Participatory forest management: a strategy for sustainable forest management in Africa

A case study of the Chinyunyu Community Forestry Project, Zambia

by **B.M.K. Lukama**
Provincial Forestry Office (Lusaka), Zambia

SUMMARY

The protection of forest resources is crucial to the survival of rural dwellers such as the Chinyunyu community. But the Chinyunyu area, along with many others in Zambia, has suffered rapid deforestation. The main cause of this has been the production of charcoal, though shifting cultivation also plays a part. The Chinyunyu area is trust land under the jurisdiction of a chief.

The chief's complaints to the Provincial Forestry Office about the indiscriminate felling of trees in the area eventually led to the flushing out of those illegally exploiting the forest resource and the inception of the forest conservation programme in 1990. The programme is known as the Chinyunyu Community Forestry Project. Members of the community have an incentive to be involved in the conservation and management of the forest resources, and the rate of deforestation has now been checked in the area as a result of the villagers' determination to prevent outsiders from exploiting those resources. However, tree planting, as a way of expanding the forest resource base, has so far yielded disappointing results. The "top-down" approach adopted by the extension staff has not helped matters, but this is now being addressed. Another shortcoming is that the local community has not been empowered to formulate its own by-laws, which makes law enforcement more difficult.

Much still needs to be done. Most local people depend on the shifting cultivation system of agriculture for their livelihood, and serious efforts should be made to encourage cultivation on permanent plots to reduce the pressure on forest resources. However, if such efforts are to be effective, the government will have to strengthen the agricultural extension system. Continued efforts are also needed to promote agroforestry practices to improve soil fertility and control erosion. In addition, alternative sources of income need to be developed for the community and the use of alternative fuels should be promoted. A start has been made in Chinyunyu, but if sustainable forest management is to be achieved, all measures to enhance forest conservation must be effectively coordinated.

Community forestry in Chinyunyu

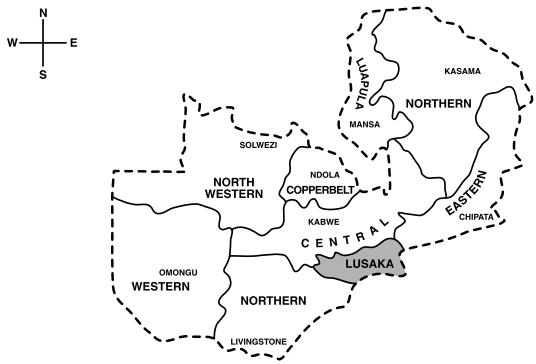
Throughout the world forests are being cleared at an alarming rate. Deforestation is a problem of our time that has reached crisis proportions in many countries and Zambia is no exception. The country has a total land mass of 753 000 km^2, a population of 8.8 million, with a current population growth rate of 3.6 percent. Around 15 percent of the total land mass is under reserved forest.

Forest clearing for various land uses is currently progressing at an estimated rate of 300 000 ha per annum. In the case of the study area, Chinyunyu, the main force behind the deforestation is the production of charcoal, and shifting cultivation also plays a part. Charcoal burning is rampant in the area because of its proximity to the rapidly expanding capital city of Lusaka, and a good tarmac road facilitates the transportation of charcoal.

Chinyunyu Community Forestry Project is situated in a rural area 100 km east of Lusaka. The programme was sponsored by the Norwegian Agency for International Development (NORAD) in conjunction with the Zambian Government, which has provided forestry extension officers to work with the local people. Chief Undaunda administers the land for the benefit of his subjects.

The information used in this discussion of the Chinyunyu forestry project stems from the author's close association with the forestry extension staff, in a supervisory capacity. The project was initiated in 1989 when Chief Undaunda complained to the Provincial Forestry Office in Lusaka about the indiscriminate cutting of trees for charcoal production in the area. This was being carried out mainly by non-local people belonging to a Tanzanian

MAP 1 • Zambia



ethnic group. As part of the provincial management team, the author and the Provincial Forestry Officer held a series of meetings with the chief and this led to the inception of the forest conservation programme in 1990, which is known as the Chinyunyu Community Forestry Project.

