Training Manual Based on the REDD+ scheme for the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)

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**Abbreviations**

CBFM..............................Community- Based Forest Management  
cm..................................Centimeter  
DFA.................................Decentralized Forest Management  
ECOWAS............................Economic Community of West African States  
EDP..................................Enterprise Development Plan  
FAO..................................Food and Agriculture Organization of The United Nations  
h....................................Hour  
LAs..................................Local Authorities  
MA&D.................................Market Analysis and Development  
m........................................Meter  
NGOs.................................Non- Governmental Organizations  
OOPP.................................Objective Oriented Project Planning  
PFM..................................Participatory Forest Management  
PFMCs.................................Participatory Forest Management Committees  
PRA..................................Participatory Rural Appraisal  
REDD+ ................................Reducing emissions form deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.
Preface

Training modules highlighted in this document intend to primarily address REDD+ trainings and subsequent activities with the goal to contribute to sensitization and capacity enhancement through participatory forest resources management by local communities and private sector with support from Change Agents and Front-line staff of Government Organizations and Non-Governmental Organizations, volunteers and village based promoters.

In order to simplify the modules, some extracts were made from existing materials accessed from ECOWAS countries for consistencies and crystal clarity.

The content of the modules were established with the objective of simplifying the approaches towards supporting the local population in Sustainable Forest Management, obtaining legal ownership over natural forests, thereby contributing to the attainment of Sustainable Development Goals and Agenda 2030 and reduction of emission from bushfires.

The modules described in the document include:

- Programme for the Module;
- An Introductory Module describing the Participatory Forest Management Concepts and Approaches;
- Module 1: Adapted Forest Management techniques;
- Module 2: Sensitization in Participatory Forest Management Concept (General and Specific);
- Module 3: Participatory Identification of proposed forest areas as Participatory Forest Management Area;
• Module 4: Forest Management Committee Formation;
• Module 5: Planning Sustainable Forest Management Activities;
• Module 6: Concluding Forest Management Agreements;
• Module 7: Commercialization of Sustainable Forest Management Products, utilization of traditional and improved stoves

**Programme of the Module (5 Days)**

Proposed timetable:

- Morning: 9.30h-13.30h (with a break from 11.00h-11.30h & lunch break 13.30h-14.30h)
- Afternoon: 14.30h-16.30h
- Friday: 9.00h-13.00h (no afternoon session)

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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</thead>
</table>
| • Introduction to the Training | **Module 1: Adapted Forest Management Techniques Continues:**  
  - Establishing Village nurseries  
  - Selection of the Tree Nursery site | **Module 2: Sensitization**  
  - Sensitization tools for environmental awareness raising  
  - Short background on development of participatory approaches (RRA/PRA/PLA/OO PP) | **Module 4: Forest Management Committee Formation**  
  - Steps of Committee formation,  
  - Composition,  
  - Function,  
  - Training,  
  - Performance Assessment of  | **Module 7: Commercialization of Sustainable Forest Management Products and transformation processes**  
  - Purpose  
  - Conditions  
  - Role of the Forestry |

**Introductory Module:**
- Situating the
Concept of Participatory Forest Management (PFM)

- Some basic principles:
  - Value local knowledge (LEARN attitude)
    - Triangulation
    - Visualization
    - Avoiding biases
  - Summary and practical exercises on currently used participatory tools (identify objectives/purpose and bottle-necks during implementation)
  - Identify and/or develop participatory tools for specific situations

Module 5: Planning Sustainable Forest Management Activities

- Purpose, Principles, and Requirements of Management Planning
- Preparing and Carrying-out Planning Workshops at Village Level
- Problem and Solution Analysis
- Work Planning
- Compilation of Management and Work Plans
- CFCs etc.

Wrap-up Sessions
- Session on development of skills for moderation,
- Department and of Forest Committees
  - Timber
  - Firewood
  - Fence Post
  - Non Wood Products
  - Monitoring and Control of Exploitation Activities
  - Marketing
  - Adopt improved cooking stoves and briquettes
<table>
<thead>
<tr>
<th>Module 1: Adapted Forest Management Techniques</th>
<th>Module 1: Adapted Forest Management Techniques Continues:</th>
<th>Module 3: Participatory Identification of Forests for Sustainable Management</th>
<th>Module 6: Concluding Forest Management Agreements</th>
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<tbody>
<tr>
<td>- Establishment of Fire breaks</td>
<td>- Plantation in the forest</td>
<td>- Procedures</td>
<td>- Prerequisites</td>
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<tr>
<td>- Controlled Early Burning</td>
<td>- Tree Planting</td>
<td></td>
<td>- Form sheets</td>
</tr>
<tr>
<td>- Forest Demarcation Planting</td>
<td>- Direct seeding</td>
<td></td>
<td>- Signatories</td>
</tr>
<tr>
<td>- Forest Patrolling</td>
<td>- Seeds (selection, treatment, storage)</td>
<td></td>
<td>- Attachments</td>
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<tr>
<td>- Controlled Grazing</td>
<td>- Calendar of Forestry Activities</td>
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<td>- Annexes</td>
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- Extension Worker’s Checklist
- Clarification on Grey Areas
- Select and apply an evaluation tool for the Training

