



## Boosting FMNR in the Sahel for the UN Decade of Restoration

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### Background

Farmer Managed Natural Regeneration (FMNR) is a low-cost natural reforestation technique ([Botoni et al. 2010](#)) that has the potential to reduce desertification, contribute to land restoration, and increase vulnerable communities' resilience to climate change across Great Green Wall countries. FMNR has been identified as a promising way to improve woodlands across the Sahel by the Great Green Wall initiative. The practice of FMNR was developed in Niger following the discovery of an underground forest of tree stumps, roots, and seeds that can be used to regrow native trees and shrubs in previously clear-cut fields (Carey 2020). It entails selectively pruning tree suckers— vegetative growths that stem from the tree's root system— to encourage additional growth of the tree's trunk. The practice also involves limiting how much regenerated greenery can be used for fodder, organic matter, or firewood ([Reij and Garrity 2016](#)). Within four to five years, growth-selected stems can reach a significant size and provide environmental services such as animal habitat and sun and wind protection, in addition to products such as fodder and timber ([Binam et al. 2015](#); [Weston et al. 2015](#)). Since its development, FMNR has spread to 7 million hectares of cropland in Niger and now occupies about 21 million hectares across the Sahel (Reij and Garrity 2016; Garrity and Bayala 2019).

### Benefits of FMNR

FMNR restores native tree species rather than planting new trees. Newly planted trees often have low survival rates (Wade et al. 2017) and exotic species can disrupt local ecosystems. FMNR is less expensive than planting new trees and regenerated trees are easier to care for and tend to have a higher survival rate than new trees, making the practice more appealing to smallholder farmers ([Binam et al. 2015](#); [Chomba et al. 2020](#); [Toudou et al. 2020](#)). Additionally, regenerated forests maintain native species composition (Wade et al. 2017), improving the ecological balance of the environment and maintaining biodiversity (Binam et al. 2015; Ellison and Speranza 2020).

FMNR also has several advantages in terms of increasing farmers' resilience to climate change ([Ellison and Speranza 2020](#)). First, the fruits and leaves of regenerated trees can serve as additional sources of food and income for farmers' households, particularly during the long dry season when farming households face low agricultural yields. Aerial fodder made up of leaves and pods can also be used to feed animals during the long dry season when standard animal feeds may be unavailable ([Botoni et al. 2010](#)).

Second, in addition to protecting crops from wind and reducing erosion and evaporation, the presence of trees enriches soil through the decomposition of tree litter and nutrients from animals that live on or under the trees ([Bayala et al. 2014, 2020](#)). Regenerated trees also sequester atmospheric carbon and increase carbon concentrations in soil, which can help combat climate change (Binam et al., 2015; Bayala et al., 2020).

### **Barriers to scaling up FMNR**

First, the lack of formal land rights among smallholder farmers discourages medium- and long-term investments in land management, such as tree growth. In many Sahelian regions, the right to land is passed down from father to son informally and women are frequently excluded. In some areas, the lack of secure legal land rights or contracts that are recognized and respected by the community discourages farmers from investing their resources, whether time, effort, or money, for medium- to long-term benefits. FMNR techniques, which only provide benefits after a few years, are thus not always appealing. In Niger, for example, farmers tend to invest more manpower in the land that they own rather than the land that they borrow (Gavian and Fafchamps 1996). Under customary tenure, landowners may have a greater incentive to plant trees on their land if tree planting can help reduce threats of land confiscation or eviction, though, in the absence of tenure security, farmers may have less incentive to plant trees on their land (Barbier and Tesfaw 2013).

Second, the absence of genuine and inclusive local forest governance in villages ([Binam et al. 2017; Toudou et al. 2020](#)) has an impact on the practice of FMNR. In the absence of community regulation, farmers may not practice FMNR because their neighbors may illegally cut down their trees in search of firewood or fodder. Community adherence to FMNR practices, cross-villages bylaws, local conventions for tree protection, and forest monitoring committees are likely necessary for the success of FMNR projects.

Third, some tree protection regulations disincentivize farmers from growing trees through the use of FMNR. A major barrier to FMNR adoption is the lack of national regulations that ensure farmers have the legal right to harvest non-timber and timber forest products produced by trees grown using FMNR. Many native species grown through FMNR are classified as protected species by ministries in charge of the environment. Often, such species cannot be pruned, felled, or marketed without a license, and cutting trees without a license often results in large fines for farmers (Garrity and Bayala 2019). Farmers in Niger, for example, had no legal right to harvest the fruits of the trees grown through FMNR practice until the [FMNR decree](#) was passed in July 2020. Because regulations prevent farmers from utilizing the native trees on their land, farmers may opt to plant exotic trees that are exempt from such regulations rather than regenerate indigenous trees or may remove young trees from their lands to avoid being fined (Garrity and Bayala, 2019). National governments need to revise forestry legislation and pass agricultural development policies that incentivize land users to invest in trees by recognizing farmers' rights to own, manage and harvest the local species they have nurtured in their farmlands.

Finally, farmers' preferences for tree species frequently differ from the tree species grown using FMNR. FMNR only permits the growth of tree species whose stumps are already present in the soil, which farmers may not choose to grow if those species do not meet their needs. Assessing the species composition and regeneration potential of woodlands to be restored is recommended when employing FMNR so farmers may plant tree species if needed ([Lohbeck et al. 2020](#)).

### **Need for adequate regulatory systems**

Restrictive environmental regulations can disincentivize farmers from managing trees if they prevent farmers from making use of the trees grown on their lands. Relaxing policies has led to significant greening in Mali and Niger ([Yatich et al. 2014, 2016](#)), though Sahelian governments must continue to work with farmers to protect both farmers' livelihoods and the regenerated woodlands (Yatich et al. 2008). There is also a need at the community level to pass local reforms to bush fire setting and free-grazing practices so as not to damage newly-regenerated woodlands, such as incorporating controlled fires, rotational grazing areas, and the promotion of livestock corridors to scale-ups of FMNR projects ([Binam et al. 2017](#); [Garrity and Bayala 2019](#)).

**While FMNR has been shown to be successful in individual plots**, scaling FMNR to the landscape and community level is a challenge. Widespread effects may not be achievable unless communities can organize themselves and develop enforceable bylaws for managing the trees. A good example is what has been accomplished in Dan Saga in Niger ([Garrity and Bayala 2019](#)).

### **Future research**

Even though the evaluation of FMNR's impacts has often been done on a small scale and despite its low cost, ease of implementation, and potential ecological and economic benefits, quantitative evidence on FMNR outcomes at scale in the Sahel is limited (Chomba et al. 2020). Some large-scale surveys have revealed positive socioeconomic impacts (Binam et al., 2015) as well as an increase in soil carbon sequestration (Bayala et al., 2020), though additional quantitative research is needed to understand the levers that can amplify FMNR's impact in each Sahelian country.

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