Status of the forest resource

The rate of deforestation has now been checked in the area as a result of the villagers' decision to prevent outsiders from exploiting the forest resources. Because of the absence of forest inventories, figures cannot be given about the reduction in the rate of deforestation. However, a comparison between the Chinyunyu area and the surrounding areas shows a concentration of immigrants and an explosion in charcoal-production activities outside the community. The huge charcoal kilns are a thing of the past in the Chinyunyu area.

The protection of forest resources is crucial to the survival of rural dwellers such as the Chinyunyu community. Most Zambians depend directly on natural resources for their food, shelter, medicines and energy – in other words, for their survival. A rapid increase in population combined with economic factors has led to overexploitation of these resources, threatening the existence of many people (Harrington, 1997).

The high demand for charcoal in the capital means many people are involved in the charcoal trade, from which they derive their main source of income. This has brought about massive deforestation in the area. People used to move on and cultivate new areas even before the soil became depleted of nutrients necessary for crop production on the land they were farming. Those involved in the charcoal trade are mainly men, who now have to travel to other forested areas to produce charcoal. However, producing charcoal is so profitable that local people work with outsiders, forming a network of charcoal traders. It is through this network that a steady supply of charcoal to the city markets is maintained, leading to deforestation on an alarming scale. The charcoal kilns used to be small and did not provoke concern about their destructive effect on the environment. The average weekly output of charcoal from one kiln was three bags of 90 kg each.

A traditional kiln, Chinyunyu area

With the rise in the demand for charcoal there has been a shift from the use of traditional charcoal kilns to the construction of huge commercial kilns, which average 20 m in length, 5 m in width and 2 m in height. The average output of these kilns is around 80 bags of charcoal in a two-week period. Large patches of the forest are cleared to fill kilns of this magnitude, resulting in extensive destruction to the environment. Trees do not regenerate easily in such areas, owing to the removal of a wide strip of topsoil around the kiln, which also removes all the seeds.

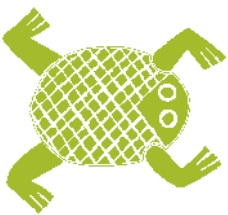
Since the indiscriminate cutting of trees was taking place on trust land, the Forestry Department was not directly involved in curbing the problem. It was entirely the responsibility of Chief Undaunda, and the Forestry Department could only play an advisory role as facilitator through the forestry extension staff. After consultations between the chief and the Lusaka Provincial Forestry Officer in 1989, the chief became convinced of the importance of forest conservation in his area. A brief feasibility study was conducted. This led to the organization of a forest "clean-up" operation conducted by a team comprising forest rangers and guards, army personnel, police and the chief's guards. The purpose was to flush out all the illegal charcoal burners, most of whom happened to belong to a Tanzanian ethnic group. The booming charcoal trade also attracted others, mainly people from the Eastern Province of Zambia. The Provincial Forestry Officer later recommended that Chinyunyu receive assistance to set up a forest conservation programme.

There are five conservation committee groups in the area, which normally carry out inspection tours to check on the illegal immigrants and any other charcoal-producers. A recent report shows an increase in charcoal production activities in areas adjacent to Chinyunyu. The Forestry Department is planning to take measures to protect those areas from overexploitation by facilitating participatory forest management.

The other control mechanism being enforced in Chinyunyu is that no charcoal-production licence is to be issued to anyone without a letter of consent from the chief. The chief and the conservation committee members know which specific areas are designated for exploitation at any particular time.

The effects of shifting cultivation are not as serious as those of charcoal burning. However, as the population rises agricultural land becomes more and more scarce. The only way to mitigate this trend is by encouraging permanent cultivation. This requires extensive agricultural extension services and the provision of agricultural inputs to these farmers, such as improved seed, fertilizers and insecticides.

The promotion of agroforestry practices forms part of the community forest conservation programme. An agroforestry demonstration plot was set up in 1991 at Chinyunyu forestry camp. The idea was to encourage people to include the tree component in the farming system as a way of maintaining land use productivity on a sustainable basis. The crucial aspects are soil fertility enhancement and erosion control. Trees help maintain or increase soil organic matter through carbon fixation in photosynthesis and their transfer litter and root decay. Some tree species being used in the project, such as *Leucaena leucocephala* and *Sesbania sesban*, are leguminous, nitrogen-fixing trees. The aim of applying agroforestry practices is to stabilize the farming systems and control shifting agriculture, which is so dependent on the felling of trees, hence speeding up the rate of deforestation.



