

Two decades of farmer managed natural regeneration on the Seno plain, Mali

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Millet stalks in *Faidherbia albida* parkland between Koro and Bankass. Photo: Chris Reij



"Farmers reacted quickly to the 1995 forest law that recognized their rights to on-farm trees, with remarkable results."

Introduction

Bankass and neighbouring districts in the Seno plain of Mali were part of a largely treeless landscape in the 1980s. Farmer managed natural regeneration (FMNR) has been promoted since the early 2000s by SOS Sahel UK and subsequently by the NGO Sahel Eco. By 2010, FMNR had resulted in the significant regrowth of trees on an estimated 450,000 hectares of land (Sahel Eco 2019), mostly on rainfed millet fields and short-term fallows. Tree densities of more than 250 trees/ha are now recorded.

This article cites data from a previous study (Allen et al. 2009), supported by more recent observations (Sahel Eco 2019).

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Both individual and collective actions were promoted by Sahel Eco. For individual farmers, this included four main tasks:

- cleaning around seedlings and coppice shoots and removing dead grass and leaves to avoid possible fire damage;
- marking seedlings and regrowth clearly, and avoiding uprooting them by lifting up the plough blade when passing;
- thinning regrowth to adequate spacing, while retaining only one or two strong shoots on each seedling; and
- pruning when trees are large enough so crops receive more light, that also provides a harvest of fuelwood.

Collective actions included prohibiting the use of fire; developing and enforcing community bylaws that support FMNR, in collaboration with the forestry service; and awareness raising and promotion of the widespread adoption of FMNR techniques.

Uptake of FMNR

Of almost 500 farmers interviewed in four villages (Allen et al. 2009), 84% of them had adopted FMNR by 2008. The most common reasons for adopting FMNR was that trees helped protect soil from wind erosion (stated by 15 of 24 heads of households interviewed) and increased soil fertility (half of the interviewees). Other reasons, such as the provision of fuel, fruit and shade, were secondary, and mentioned by only a few farmers, the vast majority of which were male heads of household. When asked how they had learned about FMNR, one-quarter of them noted that it had been practised traditionally in their village. Training received from the national agricultural extension services and SOS Sahel UK was mentioned by one-third of the farmers, and a similar number spoke of the awareness-raising activities carried out by the local traditional Barahogon association; some people learned about FMNR techniques while listening to the local Radio Seno.

Typically, the head of household decides whether to adopt FMNR, but interviewees said that it was equally important to raise awareness among women and youth, since they provide most agricultural labour and play a key role in implementing FMNR when ploughing or hoeing family fields. In 2008 most interviewees (78%) were satisfied with the outcomes of FMNR, but some thought the local association could be doing more to support them. They indicated that the surveillance of village land was not as intensive as it had been when they started, that some fraudulent wood cutting continued, and that the association lacked the resources to patrol every day.

By 2019, the percentage of farmers practising FMNR had increased to 90%, an estimated 50% increase over a 20-year period. FMNR was only one of a range of restoration practices promoted in the area; adoption had also increased for almost all of them (Table 1). It is notable that bush fires had been almost entirely eliminated by 2019, and that tree planting was limited in many villages by a lack of water. Also, agricultural intensification included a range of practices, such as improved seed, targeted fertilizer applications, and various soil and water conservation techniques.



FMNR in high density *Combretum glutinosum* parkland in Bankass district. Photo: Chris Reij

Table 1. Change in adoption of restoration practices in the Bankass area, 1999–2019

Practices	% adoption in 1999	% adoption in 2019	Change in %
Reduction of fires/burning	50	100	+50
Farmer managed natural regeneration	40	90	+50
Improved land clearance	20	70	+50
Intensification of livestock production	20	70	+50
Intensification/diversification of agriculture	20	60	+40
Improved stoves	10	40	+30
Soil and water conservation	10	40	+30
Reforestation	40	50	+10
Production of tree seedlings	10	30	+20
Organization of fuelwood exploitation	20	20	0

Source: Adapted from Sahel Eco (2019)

Impacts of re-emerging parkland agroforests

The effect of FMNR on vegetation is clearly seen in the area between the small town of Bankass and the village of Endé, where it has been practised for longer by villages belonging to the Barahogon association. In 2008 quantitative data was gathered of the effects on tree cover using a simple inventory, and local knowledge was used to identify the impacts on flora and fauna, using participatory tools that enabled communities to make these evaluations (Allen et al. 2009).

