



## Fishing villages and community tree nurseries in Malawi

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*This article reports on the forestry' needs of the fishing villages around Lakes Chilwa and Chiuta, describing an attempt by' the Malawi-German Fisheries and Aquaculture Development (MAGFAD) Project to address local environmental degradation through the development of community forestry nurseries between 1989 and 1992.*

Like many countries in Africa, Malawi is undergoing rapid deforestation and faces a fuelwood crisis. Tobacco is the country's major foreign currency earner and fish is its major animal protein source. Fuelwood is required to process both these vital products. An understanding of forestry needs, wood use and marketing and the social conditions of local communities is therefore essential for devising appropriate approaches to forestry, energy, environmental and social development in Malawi.

### The people of Lake Chilwa and their environment

The Lake Chilwa ecosystem is in the southern region of Malawi on its eastern border with Mozambique. The ecosystem is characterized by shallow, typha-dominated swamps, sedge marsh and grass flood plains (Kalk, McLachlan and Howard-Williams, 1979). In the lake's greater catchment area, smallholder farming and fishing are the major economic activities for the approximately one million inhabitants (mainly of the Yao and Lomwe ethnic groups) making it one of Africa's most densely populated rural areas. The area produces between 15 000 and 30000 tonnes of fish per year, which is one-third of Malawi's total catch and about one-quarter of the annual national animal protein intake (Department of Economic Planning and Development [DEPD], 1987).

### The fuelwood problem

Approximately 60 percent of the Lake Chilwa fish catch is wood-smoked. This has put heavy demands on local forests, not only for wood for smoking but for trees for boat building, especially the large trees used for traditional dugout canoes and for construction timber. A smoking and fuelwood survey in 1987 indicated that: more than 6 000 tonnes of hardwoods for fish smoking were being consumed annually; timber was being transported long distances, even imported from Mozambique; and the scarcity of wood had led to wide-scale illegal felling in forest reserves and other protected forest areas (Walter, 1988).

### [A typical fishing scene on the shore of Lake Chilwa - note the dugout canoes](#)

For fish processors, the cost of wood was becoming as much a price-determining factor as

fish itself. On the most important fish-landing beaches of Lake Chilwa, the price of hardwoods used in fish smoking increased by 100 percent between 1987 and 1989. Research on one major trading beach in 1991 showed that 50 percent of wood used for smoking fish was collected illegally from forest reserves and transferred through complex marketing networks involving unrecorded cash payments.

The study also revealed that significant quantities of wood were being illegally shipped from Mozambique, despite a protocol between the two nations stating that wood shipments should be recorded and limited.

Wood price increases also affected local farmers who needed wood for fuel, construction poles, etc. Women, traditionally responsible for collecting fuelwood, were walking distances of up to 5 km per day and spending up to 18 hours per week collecting wood, while wood prices around the lake were much higher than elsewhere (Barnes, 1990). Although farmers often sold wood to fish processors, the consequences of this had not been thought through and the potential for earning a cash income through growing wood specifically for sale to the fishing industry had not been developed.

## Project response

The Malawi-German Fisheries and Aquaculture Development (MAGFAD) Project began in 1987 with an overall goal to "improve the utilization of local resources for fisheries and fish production". In 1989 it was decided that special emphasis should be given to tree planting in addition to a more economical use of wood by improved fish-smoking and canoe construction technology (Otte, 1990).

The first wood conservation intervention was the promotion of a plank canoe to replace the traditional *bwatu*, or dugout canoe (Fysom 1988). In making a dugout canoe, approximately 85 percent of the trunk of a mature hardwood is reduced to chips. The result is an irregularly shaped, heavy and unstable boat that is difficult to maintain. With the disappearance of big trees, fishermen had been reduced to smaller dugouts which were even more unstable and unable to reach the rougher waters in the middle of the lake. In addition, they were increasingly using species such as eucalyptus and *Acacia albida* which, when made into canoes, have a life span of only two to five years. The design of an appropriate stable, light-weight plank canoe utilizing less wood of a more durable quality, and the training and support of artisanal boat builders have led to a more effective use and conservation of forest resources (Mills, 1989).