The Chinyunyu community forestry process

In the Chinyunyu case study the term "community" refers to the people living in the same geographical area, under one chief, who share the characteristics of subsistence farmers and their overlapping dependence on the same forest resource base. Hence, community forestry in this area denotes all the activities conducted by the people in this locality in relation to the conservation of the forest resource. It also includes the technical assistance being rendered to those people to facilitate the accomplishment of their objective of sustainable forest management.

Most of the people living in Chinyunyu are descendants of other, or previous, inhabitants and have a sense of belonging to the area. Hence their motivation in taking part in participatory forest management stemmed from the desire to safeguard the forest resource for their children and the generations to come. The other important factor was the realization of the economic value vested in the forest resource. This came about as a result of the influx of people who came to exploit the resource for charcoal production during the government's Structural Adjustment Programme. The reduction in work opportunities forced people into rural areas close to the city. With the increase in the population the scarcity of land also began to make its effects felt on local people, most of whom depend on the shifting cultivation system of agriculture (the *chitemene* system) for their livelihood. Shifting cultivation is often self-defeating, as population pressure forces the villagers to reduce the fallow period of the system, leading to a rapid reduction in soil fertility.

However, the Chinyunyu Community Forestry Project was initiated after careful consideration of most of the factors listed above. A series of discussions was held with members of the community. Participatory Rural Appraisal techniques were not applied per se to carry out the needs assessment. In any case, considering the diversity of the groupings in the community, the forestry extension officers had to consult with the schools, women's groups, the agriculture college, the farmers and the ordinary villagers. The village drama club was quite instrumental in sensitizing the people to forest conservation, through the performance of a series of sketches.

The programme began in 1990 with the setting up of a forestry camp in Chinyunyu. A central nursery was established at the camp and later some eight village nurseries were set up at individual households and also for the women's social groups. The villagers were enthusiastic about the venture. This could be seen from the high attendance rates at the village meetings and seminars.

No serious obstacles have been encountered in implementing the participatory forest programme in Chinyunyu. The only shortcoming has been lack of sufficient technical expertise of the forestry extension staff to adhere to the principles of collaborative forest management. The top-down approach, which characterizes the way in which the extension staff handle issues, tends to create dependence within the community. However, this is slowly being overcome by the reorientation of staff to the application of indigenous knowledge in the implementation of the community forestry programme.

The impact of community forestry on the conservation and management of forests

In Chinyunyu community there has been an important change – the revival of a sense of unity in defending the forest resource from overexploitation by outsiders. Hence the tragedy of the commons (the degraded state of much common land) no longer applies in this community. The participatory forest management process has so far been established on a sustainable basis, because members of the community have an incentive to be involved in the conservation and management of the forest resource.

The exclusion of outsiders in the exploitation of the resource has reduced pressure on the forest resources; hence natural regeneration is yielding results as the fallow period in the land use system has generally increased.

However, there is a weakness concerning law enforcement, since local people have not been empowered to formulate their own by-laws. All cases of serious encroachments, especially by the illegal immigrants, are reported to the Forestry Department for assistance, as no cases can be processed at local court level.

Data pertaining to the tree planting were collected from 1991 to 1995 (see Table 1 and Figure 1). The purpose of this was to check on the progress of operations on the ground in relation to the set targets for tree planting.

Considering the number of trees that have so far survived in the field for each annual planting, the result is very much below the average. Therefore, tree planting as a means of expanding the forest resource base has fallen well short of the desired outcome. The survival rate is low because of the application of poor techniques in tree tending in the nursery and in the field. The low numbers of trees planted could be attributed to a lack of interest of the people in applying themselves to the tree-planting programme. Some of the trees planted are fruit-trees, which will make all the difference to the households when they start bearing fruit.

