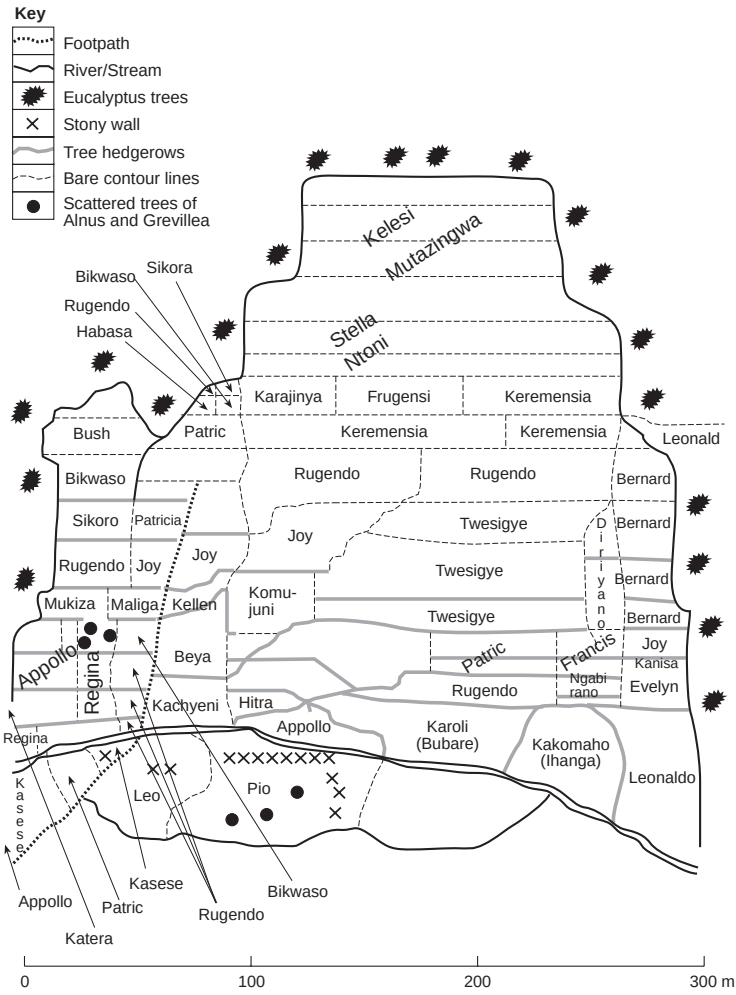
Empowering farmer groups and their local councils to plan and implement the conservation exercises should enhance the scaling-up process. Already in the Katagata watershed, 164 farmers have become involved in agroforestry and have established 32 nurseries. As mentioned, several hundred million seedlings would be required to establish contour hedges all over Kabale District. This can be achieved in a reasonable time only if planning, raising seedlings, and establishing them in the field becomes a self-propelled and sustainable exercise. Local councils appear to have the authority and most of the resources to lead this process.

Local government

Importantly, local government in villages and parishes can instigate community action and resolve conflicts; higher levels in the hierarchy have their strengths in co-ordinating, making contacts and requests, assisting in monitoring, and providing funds.

In Uganda, a typical district contains between 15 and 20 subcounties, and the subcounty appears to be the suitable unit for undertaking these

Figure 2: Kyantobi watershed area



functions. It is the lowest level with budgetary power and corporate rights, as it keeps and spends 65 per cent of the graduated tax it collects. This implies that the subcounty administration is directly responsible – and answerable – for using the main tax of its constituency. Subcounty leaders are in direct contact with all their electorate and will in most cases work towards re-election by providing good services. While agroforestry or natural resource management is probably not the highest priority (health and education usually are), the farmers who

Table 1: Exercise in participatory planning of soil conservation at landscape level

Name	Hedge length (m)	Seedlings (no.)	Amount of seed (g)	Source of seedlings
Rhoda Mukiza	60	240	36	Own nursery
Apollo Oworinawe	135	540	81	Own nursery
Regina Turyatemba	70	280	42	Own nursery
Biramahire John	30	120	18	Group (3) nursery
William Rugendo (Kyantobi)	310	1240	186	Group (1) nursery
Sikora Karya Gokwe (Katungu)	70	280	42	Own nursery
Bikwaso Thomas	Woodlot	0	0	Own nursery
Kellen Apuchi	60	240	36	Group (3) nursery
Joy Mbahunami	195	780	117	Group (3) nursery
Patric Turyahikayo	220	880	132	Group (3) nursery
Beya Rubereto	90	360	54	Own nursery
Kacyeni (Kashakyi)	60	240	36	Group (1) nursery
Habasa T	30	120	18	Own nursery
Kayinya John	75	300	45	Own nursery
Hiltra Micheal (Katungu)	100	400	60	Own nursery
Komujuni James	70	280	42	Own nursery
Barijunakyi Adonia (Kyantobi)	90	360	54	Group (2) nursery
Frugensi Butamanya (Karubanda)	105	420	63	Group (3) nursery
Keremensia Birigo	135	540	81	Own nursery
Twesigye Justus (Kyantobi)	380	1520	228	Own nursery
Diriyano Ziranga	60	240	36	Group (3) nursery
Twesigye Francis	85	340	51	Own nursery
Ngabirano Vicent	125	500	75	Group (1) nursery
Karori Nyakana	145	580	87	Group (1) nursery
Bernard Karimarwakyi (Kyantobi)	110	440	66	Group (1) nursery
Kariisa Benoni	60	240	36	Group (1) nursery
Evelyn Tibemanya	60	240	36	Own nursery
Kakomaho Peter	75	300	45	Own nursery
Leo Nkirirelhe (Mwiguriro)	70	280	42	Own nursery
Gerera	0	0	0	Own nursery
Kelesi Mutazingwa (Ihanga)	420	1680	252	Group (2) nursery
Stella Ntoni (Ihanga)	280	1120	288	Own nursery
Pio (Kashakyi)	175	700	105	Group (2) nursery
Kasese	150	600	90	Own nursery
Total number of seedlings	4300	17,200	2580	