The second intervention was the design and diffusion of an improved fish-smoking kiln. Traditional fish smoking is done over an open fire built in a shallow pit, with fish laid on wires. This method is inefficient in the use of wood and produces a product of irregular quality. The improved kiln utilizes 60 percent less wood to process the same quantity of product, while it is of higher quality and has a much longer storage life. Using the kiln is also safer than the traditional pit-roasting method because less smoke is inhaled. Kilns can be cheaply and easily constructed in the village from mud, baked brick, stone or portable flat iron sheets. More than 600 kilns have been constructed on 73 different beaches.

Despite the successful promotion of improved smoking kilns and plank canoes, the fact remained that large-scale deforestation had already taken place, fuelwood was still being rapidly consumed -albeit at a reduced rate - and no plan existed to ensure the sustainability of tree resources. Although there was some experience with private tree nurseries and woodlots, these mostly contained eucalyptus and pine seedlings made available by the Forestry Department and which were unsuitable for fish smoking.

## Starting the community tree nursery programme

In 1989 the project approached community leaders' traditional authorities, farmers and fish processors with a proposal for a community-based participatory reforestation programme, designed to revitalize deforested areas, stabilize wood costs and provide an income-generating, low-labour and low-investment crop; in October 1989 the Project identified 12 villages with community tree nursery potential.

The first stage of the attempt to start a community forestry programme involved community meetings to discuss how members perceived their wood needs and to ascertain their willingness to participate in a community forestry project. Often, the idea of a participatory community tree nursery initially seemed so original that some people had trouble conceptualizing the idea. Particularly difficult to communicate was the concept that the nursery would belong to its members, not to the project organizers, and that they could therefore plant any species they wished.

### [A fishing with deforested hills showing In the background](#)

Development theatre proved to be the most successful means for communicating this idea. Previous project activities focusing on bilharzia eradication and fish farming had employed a theatrical music group (Mr Malikebu's Band) as an extension aid, and this proved to be a popular and successful means of conveying information to large numbers of people at a level they could comprehend and appreciate.

### **Species selection**

The project's community meetings also permitted the determination of criteria for selecting tree species. The most important criteria in species selection were related to fish smoking; to be appropriate, wood should be slow-burning and impart a good flavour. *Albizia zimmermanni*, *Pericopsis angolensis* and *Acacia seyal* were identified as the preferred species.

Growth rate was a second criterion. Villagers were familiar with the rapid-growing eucalyptus and would have preferred species with comparative growth rates in spite of the fact that they realized the preferred species were all slow-growing. Species that could be regularly coppiced were also seen as desirable. Another criterion was tolerance of waterlogging and high soil salinity. This did not affect all communities but was of decisive importance to some.

Project staff participating in the community discussions also suggested that selected species should be suitable for multiple uses, an idea that was not quickly understood. Some villagers were aware of species, for example *Acacia albida*, that helped maize to grow and were a source of animal fodder, but they did not understand broader concepts such as nitrogen-fixing roots as a substitute for fertilizer inputs, or green composting with nitrogen-rich foliage. Agroforestry concepts such as green banding gardens and alley cropping were new ideas and were often viewed with circumspection.

With the above criteria in mind, a number of indigenous and exotic species were selected: *Albizia zimmermanni*, *Acacia albida*, *Azelia quanzensis*, *Khaya nyassica* (indigenous); and *Albizia lebbek*, *Gliricidia sepium*, *Senna siamea*, *Leucaena leucocephala*, *Cassia siamea*, *Terminalia catappa*, *Delonix regia* (exotic).

