



## Farmer Managed Natural Regeneration Niger

**FMNR is the systematic regeneration of living and sprouting stumps of indigenous vegetation which used to be slashed and burned in traditional field preparation.**

The naturally occurring seedlings and/or sprouts are managed and protected by local farmers. Most suitable are species with deep roots that do not compete with crops and have good growth performance even during poor rainy seasons. In the case study area the three most valuable species – as perceived by land users – are *Faidherbia albida*; *Piliostigma reticulatum* and *Guiera senegalensis*.

This option allows idle land to become a productive resource during an otherwise unproductive eight-month dry season.

The ideal density, when grown with cereal crops, is between 50 and 100 trees per hectare. For each stump, the tallest and straightest stems are selected and side branches removed to roughly half of the stem height. Excess shoots are then removed. Regular pruning of any unwanted new stems and side branches stimulates growth rates. Farmers are encouraged to leave 5 stems / shoots per tree, cutting one stem each year and letting another grow in its place. On removing a shoot, the cut leaves are left on the surface where they reduce erosion and are then eaten by termites, returning the nutrients to the soil. The remaining shoots continue to grow, providing a continuous supply of wood. From the first year, firewood is collected from trimmings. From the second year on, cut branches are thick enough to sell. A more intensive form of FMNR is to profit from every stump sprouting on the land.

FMNR is a simple, low-cost and multi-benefit method of re-vegetation, accessible to all farmers, and adapted to the needs of smallholders. It reduces dependency on external inputs, is easy to practice and provides multiple benefits to people, livestock, crops and the environment. Tree layout will need to be carefully considered if ploughs are used for cultivation.

**left:** New tree sprouts in front of the farmer, harvested wood in the background. Note the proximity of the crop (millet) to the tree without detrimental effect (Photo: Tony Rinaudo)

**right:** Re-sprouting tree stumps and roots: the basis of FMNR (Photo: Tony Rinaudo)

**Region:** Maradi

**Technology area:** 50000 km<sup>2</sup>

**Conservation measure:** vegetative, management

**Stage of intervention:** rehabilitation / reclamation of denuded land

**Origin:** Developed through land user`s initiative, 10-50 years ago

**Land use type:**

**Cropland:** Annual cropping

**Land use:**

**Cropland:** Annual cropping (before),

**Mixed:** Agroforestry (after)

**Climate:** semi-arid, tropics

**WOCAT database reference:**

T\_NIG024en

**Related approach:**

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## Classification

### Land use problems:

Deforestation, Wind erosion, Water deficiency, Movement of sand dunes (land user's point of view)

#### Land use



Annual cropping  
Cropland: Annual cropping (before)  
Mixed: Agroforestry (after)  
rainfed

#### Climate



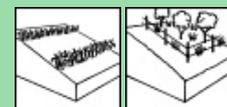
semi-arid

#### Degradation

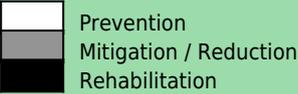
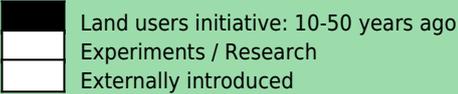
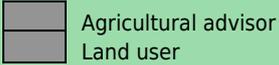


Soil erosion by wind: loss of topsoil, deflation and deposition, Biological degradation: reduction of vegetation cover, quantity / biomass decline

#### Conservation measure

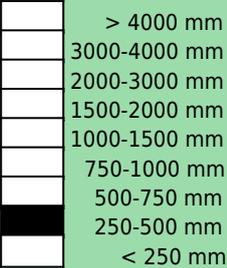
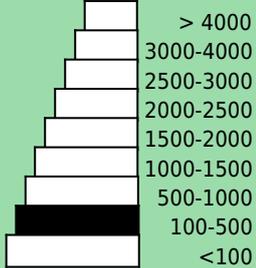
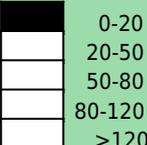


vegetative: Tree and shrub cover management: Change of land use type

<b>Stage of intervention</b>	<b>Origin</b>	<b>Level of technical knowledge</b>
		
<b>Main causes of land degradation:</b>		
<b>Main technical functions:</b> <ul style="list-style-type: none"> <li>- increase in organic matter</li> <li>- increase in nutrient availability (supply, recycling,...)</li> <li>- reduction in wind speed</li> <li>- increase of biomass (quantity)</li> <li>- promotion of vegetation species and varieties (quality, eg palatable fodder)</li> </ul>		<b>Secondary technical functions:</b> <ul style="list-style-type: none"> <li>- control of raindrop splash</li> <li>- increase of infiltration</li> </ul>

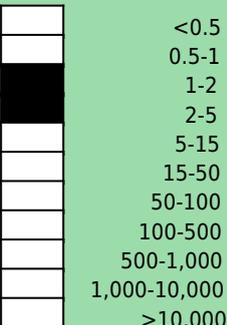
## Environment

### Natural Environment

<b>Average annual rainfall (mm)</b>	<b>Altitude (m a.s.l.)</b>	<b>Landform</b>	<b>Slope (%)</b>
			
<b>Soil depth (cm)</b>	<b>Soil fertility:</b> low <b>Topsoil organic matter:</b> low (<1%) <b>Soil drainage/infiltration:</b> poor (eg sealing /crusting)		
			

**Tolerant of climatic extremes:** temperature increase, seasonal rainfall increase, seasonal rainfall decrease, heavy rainfall events (intensities and amount), wind storms / dust storms, droughts / dry spells

