



For further information Contact -

Tony Rinaudo
tony.rinaudo@worldvision.com.au
World Vision Australia
1 Vision Drive
East Burwood
Vic 3151

Peter Cunningham
peter.cunningham@sim.org
SIM
BP 121
Maradi
Niger Republic

In what was once a degraded wasteland that could not sustain millet production, Halidou surveys a productive field of millet made possible through the practice of farmer managed natural regeneration. In addition to increased millet yields, Halidou harvests fodder, firewood and building poles from his regenerated trees. Find out how barren fields, degraded forests and grazing lands can be reforested without planting a single tree.

World Vision



SIM
Serving In Mission

What is Farmer Managed Natural Regeneration?

Many tree species have the ability to sprout from stumps and roots (Photo a.) after they are cut down. Globally, millions of hectares of seemingly treeless farm (Photo b.) and grazing lands still contain living tree stumps with this ability to sprout new shoots (stems). Trees also have regenerative capacity from soil seed banks. However, continuous grazing, cutting for firewood and clearing and burning for land cultivation deny these seeds and stems the chance to become trees.

The basic method of FMNR is very simple. The farmer selects the stumps he/she will utilize and decides how many stems will be allowed to grow on each stump, based on the farmers' needs and ultimate purpose for reforestation. Excess stems are then cut. With the remaining stems, side branches are pruned off up to half way up the trunk. A good farmer will return each 2 to 6 months for a touch up pruning and thereby stimulate faster growth rates and produce straighter stems.

There is no set system or hard and fast rules for FMNR. Farmers are given guidelines but are free to choose the number of stumps per hectare and stems per stump to leave; the time span between subsequent pruning and harvest of stems and the method of pruning.

Right. 'Barren' field

Seemingly treeless fields may contain seeds and living tree stumps and roots which have the ability to sprout new stems and regenerate trees if given a chance. Even this 'bare' millet field in West Africa contains hundreds of living stumps per hectare which are buried beneath the surface like an underground forest.



Above. Shoots sprouting from tree stump

FMNR depends on the existence of living tree stumps, tree roots and seeds in the fields, grazing lands and degraded forests to be re-vegetated. New stems which can be selected and pruned for improved growth sprout from these stumps and tree roots.

Sprouting tree stumps and roots may look like shrubs and are often ignored or even slashed by farmers and foresters alike. However, with culling of excess stems and by selecting and pruning of the best stems, the re-growth has enormous potential to rapidly grow into trees.



FMNR STEPS

Step 1.

Do not automatically slash all tree growth, but survey your farm noting how many and what species of trees are present.



Step 2.

Then select the stumps which will be used for regeneration.



Step 3.

Select the best five or so stems which will be pruned and cull unwanted ones. In this way, when a farmer wants wood he/she can cut the stem(s) that are needed and leave the rest to continue growing.

These remaining stems will increase in size and value each year, and will continue to protect the environment and provide other useful materials and services such as fodder, humus, habitat for useful pest predators and protection from the wind and sun. Each time one stem is harvested, a younger stem is selected to replace it.



Tag selected stems with a colored rag or paint. Work with the whole community to draw up and agree on laws which will protect the trees being pruned and respect each person's rights. Where possible, include government forestry staff and local authorities in planning and decision making.



What tree species can be used in FMNR?

The important determinants of which species to use will be: the particular species occurring in a field having the ability to re-sprout after cutting; the value local people place on those species and the farmers objectives in practicing FMNR.

For example, on farmland, farmers may not want to leave species known to depress growth of annual crops and may want to select trees which produce fruit or firewood and/or which are beneficial to annual crops.

On grazing lands, farmers may have a preference for known fodder trees and in degraded forest land, all species may be encouraged if maximizing biodiversity is the goal.

What tools are used to prune trees?

The best implement to use is a saw because it provides a clean cut. However, few farmers in developing countries can afford to buy one. In fact, a wide range of commonly owned tools can be used, including axe, machete, harvesting knife and even hoe. The main requirements are that the tools be sharp and that cuts are always made in an upward motion, not in a downward motion. The objective should be to make a clean cut with minimal damage such as stem bruising or splitting, or stripping of bark. Different tree species may require different pruning techniques, something that can be determined by farmer experimentation and observation.



Who can practice FMNR?

With a little training, women and men, boys and girls, farmers and herders can practice this simple activity. It really depends on the community, the culture and who owns the trees and/or who has the right to utilize them.

When is FMNR practiced?

FMNR is normally practiced in the dry season when labour is more readily available but does not have to be restricted to a particular season.