The data showed that the restored agroforests had an average density of 277 trees per hectare, dominated by *Combretum glutinosum* (82%), with *Gueira senegalensis* and *Balanites aegyptiaca* making up a further 10%. Farmers also noted that of the 49 species of trees, grasses and wildlife they identified as most useful to them, 35 were observed to be increasing in frequency. Analysis of distribution by trunk diameter confirmed that agroforests were dominated by young trees or recent regrowth, with 95% of all trees estimated to be less than 10 years old. The benefits of FMNR seen by local communities included more fuel and timber to meet their needs, more animal fodder from browse and undergrowth for their herds and for visiting herds, income from selling surplus cut grass in nearby towns, and the protection of young millet crops from wind and water at the start of the rainy season.

Elsewhere in the region, farmers actively manage a mix of regenerating species. In neighbouring Koro District, FMNR thrives on both sides of the road to Burkina Faso and *Faidherbia albida* is an important species in many places. This may be due to the influence of an earlier agroforestry project run by CARE Mali, which actively promoted the protection of this species in collaboration with the traditional association Ogokana (Boffa 1990; Kerkhof 1990). In Bankass District, it was individual farmer innovators such as Boucary Guindo who first began to selectively regenerate *Faidherbia albida* to improve soil fertility (see below).

The power of example

Boucary Guindo lives in Ogossagou village. In 2004 he started to protect naturally regenerating trees in his fields after hearing about the experiences of the Barahogon association. But he wanted to grow more *Faidherbia albida* trees (called balanzan in Mali), since they increase crop yields. There were very few mature trees nearby, so he decided to give natural regeneration a helping hand by collecting the pods, feeding them to penned sheep and goats and then planting the manure and pre-digested seed mixed in pockets on his fields. Boucary said that only two other neighbouring families did the same, and most people thought he was crazy. Later, he persuaded the village chief to introduce a rule that people can cut trees only in fields that they themselves cultivate. He believes that this will pave the way for many more households to adopt FMNR techniques in the future.

During a three-day workshop and parallel interviews in Bankass District in 2008, local farmers noted improved millet harvests, resulting from both the physical protection of soils (“winds no longer bury millet shoots”) and enhanced soil fertility (“leaves decompose and enrich our fields”). Farmers also observed that so much more grass and foliage was available for livestock in the dry season that a surplus could be cut and sold. FMNR reduced the time and effort required for women and girls to collect fuelwood, since they can now use the branches that the men prune from trees when preparing their fields. And farmers also noted that there was less tension (fewer conflicts) between villagers over natural resources, and stronger relationships had developed.

Interestingly, the findings suggested that farmers who cultivate fields that are “borrowed” from the families who first occupied and cleared the land have also adopted FMNR techniques, despite tree planting being strictly forbidden by customary tenure arrangements. This indicates that “first occupant families” have accepted FMNR as a mark of good stewardship of their land, rather than as something that will undermine their customary rights.



Fuelwood from naturally regenerated trees. Photo: Sahel Eco.

Lessons learned

These six factors were seen to have contributed to successful tree regeneration in the area between Ende and Bankass.

- *A favourable institutional and legal context.* This included the introduction of multi-party democracy in 1991, followed by decentralization of local government, the revision of the forestry law in 1995, and the first municipal elections in rural areas in 1999.
- *A tradition of environmental protection at the community level.* Local people consider members of the Barahogon association to have a legitimate role in drawing up and enforcing regulations that govern access to natural resources.
- *A core group of enthusiastic and committed people.* These people from the village of Ende took the initiative to revive the local Barahogon institution by building support in neighbouring villages, registering the association, defining its bylaws and initiating patrols.
- *Training of the local association and other key stakeholders.* This included training in forestry legislation, and in basic literacy in their local language, and exchange visits to learn about field tree management techniques.
- *Ongoing moral support from local community leaders, politicians and NGO staff.* This was particularly important when communities challenged the practices of others, such as foresters and wood cutters from nearby towns.
- *Use of innovative communications.* A local-language film, radio broadcasts and brochures allowed information to be disseminated widely in the Mopti region, and a strategy for wider-scale dissemination within Mali and across the Sahel was proposed.



