



INSIDE STORIES

on climate compatible development

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Key messages

- Farmer Managed Natural Regeneration brings increased crop yields, income and food security to impoverished rural communities in Niger. It also holds climate change mitigation potential.
- Honouring local wisdom is key to the success of Farmer Managed Natural Regeneration – farmers can play a central role in experimenting, innovating, communicating potential benefits, and advocating behaviour change.
- Winning the support of opinion leaders and authorities is important in tackling farmers' initial resistance.

From vulnerability to resilience: Farmer Managed Natural Regeneration (FMNR) in Niger

Challenging climatic conditions, limited arable land, intense population pressures and a history of political upheaval have undermined Niger's development prospects – 60% of its people live on less than \$1 per day. For decades, Nigerien farmers cleared their fields of native trees and shrubs, exposing their crops to the fierce Sahelian winds. Over the past twenty years, however, Farmer Managed Natural Regeneration (FMNR), in combination with other improved soil and water conservation practices, has helped reverse this trend. Today, almost half of all cultivated land in Niger is studded by trees, shrubs and crops; between a quarter and one half of all farmers have adopted and promoted FMNR, and at least 4.5 million people are reaping the benefits – on approximately five million hectares of land. Local communities are moving from vulnerability towards greater resilience as FMNR brings increased crop production, income and food security to impoverished rural communities. This brief aims to provide an overview of FMNR and its benefits, assess the key elements that catalysed its success, and summarise its most important lessons.

The widespread adoption of FMNR practices in Niger was, to a very large extent, due to word-of-mouth. The program began with a few brave pioneers and expanded when neighbours witnessed the visible agricultural and economic improvements created by these changes. Once farmers understood the relative ease of FMNR, its benefits and the speed of its impact they shared the good news with their neighbours. FMNR adapts centuries-old methods of managing tree species that re-sprout vigorously after being cut to produce continuous harvests of trees for fuel, building materials, food and fodder

– without the need for frequent, costly replanting. Trees are trimmed, and small branches regularly pruned, to provide fuelwood, poles and other products. This also promotes more favourable growing conditions for crops by providing for *inter alia* increased water infiltration and retention, a reduction in wind speed, a reduction in local temperatures due to dispersed shading, and additional organic matter from leaf fall and litter, as compared to when trees are cut down altogether. The potential to increase soil fertility is critically important in the light, sandy soils common in Niger. Moreover, the growing season on land with trees

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is longer because farmers only have to sow once, compared with twice or more on fields unprotected from the elements. The trees also provide regular harvests of edible fruits, leaves, seed pods and fodder for livestock. FMNR does not require establishment of tree nurseries, sourcing of superior seed, transportation of seedlings, planting out or special care. The farmer selects sprouts from the stumps of a tree and decides how many stems will be allowed to grow on each stump. Excess stems and side branches are pruned off every 2–6 months, stimulating faster growth rates and producing straighter stems, which are more valuable than unpruned stems.

Project implementation costs are approximately \$10 per hectare (ha), compared to \$200 or more per ha for tree planting schemes, allowing farm restoration at significantly reduced costs. FMNR also has a 100% survival rate compared to variable rates for planted trees.

One stone, many birds: the benefits of FMNR

Through FMNR, very rapid and large-scale restoration of tree cover is possible. Stems sprouting from tree stumps have a much deeper root system to draw water and nutrients, than do newly germinating or freshly planted seedlings. Thus growth rates of two and three meters per year for the first few years are not unusual for sprouts managed through FMNR, in comparison to 20–40 cm per year for planted seedlings.

One of the more immediate and obvious benefits of FMNR is the availability of fuelwood from pruned tree branches. From the first year, communities are able to harvest light fuelwood; and from the second year, to cut branches to sell in local markets for much-needed extra income. According to conservative estimates, farmers

regenerating 40 stumps on a 1 ha field could earn an additional \$140 per year – half the average annual income of a poor farming household. Earlier studies indicate that in 100 villages alone, about \$600,000 worth of wood was sold between 1985 and 1997.

Trees also yield direct non-timber benefits. While most non-timber tree products are consumed by farming families, some districts have generated significant income from their sale. This is especially true in the Zinder Region, where there is strong regeneration of baobab trees in the Mirriah department (a Nigerien administrative district). Each baobab can bring in an average of \$20 a year, just from the sale of its edible leaves. Fifty baobabs per ha, on a typical 2–3 ha farm, can bring in \$2,000–3,000 per year, translating to an additional \$6 per day per household – a significant increase on the national average income of less than \$2 per day.

Farmers practicing FMNR, who are able to stockpile some grains during good years and to harvest trees for food and income, are better insulated against the cyclical droughts that have plagued Niger for the past 50 years, and which are predicted to increase as a result of climate change.

FMNR has had especially important benefits for women, who have been relieved significantly of the burden of gathering fuelwood, with average time spent on fuelwood collection falling from 2.5 hours to half an hour.

There is also anecdotal evidence to suggest that FMNR has climate mitigation benefits. According to experts the *Faidherbida albida* parkland in the Diourbel region of Senegal stores 30 tons of carbon/ha (Reij, personal communication, 2011). If farmers protect and maintain their on-farm trees, it is reasonable to assume that carbon sequestration in Niger's new agroforestry parklands can reach an

average 12 ton/ha, which would bring the carbon storage in Niger to 60 million tons (Reij, personal communication, 2011). This is an estimate of carbon stored on 5 million ha of restored, regenerated parkland – an area confirmed through remote sensing analysis. Additional research is needed to fully explore, and quantify, the full mitigation potential of FMNR.