Above Right: All members of a community can practice FMNR. There is no single way of practicing FMNR. Being 'Farmer' managed, on farmland, each individual chooses the pruning method and timing which suits his/her needs.

Below Left: This Nigerien farmer has only left one stem, allowing it to grow to a full tree size, but each year alternately prunes one or two main side branches. In community based reforestation projects, the community agrees together on the by-laws governing FMNR practice.

Below Right: This Ethiopian community decided amongst themselves when and how to prune, who has the right to benefit from the work, how to protect the forest and punishment for infringements.



Do's & Don'ts

Simple rules of pruning are:

1. Always use sharp implements.
2. Always cut upwards carefully to avoid bruising and stripping of bark.



Don't cut downwards

When cuts are made downwards, the tree can be easily damaged through splitting or the bark may be stripped from the stem (right). Excessive damage will set back the plants ability to re-grow and the wound may become an entry point for disease and insects.

Don't prune too high

If the stems are pruned too high, they may easily be broken by livestock or even strong winds.

Ideally, stems should be pruned up to half way up the trunk while small, and up to two thirds up the trunk once they are over two meters tall.



Protection from Livestock: FMNR re-growth is hardier than transplanted seedlings, and reforestation using FMNR has succeeded even without excluding livestock. However, where possible, it is beneficial to exclude livestock for six months to a year after pruning. Fewer trees will be damaged and better growth achieved if livestock are excluded during this initial period.

Protection from fire: The best protection from fire comes from the community itself. It is important to know the common sources of fire – lightning, accidental escape from cooking fires, deliberate lighting by children or herders wanting to encourage growth of green grass. Once the common causes are known communities can be encouraged to draw up a fire plan which includes both preventative and defensive measures. On the prevention side, activities might include establishing local bylaws against unnecessary burning, establishing a fines system for infringements, clearing fire breaks, educating children and reducing fuel available to burn through regular pruning of trees and either heavy grazing of dry grass or harvesting and removal of dry grass. Additional measures include equipping and training community members on fire fighting and establishing an early warning system.

Why not just plant trees?

The question is not whether to plant tree or to practice FMNR but what is appropriate and cost effective for the situation. There are times when tree planting is required such as when a farmer wants to grow a particular tree species, or when large numbers of a certain species need to be grown in rows.

On the other hand, large scale tree planting schemes often failed, or have not been continued by a community after the 'project' has ended. Tree planting is very costly and time consuming and many communities cannot undertake these activities without external support. Transplanted trees need watering in semi-arid environments and often water is scarce, or communities simply don't have the time to do it.

By contrast, FMNR is very cheap, rapid and replicable without ongoing external or government support. In Niger Republic for example, over a twenty year period, FMNR has spread to over five million hectares of farmland and it has spread largely by word of mouth, from farmer to farmer.

Where is FMNR practiced?

FMNR is practiced on farmland, on degraded forest land and on grazing land. In fact, FMNR can be practiced wherever there are sprouting tree stumps and roots and where the individual or community wishes to restore trees to the landscape.

On individually owned farmland, FMNR is best managed by the farm owner as it is in her best interest to protect the trees. On communal land, it is important for the whole community and external stakeholders such as nomadic herders who frequent the area regularly to jointly manage FMNR. For community management to work, organizational structures such as traditional authority roles or new structures such as cooperatives are needed in order to manage the work and for dealing with issues and for communication purposes.

It is important to note that the decision on where to practice FMNR and the exact method of pruning will largely depend on the individuals and communities themselves. No prescription will be entirely suitable for every situation; hence the emphasis is on the method being 'farmer' managed over other considerations. This allows for great flexibility to suit local conditions and to meet local needs. When community members have the freedom to adapt FMNR to meet their own needs there is a greater chance of successful adoption. For example, in high rainfall areas where woody vegetation may quickly form thick bush, farmers may need to prune heavily and leave only certain species, or where imperata grass has taken over, innovative ways of suppressing grass growth while establishing trees will need to be applied.

Benefits

FMNR contributes directly to:

- women and children's welfare as fuel wood becomes more plentiful and is close at hand.
- human and animal nutrition as many regenerated species provide edible leaves and fruits.
- the local economy through harvest and sale of firewood, poles and non timber products.
- the quality of life by providing shade and beauty and by reducing wind speeds, dust and high temperatures.
- improved water infiltration and hence groundwater recharge.
- increased crop yields by providing shade, wind protection and through soil enrichment.
- rapid, cost effective and large scale land reclamation and forest regeneration.
- bio-diversity with the return of wildlife, rare plant species and natural pest predators.