Award presentation by Sahel Eco to recognize regreening champions. Photo: Sahel Eco.

Informing future activities

The effectiveness of future activities can be increased by taking account of the following considerations, and the single most important factor that limits the adoption of good agroforestry management in Mali is the widely held misconception that farmers do not have any rights to protect and control access to the trees on their land. In 1999, when a senior forester confirmed this with local leaders from Ende, they decided to organize themselves and take action. They paid for announcements on the local radio station to inform neighbouring villages that — with or without an official permit— non-residents would no longer be allowed to cut firewood or timber on their agricultural land. With the support of village chiefs, they also introduced a community bylaw forbidding the cutting of trees on fields or fallow land without permission from the respective head of household. This simple rule is strictly enforced, but each head of household is free to decide whether or not to adopt FMNR techniques on his or her land.

Enabling legislation is necessary, but does not in itself necessarily bring about the desired changes in behaviour. To be effective, the introduction of a new law must be accompanied by discussions among all stakeholders to ensure they have a shared interpretation of how the law will be applied, enforced and evaluated. Mali's 1995 forest law, for example, allowed farmers to manage their own agroforests, but the forestry service did not give any clear instructions about how this should be done. Furthermore, foresters were evaluated on the income they raised from selling timber permits and levying fines, undermining any incentive they might have to promote FMNR.

Good agroforestry practices should be promoted as an essential component of improving agropastoral production systems and enhancing food security in the Sahel. This was the principal motivation for farmers in Bankass to adopt FMNR and invest in tree protection, with increased fuel and fodder supplies being key to ensuring that women and herders also benefitted.

Community regulations and enforcement systems must be perceived as legitimate by local people. This is best achieved by building on traditional institutions, where they still exist and are respected, and by ensuring that women and herders (resident and transhumant) are involved when drawing up appropriate rules of access. New systems must not contradict any formal legislation, but they do not necessarily need to be written down. Formal endorsement of local conventions or adoption of bylaws by the local municipal council may help to secure compliance in the long term, particularly by “outsiders,” but this has yet to be tested in Bankass.

Training, information and other support activities should target elected local government officials and state administrative and technical staff as well as farmers. Training should include the district judge and agents from the agriculture and livestock extension services, as their support is crucial to the widespread adoption and success of FMNR. In addition, joint training sessions and exchange visits are useful for building relationships and developing alliances between community representatives, local government officials and civil servants.

Conclusions

The adoption of FMNR increased by 50% over 20 years; about 90% of all farmers now encourage natural regeneration on the land that they manage. The key to success is having local institutions that are respected and effective. The experience in Bankass shows that reforestation rates of at least 250 trees per hectare can be achieved by farmer managed natural regeneration on Sahelian agricultural lands, recreating an agroforestry parkland at a fraction of the cost of establishing conventional plantations. Lessons learned about FMNR and key factors for its success include the critical importance of effective local institutions and of their good working relationships with communes, community-based associations, government extension services, and NGOs.

The Barahogon traditional association was formally registered 20 years ago and has been promoting FMNR ever since. The strength of these traditional institutions is remarkable, given the constantly changing context, including the adoption of new legislation and regulations, the near-doubling of the sedentary population in the area, added pressure on access to land and natural resources, and increased security concerns.

The current situation in Mali has exacerbated intercommunity tensions, in particular between the Dogon (traditionally farmers) and Peulh (traditionally pastoralists) (Toulmin et al. 2020). Also, because one of the country’s jihadi leaders is Peulh, many people assume that all Peulh are jihadists, and there are accusations of extrajudicial killings by the military and of attacks by local militia from both sides. Due to this deteriorating security, the management of natural resources is a lesser priority for local communities, whose lives and livelihoods face more immediate threats. Many people — both Dogon and Peulh — have fled the district, and some may never return. If local institutions are to continue to contribute to the management of natural resources, they will require backing from national and local authorities. This must be well financed over the long term, and supported by capacity building and training for their leaders.

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