### **Determining community and project responsibilities**

The issue of responsibilities was something the project learned it had to clarify at the start of each effort. If tree nurseries were to be genuinely self-help activities, then project interventions, both in terms of material inputs and technical assistance, should be finite and ultimately aimed at community-level sustainability. It was agreed that the project should provide each club with a watering can, quality seeds, propagation sleeves and technical

advice through regular visits by extension staff. The clubs would be responsible for preparing a fenced, sun-shaded nursery plot; the collection of fertile soil; preparation of the propagation sleeves; daily watering of the seedlings; and the organization of regular club meetings. As policy, it was agreed to advise that seedlings belonged to club members as a whole until National Tree Planting Day when they would be divided up among the membership on a basis agreed by a club meeting called for that purpose. After this, the seedlings would belong to the person concerned who would be able to choose what to do with them including selling them. In some cases, this turned out to be a successful income-generating venture.

### **Use of seedlings**

Decisions about exactly where seedlings should be planted and for what purpose were an important element in the overall effort. The project's usually accepted advice was that individual community members should be personally responsible for planting out and caring for their own seedlings, that they should be planted on their own, rather than on communal land, and that this should be done as far as possible according to agroforestry principles.

### **[A tree nursery destroyed by flooding](#)**

Three basic planting out schemes were implemented. In the first approach, and particularly when *Leucaena leucocephala* and *Gliricidia septum* had been propagated, alley cropping with maize was recommended. In the second approach, participants used border plantings to delineate their land. For farmers with larger landholdings, in addition to border planting, the introduction of up to 12 trees per hectare in maize fields was recommended. This was a particularly valid approach for the propagation of *Acacia albida*. Important considerations for all planting schemes concerned discussing the usefulness of tree foliage as a potential source of animal fodder, when in the annual cycle to prune and how to use the foliage - if required as green manure. Finally, trees that were not particularly suited to agroforestry were recommended for planting near houses to provide shade or on areas of otherwise agriculturally unproductive, marginal land. This was particularly the case for *Delonix regia*, *Khaya nyassica* and fruit-trees such as *Carica papaya*.

### **Challenges and constraints to success**

The villagers never rejected the idea of a community tree nursery, but this did not mean automatic success. Failures in communications, community politics, a poor understanding of timber royalties and land rights, the importance of gender orientation, natural disasters and poor extension training were all interrelated constraints.

One important lesson learned was that, although formal community protocols must be adhered to and local leaders taken on board, communications must be primarily and directly aimed at the immediate beneficiaries. For example, an important constraint was dispute over who owned the seedlings and watering can. In a number of cases, although it appeared that public agreement had been reached in favour of a formal club structure with elected officers and for the village head to provide a plot of land to belong to the club, soon after the departure of project personnel the watering can, seeds and propagation sleeves were appropriated by the head and the club disbanded. Whether or not some village leaders saw an independent organization such as a club as being a threat to traditional authority, or saw the situation as a means for personal gain, is an open question. Yet in some cases we learned that village heads had a fuelwood monopoly and so it was not in their immediate interest to support a community tree nursery.

Another common situation was that heads would often stand for election as club chairperson, in which case, within the context of traditional village society, members could not oppose them. This was unfortunate, as the village heads often made disastrous club chairpeople,

especially at the beginning. However, subsequent monitoring during the two years after the first tree nurseries were introduced revealed an autonomous process of "normalization". It would seem that, as the novelty of the community tree nursery wore off and it became a routine feature of village life -self-sustaining and no longer receiving direct inputs from the project - the village heads, who initially either saw them as a threat or a source of personal gain, learned to assume responsibility for nursery success without having to be directly and personally involved. As successful village-based tree planning began to yield visible results, village heads as well as farmers and fishermen all became beneficiaries. The initial conflict between an essentially alien idea and the authority of the village head dissolved.

Tree royalties (Forestry Department licence fees) for felling indigenous trees proved a considerable constraint. This applied especially to species such as *Khaya nyassica*, *Azelia quanzensis* and *Acacia albida*, which were much in demand. Based on past experience, farmers feared that the indigenous trees they planted would belong to or be taxed by the government in spite of the fact that Forestry Department licence fees do not apply to planted trees.