Caution

While FMNR is a proven method of rapid reforestation, as with all new techniques caution should be exercised when introducing it. Farmers should be encouraged to try FMNR on a small area initially. Certain annual crops may be more sensitive to competition or shading; some tree species may suppress crop growth or be very competitive for scarce water or nutrient resources. Communities may need to be sensitized before introducing FMNR, particularly where there is a history of free exploitation of all tree resources. All stakeholders should be consulted. Nomadic herders may interpret reforestation as a ploy to hinder their access to grazing areas and react negatively. Hence care must be taken to work with all groups, explaining the mutual benefits of reforestation. Considerable effort needs to first go into gaining community consensus and collaboration before promoting FMNR, otherwise, trees may be destroyed.

FMNR is not a fixed science, and so farmers should be encouraged to experiment and work out what practices (e.g. which species, how many trees to manage, their spacing, how and when to prune etc) best meet their needs. While teaching about FMNR many people want to know the specifics on how the pruning is done, which species to use, how many stems to leave etc. Actually, there is no set answer. FMNR is a very flexible approach to reforestation and it is this flexibility seems to give FMNR such universal appeal. The emphasis is and always has been on the "Farmer Managed" part of FMNR. Thus farmers have freedom of choice on how to meet his/her own specific needs, using the free materials at hand (species mix), responding to the specific climate and soils and crop mix and understanding at the time of implementation.

FMNR practice actually varies greatly from region to region and even from farm to farm. In one district of Burkina Faso, farmers only leave trees which are growing approximately in straight lines and they transplant naturally occurring seedlings that germinate in the fields into these lines. Within the rows most of the trees are grown as bushes which are slashed to ground level annually, except for single stems that are allowed to grow about every 12 meters. They choose to do this because they do not like interference with their ploughing and soil infertility is a major issue which they address by mulching with the pruned branches.

In the Maradi region, Niger Republic, farmers leave from very few trees (10 - 20 / hectare) to very many (150 trees+/hectare) in no particular pattern in their fields. Many farmers allow only a single stem to grow from each stump and they harvest it when they have a need or at an optimum time for them. Others leave multiple stems, successively harvesting one each year. Others still allow a single stem to grow into a tree, and then only harvest 1/2 to 1/3rd of the branches per year, but the main trunk is never cut. In Maradi, the main species used in FMNR are *Guiera senegalensis* and *Pilostigma*, which predominantly provide firewood and building poles. However further east in Zinder region, *Faidherbia albida* and *Baobab* are the dominant species being managed and neither of these is good for firewood!

The majority of FMNR activity appears to be based on live tree stumps. However, in the Tahoua region of Niger, FMNR began after farmers dug zai (compost) pits and half moons. Tree seeds in animal and bird droppings germinated in these holes resulting in massive revegetation on what had been a barren moonscape. This growth from seed is now managed under FMNR. In Zinder region, there is a suggestion that the one million or more hectares of *Faidherbia albida* is partially at least generated from the roots of mature trees.

In Niger, FMNR is on individual's farmland and there are no reports of community management of trees on communal land. However, as FMNR is promoted in other countries such as Ethiopia, Ghana and Uganda, there are ample opportunities to not only practice FMNR on farmland but in the extensive degraded forests - and this is now happening. Additionally, the mix of tree species occurring in new countries implementing FMNR are very different to the mix used for FMNR in Niger, West Africa.

Finally, farmers have many different objectives in mind when they practice FMNR, including - soil fertility, wind break, fire wood and building poles - for home consumption and sale, fruits, edible leaves, fodder, erosion control, reversal of land degradation, aesthetics, medicines, income generation, social acceptance etc. Ultimately it is the mix of objectives a farmer has in practicing FMNR that will determine the type of FMNR practiced.

Interestingly, NGOs and forestry personnel invariably ask for specifications – “what species, how many, when and how to prune?”, whereas farmers ask questions like - how can I possibly leave trees on my field since they will shade the food crops and reduce the yields?” When it is explained that the farmers are the experts, and/or that the farmer will know through experimentation which trees to leave and how to prune, and it is them who will make the choices, they relax. This is very, very important - if a farmers objective is to increase food production, she does not want to be forced to do something that 'she knows' will reduce yields. Effectively, your role is to give farmers the freedom and the confidence that ultimately, they are in charge, and they will decide on what to do - not the forestry officer and not the NGO extension agent. This document simply provides some ideas and guidelines on possible ways to practice FMNR.