Using the map (see Figure 2), farmers estimate the length of the contour hedges they will need; assuming four seedlings per metre of hedge, they then determine the quantity of seedlings and seeds.

depend on the sustained productivity of their land will appreciate a leader's efforts in this direction.

It is essential for the research and development organisations to participate in local government planning processes, because only then will local governments perceive them as true partners. Together they can design sustainable development plans. It proved helpful for the subcounty administration and the Agroforestry Research and Development Project to sign a joint memorandum of understanding. While this only spelled out the broad basis of the collaboration the document positively influenced the perception of co-operation on both sides. For example, it became common for project staff to be invited to all environment-related meetings, and it was accepted that agroforestry activities would become part of the subcounty's workplan, including budget allocation for them. The project, in its turn, supported such activities as typesetting and producing a quarterly subcounty bulletin, although only a small part of it referred to environmental issues.

An initiative to explore would be for local governments with similar problems or programmes to establish ways to network so they could share resources and information, such as on natural resource management.

Minimum-input strategies

Large-scale agroforestry adoption has to be affordable if it is to be successful and sustainable. Firstly, the innovations themselves should require minimum inputs in terms of labour and cash. Secondly, if agroforestry is to be adopted on a wide scale, the dissemination approaches need to be low-cost. This is even more the case if the main inputs are not expected from development organisations but from communities themselves. Scaling up agroforestry, which will largely have to be paid for through local people's work and taxes, has to be as cheap as possible in order to be accepted. People's labour and tax funds have to cover a wide range of other communal necessities, which include other and often higher priorities like schools, health, transport, and marketing.

If it is agreed that the project mode is too expensive for widespread, locally supported scaling up of agroforestry, then the fundamental question for any agroforestry extension programme becomes: can it still be successful with less labour and fewer inputs than are generally available in projects?

Developing these innovations in a research and development continuum (ICRAF 2000) should involve farmers at all stages, allowing them to simplify the methods. If local government structures are to lead the dissemination process, only the absolute minimum of required inputs should be externally provided – in most cases, training and germplasm. Most farm nurseries will not require polythene tubing, wheelbarrows, shovels, rakes, and watering cans. Farmers have for decades raised their vegetable seedlings without these items and can raise many of their tree seedlings the same way. It is, however, acknowledged that quality fruit trees, for example, require a different approach, since they need higher inputs and probably specialised commercial nurseries.

Similarly, the momentum and widespread adoption of agroforestry innovations will depend on whether local councillors will facilitate the adoption as part of their regular duties and not as an additional 'project' service that needs to be paid for externally. It is therefore important that councillors be trained and become aware of the programmes, so that their perception of environmental issues and interventions is raised and their willingness to allocate their constituency's resources towards such issues is increased.

The true decentralisation process in Uganda is only two years old. So we are seeing just the beginning and have a unique opportunity to learn from it. We should begin to develop clear development hypotheses in relation to the perceived potential of local community action and local government structures. Only then will we be able to test them and discover whether the potential really exists.

For research and development organisations, the opportunities are tremendous. We could test innovations with hundreds or thousands of farmers, explore their impact on watershed and landscape scales, and monitor farmers' modifications. Monitoring is particularly important since widespread testing by farmers, coupled with a workable monitoring system, may initiate a true evolution. When thousands of farmers undertake small trial-and-error experiments, we can expect the 'fittest' innovations to survive.

Conclusions

Scaling up adoption of agroforestry innovations from individual farms to watersheds and whole farming systems is a formidable task. Despite the impressive impact made by various agroforestry development projects in south-western Uganda, the task is far too large to be

accomplished in a project mode. Only if communities – convinced by the success of early agroforestry adopters – take responsibility for searching for solutions, adapting and adopting them to their complex environmental problems, and implementing them on a large scale, will environmental degradation in the watershed be addressed in time and with affordable resources. This requires enabling the community to understand the problems and plan interventions.

Local farmer organisations and local governments are best able to mobilise the community and solve local problems, with research and development organisations providing technical backup and quality germplasm. This proposed mode is different from the traditional technology-transfer approach, in which researchers generate technologies and extension specialists extend them to farmers. Here we propose enabling farmers to analyse and plan a range of options and solutions. Most importantly, they should themselves identify these options and solutions and maintain an open and regular dialogue with all the institutions involved. Another key ingredient for a successful approach is patience: patience to allow initiatives to grow and farmers to plan and explore them for themselves.

The scaling-up process this paper describes is still in its infancy and needs more social research and quantification. However, the achievements made with limited physical inputs from outside are remarkable.

Uganda is advanced in the decentralisation process; however, even in countries with weaker local governments, the potential to make use of local organisations in scaling up innovations often appears to be untapped. Greater efforts are needed to mobilise local government officials as promoters of natural resource management practices.

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