Recommendations for the promotion of community forestry

The management of the existing forests is the responsibility of everyone in the community as well as of other stakeholders. Hence, since 1990 the Chinyunyu Community Forestry Project has provided the mechanism through which local people have been participating in the management of the forest resource.

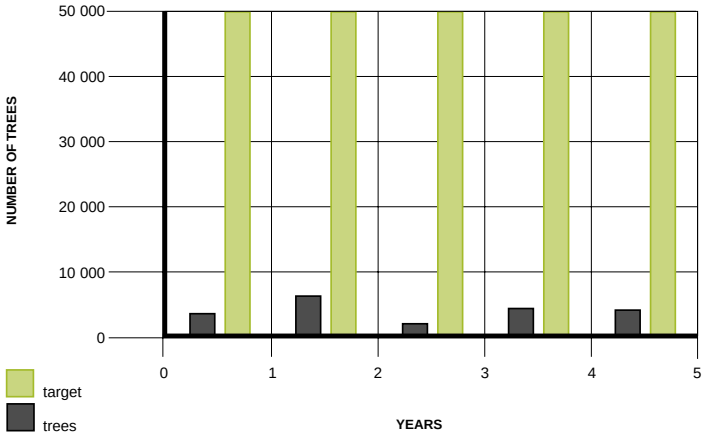
But it would be wrong to assume that community members had no knowledge of forestry before the inception of the forestry project in the area. There are signs of an interest in tree planting, as can be seen from the few fruit-trees planted around the homesteads, prior to the commencement of the forestry extension tree-planting campaign. Therefore the use of indigenous knowledge in the implementation of the conservation programme is highly recommended.

Moreover, if conservation is to gain ground in Chinyunyu, much more needs to be done than is currently being portrayed through the available tree-planting data. Proper techniques for tree planting and tending have to be put in place. However, the impact of the project on the lives of the people and their positive attitude towards forest conservation cannot be overlooked – a start has been made. The direction to take from this point henceforth should be decided before the confidence of the community in the conservation programme diminishes.

TABLE 1 • The number of surviving trees planted in Chinyunyu community, Zambia (estimated survival rate is 50 percent)

	YEAR					
	1991	**1992**	**1993**	**1994**	**1995**	**TOTAL**
Trees in the field	3 765	6 180	625	4 400	4 546	**19 516**
Target	50 000	50 000	50 000	50 000	50 000	**250 000**

FIGURE 1 • Comparison of number of surviving trees planted with targets over a five-year period, Chinyunyu community, Zambia



Government intervention

In addition to the factors outlined above, the Chinyunyu Community Forestry Project needs to be fully integrated with other government rural development programmes if the forest conservation efforts are to get out of a vicious circle. This is partly because shifting cultivation will continue as long as permanent agriculture methods are not seriously promoted and given sustained support by the government. Local people may be willing to adopt the new methods of agriculture, but they are not capable of acquiring the inputs that go with permanent agriculture such as improved seed varieties (especially maize as the staple food) and fertilizer. The agriculture extension system has to be strengthened to convey effectively the technical expertise needed by the people to grow crops on permanent plots. This will reduce pressure on the forest resource. It is an extremely difficult task to try to conserve the forest without providing an alternative to the factors that bring about deforestation.

Agroforestry

The forestry extension staff have done all they can to disseminate the information on the necessity of incorporating the tree component in the farming system (agroforestry practices) as a means of enhancing soil fertility. If this practice can be implemented on a wider scale people will be able to use the same piece of land longer, and the frequency of shifting to new sites can be reduced. This in turn will help in the forest conservation process. An agroforestry demonstration plot has been set up at the forestry camp, but there is no information available as to how much the practice has been integrated in the community forestry programme. One farmer had been practising an improved fallow system with sunhemp on his 5 ha plot, with positive results, prior to the commencement of the forestry project in the area. Regarding the whole conservation programme, in view of the fact that the tree-planting achievement stands at a mere 8 percent of the target figure, it is not possible to predict when the practices of agroforestry (a specialized field) will be adopted by local people for successful soil management and sustainable land use.