### Human Environment

<b>Cropland per household (ha)</b>	<b>Land user:</b> Individual / household, Small scale land users, disadvantaged land users <b>Population density:</b> 10-50 persons/km2 <b>Land ownership:</b> individual, not titled <b>Land use rights:</b> individual <b>Relative level of wealth:</b> poor very poor	<b>Importance of off-farm income:</b> : <b>Access to service and infrastructure:</b> <b>Market orientation:</b> mixed (subsistence and commercial) <b>Mechanization:</b> manual labour <b>Livestock grazing on cropland:</b>
		

## Implementation activities, inputs and costs

<b>Establishment activities</b>	<b>Establishment inputs and costs per ha</b>									
<ul style="list-style-type: none"> <li>- Remove excess shoots, leave the cut leaves on the surface</li> <li>- Prune any unwanted new stems and side branches (each 2-6 months)</li> <li>- Select 50 - 100 stumps per hectare for regrowth during the dry season</li> <li>- Select the tallest and straightest stems and prune side branches to roughly half the height of the stem (using sharpened axe or machete and cutting upwards carefully)</li> </ul>	<table border="1"> <thead> <tr> <th>Inputs</th> <th>Costs (US\$)</th> <th>% met by land user</th> </tr> </thead> <tbody> <tr> <td>Labour</td> <td>6.00</td> <td>100%</td> </tr> <tr> <td><b>TOTAL</b></td> <td><b>6.00</b></td> <td><b>100.00%</b></td> </tr> </tbody> </table>	Inputs	Costs (US\$)	% met by land user	Labour	6.00	100%	<b>TOTAL</b>	<b>6.00</b>	<b>100.00%</b>
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Labour	6.00	100%								
<b>TOTAL</b>	<b>6.00</b>	<b>100.00%</b>								

Maintenance/recurrent activities	Maintenance/recurrent inputs and costs per ha per year		
<ul style="list-style-type: none"> <li>- Cut one stem (per tree) each year and let another grow in its place</li> <li>- Once the stems selected for growth are &gt; 2 meters high, they can be pruned up to two thirds</li> <li>- Prune any unwanted new stems and side branches (each 2-6 months)</li> </ul>	Inputs	Costs (US\$)	% met by land user
	Labour	4.00	100%
	<b>TOTAL</b>	<b>4.00</b>	<b>100.00%</b>

**Remarks:**

Main costs are in the form of labour. One man could prepare one hectare in 1-3 days, depending on tree density (labour is undertaken by the farm owner and rarely through paid labour). No inputs used; no extra tools needed, tools are available on-farm (hoe, axe, machete etc). Maintenance costs depend on tree density also and could require 1-2 days/year/ha. Annual income from selling wood: US\$ 140 (from the 6th year after implementation). By some estimates, total benefit per hectare (incl. wood sales, increased crop yield, increased livestock productivity, wild foods and medicines etc) are in the order of US\$ 200/ha, compared to an investment in labour US\$ 10-15.

**Assessment**

Impacts of the Technology	
<b>Production and socio-economic benefits</b>	<b>Production and socio-economic disadvantages</b>
<ul style="list-style-type: none"> <li>+++ increased crop yield</li> <li>+++ increased wood production</li> <li>+++ increased farm income</li> <li>++ decreased workload</li> <li>++ increased livestock production</li> </ul>	
<b>Socio-cultural benefits</b>	<b>Socio-cultural disadvantages</b>
<ul style="list-style-type: none"> <li>+++ improved food security / self sufficiency</li> <li>+++ improved quality of life</li> </ul>	
<b>Ecological benefits</b>	<b>Ecological disadvantages</b>
<ul style="list-style-type: none"> <li>+++ reduced wind velocity</li> <li>+++ improved soil cover</li> <li>+++ increased nutrient cycling recharge</li> <li>+++ increased soil organic matter / below ground C</li> <li>+++ increased plant diversity</li> <li>+++ increased beneficial species</li> <li>+++ increased biological pest / disease control</li> <li>+++ increased / maintained habitat diversity</li> </ul>	
<b>Off-site benefits</b>	<b>Off-site disadvantages</b>
<ul style="list-style-type: none"> <li>+++ Urban populations benefit from cheaper, sustained wood supply and reduced incidence of dust storms</li> </ul>	
<b>Contribution to human well-being / livelihoods</b>	
+++	

Benefits /costs according to land user			
	<b>Benefits compared with costs</b>	<b>short-term:</b>	<b>long-term:</b>
	<b>Establishment</b>	positive	very positive
	<b>Maintenance / recurrent</b>	positive	very positive
Annual income from selling wood: US\$ 140 (from the 6th year after implementation).			

**Acceptance / adoption:**

100% of land user families have implemented the technology voluntary. Spread has been largely spontaneous, with minimal external assistance. The area covered today by trees from FMNR is estimated to be more than 50,000 km2 in Niger.

## Concluding statements

Strengths and → how to sustain/improve	Weaknesses and → how to overcome
FMNR is a simple, low-cost and multi-benefit method of re-vegetation, accessible to all farmers, and adapted to the needs of smallholders →	Scarce presence of live tree stumps → alternatively broadcast seeds of indigenous species (reduced short-term benefits; high mortality rates)
It reduces dependency on external inputs, is easy to practice and provides multiple benefits to people, livestock, crops and the environment →	Cultural norms and values: 'a good farmer is a clean farmer' (= no trees) → work with all stakeholders to change norms
	Land (including trees) is treated as common property during dry season; damaging and removing trees on other people's land occurs → create sense of ownership of trees: (1) Encourage communities to develop rules that respect property; (2) Local forestry authorities granting informal approval for farmers to be able to reap the benefits of their work.



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