

Summary

Ethiopia is known for its bamboo forests and their considerable potential. Bamboo supports hundreds of small and big businesses, and the livelihoods of millions of farm households in the country. Extra fast growth, large biomass production, widespread local and industrial applications, growing world market for its products and its ecological importance make sustainable bamboo production and management important. Gregarious flowering and mass death, a rare event in bamboo lifecycle, recently hit the bamboo forests in many parts of Ethiopia. One of these most affected is the bamboo forest in Masha, the third largest area of highland bamboo in the country. Under normal condition, about 5-8 years is needed for post flowering recovery as the plant re-grows from seed. The effective recovery depends on proper site management after the flowering and mass death. Unfortunately, many stands in Ethiopia suffer poor restoration due to grazing and agricultural expansion. Through the work of the NTEFP - PFM project and the local PFM communities, local forest management groups are ensuring that the Masha bamboo forest areas are recovering well. This Briefing Note shares the experience of Masha and identifies management and policy implications.

The Challenges of Bamboo Gregarious Flowering and Mass Death

Bamboo has a unique reproductive system. Once established from seed, it reproduces and expands asexually from underground stem called a rhizome for several decades until it sets another batch of seeds. It flowers and sets seed only once in its lifecycle, and this usually takes 40-70 years depending on the species. After flowering the stand dies (Plate 1). This is a phenomenon that is called *gregarious flowering and mass death*. The death of all bamboo plants after flowering affects the ecosystem and the supply of bamboo raw materials for local community and bamboo-dependent large- and small-scale industries. However, if the seeds germinate a new generation of plants are produced which are genetically strong. The supply of a large quantity of seeds can also help widen the area of bamboo forest through the replanting of seedlings or wind borne distribution of seeds. However, bamboo forest may also not re-establish itself after flowering.

The danger for bamboo forest is that the new seed based generation may not be able to fully reoccupy the original area due to a variety of ecological and anthropogenic challenges (Sertse et al., 2011). Under favourable conditions, it takes from five to eight years for the full recovery of the new seed based generation, and what happens to the sites during that time will significantly affect the regeneration of the new bamboo forest.

There are many reasons to worry about the gregarious flowering and mass death of bamboo in general:



Plate 1. Mass death of old growth highland bamboo stand in Masha following gregarious flowering in 2011

- A. The seeds lack dormancy and are very recalcitrant; hence they cannot be stored for a long period. Usually after gregarious flowering the entire mass of seeds germinates quickly and produces seedlings. If the sites are not protected from livestock grazing or from conversion to agriculture, they could be damaged and the chances of restocking are reduced. According to local people from Masha district, juvenile bamboo seedlings (Plate 2) are highly nutritious and sought after by livestock. Moreover, given the growing land shortage, the dying bamboo forest sites could be targeted for quick invasion by farmers if not protected.

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B. Secondly, the large volume of seeds sometimes induces a boom in the rodent populations which can damage the entire seed supply and the emerging seedlings thereby suppressing regeneration. Further, the outbreak of rodents may lead to an increase in diseases, crop damage and famine in nearby human populations, which could instigate hostility against the bamboo ecosystem and lead to destruction through burning.



Plate 2. Very sensitive juvenile bamboo shoot (left) sought after by browsing animals (right) threaten bamboo forest restoration

C. The mass death of bamboo could also affect the economy of the people who depend on the bamboo resource for food and income. Interruption of bamboo based income could force local people to convert the area into a land use that can offer short-term returns such as agriculture to fill the income gap and so prevent the recovery of the bamboo forest.

These problems, coupled with the weak forest sector institutional arrangements, could lead to a significant loss of the bamboo forest and its ecosystems. Such experience has been reported recently from an area of lowland bamboo in Pawe, Beneshangul-Gumuz regional state (Embaye 2003). This presents a good reason to worry about the regular mass death of bamboo plants and the implications of this for such forest in the country.

Why is it important to Manage and Restore Bamboo Forests in Ethiopia?

Ethiopia has very limited forest resources, particularly industrial forests. Only 190,400 ha of industrial plantations exist in the country to supply lumber and other industrial wood. Industrial wood production from natural forest is long banned, and even if attempted the forests have a poor supply of suitable trees. On the contrary, rapid economic growth and unprecedented construction sector boom is driving a continuous increase in the demand for wood and wood products. The gap between supply and demand is already very large, and widening. A major part of this gap is currently filled through imports which are sharply increasing. Wood and wood product imports for the past 11 years (2000-2011) reached 345,531 tons, worth US\$32 million. Such imports are unnecessary for a country that has high forest growth potential, including a large bamboo production potential. Further such wood imports affect economic growth by diverting foreign currency from other essential imports.