Alternative sources of income

The high demand for charcoal has resulted in the rapid disappearance of the forest resource in Chinyunyu. Many in the community have seen this demand as an opportunity to raise money quickly to improve their living standards. Apart from the forestry conservation programme and its limitations, nothing else is being done to try to curb the deforestation caused by charcoal production. The efforts by the forestry extension officers to educate the members of the community about the importance of conservation will not yield much because there are no alternative sources of income to charcoal burning in the area. If the villagers could be motivated to involve themselves in meaningful agricultural production and small-scale industries such as basketry, carpentry and tailoring, which would allow them to sell some products, then the charcoal trade could easily be discouraged. However, these factors must not be considered in isolation.

Alternative fuel sources

The government needs to promote the use by city dwellers of alternative fuels such as biogas and coal briquettes. The use of improved cooking stoves (e.g. the Kenyan *kijiko*) is practical and should be promoted in order to make more efficient use of charcoal. Where possible an expansion of the hydroelectricity network and supplies at affordable rates would be of great assistance. The reduction in charcoal consumption per household would cut demand, production and the deforestation rate.

Formation of cooperatives

The other way of combating forest destruction caused by charcoal burners is by forming cooperatives, which can easily be supervised and made to adhere to laid-down conservation guidelines. This may entail demarcation of

the forest into zones and concentration of charcoal production in a specified area at any one time. This would prevent overexploitation of the resource and enable the forest to regenerate. The regeneration may be natural, or organized enrichment planting can be carried out. The forestry extension staff should advise the community on ways of speeding up natural regeneration and artificial regeneration of indigenous trees.

The charcoal producers, organized into cooperatives, could solicit for funds to purchase steel kilns, which have a recovery rate of about 53 percent, compared with 32 percent for earth kilns. In earth kilns a larger proportion of the wood becomes ash than when steel kilns are used.

Tree management technology for drier areas

A lot of investment in tree planting will go to waste if we do not accept the fact that Zambia is becoming more prone to droughts. Hence we need to go further than the current efforts and produce seedlings that will withstand harsh climatic and environmental conditions. The hardening-off of seedlings in the nurseries and the construction of water conservation structures around the plants during establishment are vital.

Tree species selection

Apart from the ecological conditions, the selection of tree species should be based on the preferences of local people, while two other factors – enriching biological diversity and maximizing economic benefit – should also be considered.

Project data processing

A simplified, updated forest information system has to be maintained for easy monitoring of the forestry project. This consists not only of information on the number of trees in the field, but also on the categories of participants and the economic benefits they derive from the conservation programme.

If sustainable forest management is to be achieved, all the corrective measures for the enhancement of forest conservation discussed need to be coordinated effectively, with all the stakeholders pulling in one direction at the same time. These are real issues that have to be addressed by the Chinyunyu project, otherwise the whole investment may turn out to be little more than a waste of time.

Remarks on community participation in forestry

Participatory forest management is the most natural way of going about conservation of the forest resource. However, in this case it was superseded by the top-down approach, which does not seem to be producing the desired results, and affected by the rise in population. Efforts are needed by the facilitators to do away with ceremony and get down to the business of serving the communities and restoring the environment in the process, for the good of everyone. A community forestry project should be run as a business because of the high investment levels, the time factor and the way such a venture affects people's livelihoods.

References

Arnold, J.E.M. 1991. *Community forestry: ten years in review.* Community Forestry Note 7. Rome, FAO.

Atampugre, N. 1991. *Whose trees? A people's view of forestry aid.* London, Panos.

Chambers, R. 1989. *Farmer first.* New York, Bootstrap Press.

Chambers, R. 1997. *Rural development, putting the last first*. Essex, UK, Intermediate Technology Publications.

Gayfer, J.R. 1994. *Nepal-UK community forestry project: an overview*. Kathmandu, NUKCFP.

Harrington, W. 1997. Speech to members of Parliament. *Times of Zambia*, 17 January, p. 2.

Hobley, M. 1996. *Participatory forestry: the process of change in India and Nepal*. ODI Rural Development Forestry Study Guide. London, Overseas Development Institute (ODI).

William, A. 1995. *Communities and sustainable forestry in developing countries.* San Francisco, California, Institute for Contemporary Studies.