One important constraint to village-based tree planting was the prevailing land tenure system comprising government land, which may be leased; a very small percentage of private land; and customary land, which is the largest sector and is held in trust by the president of the country and distributed by chiefs and heads under traditional authority. More than 80 percent of families are smallholders with customary land usufruct, and the idea of permanent legally binding land tenure is an alien concept (Pachai, 1979). In southern Malawi, land is largely matrilineal and, should the spouse die or the couple separate, the man loses both land and tree rights. Similarly, families with no traditional roots in an area have no land or resource rights and have precarious tenure. With population density in excess of 200 per km<sup>2</sup> and 75 percent of families relying on less than 1 ha for total farm production, any tree-planting project had to be keenly sensitive of land rights and the right to trees planted by individuals, issues that had to be addressed in open public meetings at which chiefs made definitive land tenure and tree rights commitments to individual participants.

### [A community tree nursery](#)

The role of women was an important issue. All project staff were male; typically, therefore, when communities were first addressed communications were primarily aimed at men, despite two important and initially unappreciated facts. First, being a matrilineal society, nearly all land "belonged" to women and, second, women carried out approximately 90 percent of farm labour and had traditional responsibility for household fuelwood management (Ngwira, 1987). Initially, at community meetings it was men who stood in prominence, negotiated with the project and, of course, secured for themselves whatever resources the project was distributing. It was only after the project was approached by groups of women wishing to establish separate women's tree nursery clubs and after the establishment of women's fish processing clubs, resulting from a separate women's income-generating project, that women were identified as the most important sector of the project's target group (Evans, 1991).

Extension training proved critical in maintaining club members' enthusiasm. While the use of development theatre and community meetings was important, this was only during the initial phase. Follow-up extension services and the development of positive interpersonal relations between extension staff and communities was crucial. The notions of knowledge sharing, equality in participation and community service were contrary to many extensionists' perception of their role, i.e. to tell the villagers what they should and should not do. Regular workshop training, performance evaluations, role play simulation and debates on community development theory proved important for the relative efficacy of individual extension workers.

Related to the issue of nursery maintenance is the importance of the sociological dynamics of

the lakeside population. One important feature of the population was its geographical mobility: as lake levels change and fish catches vary, the population tends to relocate accordingly. Being close to where fish are caught or landed, or living where there is access to the lake through reed channels is an economic necessity and leads to large-scale population migrations, sometimes resulting in the abandonment of villages and free nurseries. Although project staff emphasized the need to locate tree nurseries close to a water supply, this point should be reconsidered against prospects of destruction by flash-flooding and rising lake levels.

Other less important causes of failure were disease, which in one case destroyed a complete nursery; termite and insect attack; and animal damage, resulting from chickens or goats penetrating the protective fencing and eating the seedlings.

## Conclusion

Following the success of the 1989 pilot community tree nursery campaign, where 12 village tree nurseries were established, the project initiated a much larger campaign from 1990 to 1992 during which time nearly 120 community tree nurseries were established. The highest seedling propagation was at Nyanya, Chilimoni and the Northern Marsh which produced approximately 4 500 seedlings each, and the lowest propagation rate was just 33 seedlings. It is significant that the most successful clubs were also growing species not supplied or specifically recommended by the project. This was viewed by the project as an important aspect of the club's autonomous development, a clear sign that its participants were examining their own tree needs and making independent decisions about what should be propagated.

Community tree nurseries have proved to be an important step towards developing a sustainable wood supply and rehabilitating the local environment around Lake Chilwa. However, such community activity cannot entirely prevent environmental degradation, nor will it guarantee all the wood needs of the lakeside communities -at least in the short term. It must be considered alongside other forestry and agricultural development efforts, and it illustrates the need and potential for intersectoral approaches and cooperation.

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