Eucalypt is expanding across the country to partially fill the demand for wood products. However, eucalypt is blamed for multiple ecological problems. Bamboo by the virtue of its fast growth, even faster than eucalypt, is a good candidate to replace eucalypts and supply some of the needed wood-based products. Bamboo grows fast and in very high density per square metre. Once established, it matures and is ready for utilisation in just 3 - 4 years. This makes it a good candidate to provide a sustainable supply of biomass to address the demands in the energy and construction sectors.

As the country also embarks on the carbon neutral "Climate Resilient Green Economy" (Anonymous, 2011), bamboo offers on one hand a renewable energy source and on the other an effective means for sequestering carbon when it is used in construction. It can also help replace dung as a fuel and so improve soil conditions and crop yields.

Masha Case of Bamboo Forest Restoration: Causes of Success

Masha Woreda in Sheka Zone of the SNNPRS has about 18,652 ha of highland bamboo, the third largest in the country after Harena and Gera. Like many bamboo forests in the country, the stand in Masha flowered and died in 2008-11 (Plate 1).

Local farmers when speaking of the experience say they were very sad and shocked by the mass death. Although they had heard of such behavior in bamboo, most of the current generation had not experienced it. Bizuayehu Zewdie, one of the group discussion participants from the area said 'I have heard of my father, who is now about 70, talking of seeing a similar mass death of the Masha bamboo forest during his childhood. This means the event is very rare.' In a group interview, local farmers expressed their feeling about the mass death as follows:

"Bamboo is everything for us: it is food, fencing and construction material, household furniture and utensils, feed for animal, cash, etc. We rely heavily on it for making hives for honey production, the main forest product and source of cash income for communities in Masha and neighboring districts. When this event (gregarious flowering and mass death) took place, we were shocked and sad because our sustainable and abundant source of wood material vanished and will not be available for several years, if ever such a restoration happens. We felt as if we had lost our beloved ones, and we are almost left empty handed. In fact, we know it can recover in 5-8 years if the area is protected against grazing and conversion to farming. We had two main worries: could we organize ourselves effectively to collectively manage the ecosystem for its restoration, and how could we fill the gap in wood products supply. Now thanks to the NTFP-PFM Project, local communities around Masha bamboo forest are organized into PFM Associations, got by got, and are engaged in protection of the ecosystem through fencing. Consequently promising signs of recovery are observed."

The NTFP-PFM project run by the South-west Forest and Landscape Grouping (SWFLG) has been working in four districts of SNNPRS in the south-west of Ethiopia, including Masha and Andracha that have one of the largest bamboo forests in Ethiopia. The bamboo ecosystem that experienced gregarious flowering in the area also falls within the project's territory. The project took the initiative of helping to restore the bamboo forest as part and parcel of its forest management goals and organized local communities around the bamboo ecosystem into PFM Groups which are part of the Woreda Forest Management Association (PFMA). The communities organised themselves to actively protect the bamboo ecosystem against animal grazing and farmland encroachment. Several kilometres of fences have been built (Plate 3) to protect the emerging juvenile bamboo seedlings from livestock bringing a total area of 4066 ha bamboo forest under active management by local community in Masha district. An additional 3793 ha of bamboo forest is also put under active community management in the neighbouring Andracha district.



Plate 4. Promising regeneration of new bamboo stand within PFM protected areas in Masha.



Plate 3. PFM communities in Masha fenced an entire bamboo forest area to induce regeneration after death of old stand bamboo forest

According to the interviewed group only a few sites where PFM has not been successfully established, due to internal problems, are left unfenced and suffer from uncontrolled grazing and damage to the regenerating bamboo. The interviewees also indicated that had it not been for the NTFP-PFM Project's facilitation with them to establish a PFM process, large parts of the bamboo ecosystem could have been lost due to grazing or encroachment by farmers. Now, thanks to their collective action through their PFMGs, the ecosystem is showing promising signs of restoration (Plate 4). One of the Kanga Kebele PFMG members, Wondimu Deneke (right in the left picture of Plate 4) said 'we observe a clear difference in the abundance and health of young bamboo shoots between actively managed sites and those not managed. He said fencing alone is not enough. You need to follow up and repair fences where they are broken if you are to successfully restore the bamboo.