Key lessons

There is no *single* actor, policy or practice behind the results seen in Niger. Success lies in combining the following elements to create a dynamic enabling environment:

The farmer as champion

Farmers have played a central role in providing feedback, monitoring progress and continued refinement of approaches. Local champions – community leaders – investigate root causes of problems, explore options, test hypotheses, envision what is possible, innovate, experiment, communicate potential benefits, advocate behaviour change and generate a groundswell of additional practitioners. When promoting FMNR, resist the temptation to impose an external blueprint. The right environment allows farmers to experiment with FMNR and devise methods that suit their needs, honouring their wisdom and elevating their position to that of FMNR researcher/expert. It also minimises dependence on external expertise and speeds up the transfer from international to local ownership of FMNR indigenisation of FMNR.

Farmer engagement is not without its challenges: some community members will feel threatened by the potential loss of access to trees and fodder, and exposure of illegal activities. It is important to win the support of opinion leaders and authorities such as chiefs, traditional land custodians and religious leaders. Farmer resistance should not be underestimated – farmers who are

used to being excluded from forest benefits are often sceptical at first about collaborating with NGOs and government forestry departments in tree regeneration. They fear that trees left in fields will reduce crop yields, or that others will steal the wood, or that the government will forbid harvesting of the wood.

Good governance is critical

In a bid to protect trees, many governments make it illegal for communities to harvest (cut down) trees; although well-intentioned, this directive commonly has the opposite effect. When communities that depend on the natural environment for their livelihoods are excluded from its benefits, they are forced to act illegally. For long periods this was the common practice in Niger. Exclusion policies leave those who are best placed to protect and sustainably manage resources with no incentive to do so, hence, in time, the forest disappears. It is critically important to work with policy-makers and relevant government departments to change this paradigm.

Governments are advised to invest in stable and secure land tenure. Secure land tenure can be achieved through customary arrangements, traditional land use/resource management regimes, or modern, titled and registered private property regimes.

On the markets front, governments should invest in rural road networks and means of transport required to move goods to markets. They should ensure free and open access to markets, and a market-based pricing system, with minimal interference from regulatory bodies and state controls. In the past, farmers could buy permits for harvesting and selling wood, but most would not bother because of the distance they would need to travel in order to purchase them. Following the adoption of FMNR, a number of rural wood markets sprung up and forest agents were stationed

there on market days, enabling farmers to purchase permits on the spot. This made for a more transparent process, increasing forestry department revenue while making it easier for farmers to acquire permits.

Forestry departments in particular may feel that FMNR challenges everything they have done to date and if not handled carefully, FMNR promotion could be viewed as a threat, with subsequent hostility and stonewalling on the part of authorities. In Niger, international donors and NGOs promoted new land management practices, facilitating government reforms that enabled community experiments to reach national scale. External influence from civil society organisations and the international development community is an essential part of an improved governance framework, and in the case of Niger, proved to be a vital catalyst for FMNR.

Tony Rinaudo, who spent the 1980s and 1990s working in Niger with Serving In Mission (SIM) was pivotal to this effort. He argued that tenure rights, combined with the prospect of new income from timber products, would give farmers an incentive to protect the trees on their land. This was championed in parallel with practical steps to re-evaluate and change common land-clearing and field-preparation methods, and to protect and manage sprouts regenerated from tree stumps (Rinaudo, personal communication 2011). Today FMNR is also being utilised in community-managed forest regeneration projects in countries such as Ghana and Ethiopia.

The American and German governments, and the World Bank, provided intellectual input; conducted research on the economic co-benefits of FMNR, funding and land management expertise; and applied pressure for policy reform (Winterbottom, personal communication 2011). The government of Niger responded by increasing the security

of land tenure, revising Forest Law, clarifying property rights for trees, and bringing about institutional reforms in the Forest Service. Subsequent changes in the role and conduct of Forest Service field agents reduced barriers to the adoption of FMNR – creating incentives and a more favourable environment, overall, for FMNR.

Information is key

SIM project intervention lasted a number of years. The project sent staff and lead farmers to various districts in Niger to train farmers. Peace Corps interns came to SIM for part of their orientation and introduced FMNR widely across the nation. Various other NGOs, including CARE and the Netherlands development organisation SNV, brought staff and farmers to Maradi – a region in south-central Niger where international NGOs had decided to focus initial interventions – to share experiences.

Ultimately, FMNR is less about investment than about knowledge management – farmer-to-farmer visits, extension and outreach, networking, practical training and demonstration sites all facilitate dissemination of knowledge.

Implications

- FMNR is an example of a climate compatible development practice that evolved through a partnership among grassroots stakeholders (in this case, farmers), external experts and supporters. While local buy-in is key to success, external agencies including international voluntary organisations and donors can provide a catalytic role in seeding new practices and strengthening the indigenous skill base. This practice benefited from persistent international support over a period of decades, which helped to sustain greening efforts even when political conditions were difficult.

- FMNR demonstrates how an appropriate technology can be replicated and scaled up from the grassroots level.
- Harnessing and applying appropriate technology to support climate compatible development needn't be about investing in expensive infrastructure. It is as much about local relevance and effective knowledge management and communication.
- Addressing property and land use rights is fundamental to the successful uptake of environmentally sustainable practices in the forest and land use sector, just as it is in other areas of climate compatible development.

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The Climate and Development Knowledge Network (CDKN) aims to help decision-makers in developing countries design and deliver climate compatible development. We do this by providing demand-led research and technical assistance, and channelling the best available knowledge on climate change and development to support policy processes at the country level.

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