Policy Implications

The success with bamboo forest restoration in Masha is due to the involvement of local communities in PFM which has allowed them to manage the ecosystem. The organization of

local communities into legal CBOs which have been granted clear rights and responsibilities is ultimately leading to increased investment in forest management (Figure 1). This role played by the PFM community indicates clearly the potential of PFM in contributing to sustainable forest management in Ethiopia. The PFM approach needs to be mainstreamed into a regular forest management system of the country. In the process of mainstreaming it, the rights and responsibilities of the community should be explicitly indicated in a strong legalized manner. With this respect two elements are essential:

First, the rights granted to communities should be in balance with the costs associated with their responsibilities as forest managers; and

Second, the key role that tenure security plays must be acknowledged and the right of use should be explicitly stated and formalized so as to impart better on feelings of ownership. One such a means is to grant communal forest land certification (see Briefing Note 2).

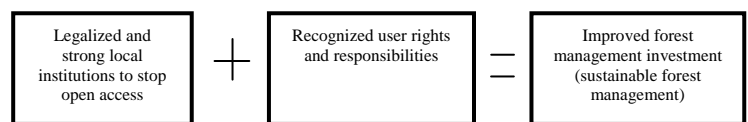


Figure 1. Two essential preconditions that lead PFM to succeed in improved forest management

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South-West Forest and Landscapes Grouping

This grouping brings together three partners who have been working in this part of Ethiopia for more than 12 years: University of Huddersfield, Ethio-Wetlands and Natural Resources Association and Sustainable Livelihood Action. They have recognised the need for serious attention to be given to the forests and forested landscapes of the south-west highlands of Ethiopia. At present the grouping has two other projects in this area besides the NTFP-PFM Project. These are:

Wild Coffee Conservation by Participatory Forest Management Project (WCC-PFM) led by the University of Huddersfield with contributions from EWNRA and SLA and funding from the European Union and the Horn of African Regional Environment Centre and Network, and

REDD+ Participatory Forest Management in South-West Ethiopia (REPAFMA-SW Ethiopia) led by Ethio-Wetlands and Natural Resources Association in association with the Development Fund of Norway with contributions from SLA and UoH, and funding from NORAD.

NTFP-PFM Project Summary

The “Non-Timber Forest Products – Participatory Forest Management (NTFP-PFM) Research and Development Project in South-west Ethiopia” started in July 2003. Its first phase ran until July 2007 and a second phase, for six years, will continue until mid 2013.

The project has a “research and development” orientation, in which it combines an integrated technical approach to the sustainable use and management of forest resources with a participatory and gender/equity sensitive strategy for improved rural livelihoods.

The project tries to explore and disseminate successful ways of applying Participatory Forest Management in Ethiopia so that forests can pay their way and become viable and competitive land uses which are sustainably managed by rural communities. This involves policy support, PFM institutional development, forest enterprise development and the economically viable marketing of forest products

Through the direct involvement of government institutions and communities in project implementation and the dissemination of project findings, the project aims to ensure the sustainability of its initiatives and their scaling up.

Briefing Notes (produced or in preparation)

1. Challenges and Opportunities for Sustainable Forest Management in South-West Ethiopia
2. Collective Forest Land Certification: a milestone for tenure security and sustainable PFM in Ethiopia
3. PFM Institutional Development: experiences from the NTFP-PFM Project
4. Bamboo Forest Restoration through PFM: experiences from Masha
5. Economic Assessment of the Costs of Deforestation in South-West Ethiopia
6. Forest Policy Development : engaging PFM with the policy process in SNNPRS
7. Evolving Interpretation of Participatory Forest Management in South-West Ethiopia
8. Forest-Based Enterprise Development: comparative experience of cooperatives and PLCs
9. Land use change in the highlands of south-west Ethiopia, 1973-2012
10. The *Korerima* Value Chain: enhancing the value of forest products
11. Competitive and Sustainable Forests: making forests pay their way in south-west Ethiopia

Project Funding Agencies



European Union, Environment Budget



Royal Netherlands Embassy

Royal Netherlands Embassy, Ethiopia



ROYAL NORWEGIAN EMBASSY

Royal Norwegian Embassy, Ethiopia

Project Partners



University of HUDDERSFIELD

The University of Huddersfield: With 18 years experience of field research, project management and consultancy / advisory work on natural resources in Ethiopia.



Ethio-Wetlands and Natural Resources Association: The first Ethiopian NGO to focus on forest and wetland issues. It has worked with most of the donors in the country and has run projects in three of the country's eight rural regions.



Sustainable Livelihood Action: A European Economic Interest Grouping which focuses on capacity building to support local NGOs and organisations in developing countries. Its staff have over 25 years of experience in Africa, Asia and Latin America.



Southern Nations, Nationalities & Peoples Regional State

For further details see: www.hud.ac.uk/wetlandsandforests/