END OF TRAINING
**Introductory Module: Situating the Concept of Participatory Forest Management (PFM)**

The concept of Community-Based Forest Management (CBFM) emerged out of the need for forms of forestry that are responsive to local needs as opposed to state forestry which regarded state agencies as having unique capacity to manage the resources. This was precipitated by the failure of centralized forest management to achieve an equitable distribution of benefits from forest resource management both for regional development and for the improvement of community livelihood. Several CBFM approaches have evolved over the last three decades. Some of the forms of CBFM in different countries of ECOWAS include:

- Community Forestry,
- Social Forestry,
- Collaborative Forest Management (CFM),
- Participatory Forest Management (PFM),
- Decentralized Forest Management,
- Community Based Forest Management (CBFM) and

For the purpose of this Manual, focus will be on Participatory Forest Management (PFM) concept.

**Participatory Forest Management (PFM) term** is used to describe forest management systems in which communities (forest users and managers) and government services (forest department) work together to define rights of forest resource use, identify and develop forest management responsibilities, and agree on how forest benefits will be shared. This term is commonly used in The Gambia, Senegal, Guinea Bissau, Sierra Leone, Nigeria, Liberia, Niger, Burkina Faso, Ghana and some East and Southern African countries especially Ethiopia, Kenya, Tanzania, Uganda, Malawi, Mozambique and South Africa.
Spectrum of generic types of Community Based Forestry based on level of rights and responsibilities and hence empowerment (adapted from ideas in O’Hara 2013)

<table>
<thead>
<tr>
<th>Type of CBF</th>
<th>Generic description</th>
<th>Key characteristics</th>
</tr>
</thead>
</table>
| 1. Delegate | Participatory conservation | **Some community responsibility to protect forests, but little authority to make decisions. Very few (or no) rights for local communities to access and use forest products.**  
Pressure on use of forest products reduced by application of outside managed integrated conservation and development (ICD) approaches often in buffer zones of protected areas – includes encouraging alternative livelihoods and enforcing protection through external agents or by delegating protection functions to local people. Limited NTFP collection sometimes allowed.  
**Indicative rights:**  
- Access-Rights to access forest  
- Withdrawal-Sometimes limited rights to harvest prescribed NWFPs  
- Management-No rights to make forest management decisions  
- Exclusion-No rights to determine who will have access to the forest  
- Alienation-No right to sell or lease either or both of the management or exclusion rights or to use them as collateral  
- Duration of rights-No defined term  
- Rights to compensation-No rights to obtain compensation if rights are withdrawn |
| 2. Share | Joint forest management | **Shared authority - Limited and highly prescribed rights for local people to access and use forest products.**  
Forest products and related benefits from government owned forests shared between government and local communities to encourage communities to protect the forests. Employment in forest management activities sometimes available.  
**Indicative rights:**  
- Access-Rights to access forest  
- Withdrawal-Generally rights to harvest NWFPs, but rights to harvest timber held by government agencies  
- Management-Rights to make forest management decisions held by government agencies |
### Limited rights for defined local communities to manage forests and access and use forest products. Significant government authority and oversight.

Rights to manage forests and use some forest goods, usually NWFPs and subsistence products, devolved to local communities, generally subject to the development of a management plan. Rights generally do not include selling timber into the open market, but selling NWFPs may be allowed.

### Indicative rights:
- Access-Rights to access forest
- Withdrawal-Rights to harvest NWFPs (may be subject to a management plan)
- Management-Rights to make forest management decisions held by government agencies
- Exclusion-Limited rights to determine who will have access to the forest
- Alienation-No right to sell or lease either or both of the management or exclusion rights or to use them as collateral
- Duration of rights-Generally defined term fixed by a management plan
- Rights to compensation-No rights to obtain compensation if rights are withdrawn

<table>
<thead>
<tr>
<th>3. Partly devolve</th>
<th>Community forestry with limited devolution</th>
</tr>
</thead>
</table>
| **Limited rights** | **Significant government authority and oversight.**
| **Indicative rights:** | **Rights to manage forests and use some forest goods, usually NWFPs and subsistence products, devolved to local communities, generally subject to the development of a management plan. Rights generally do not include selling timber into the open market, but selling NWFPs may be allowed.**
| **Access-Rights to access forest** | **Withdrawal-Rights to harvest NWFPs (may be subject to a management plan)**
| **Management-Rights to make forest management decisions held by government agencies** | **Exclusion-Limited rights to determine who will have access to the forest**
| **Alienation-No right to sell or lease either or both of the management or exclusion rights or to use them as collateral** | **Duration of rights-Generally defined term fixed by a management plan**
| **Rights to compensation-No rights to obtain compensation if rights are withdrawn** | |
| 4. Fully devolve | Community forestry with substantial or full devolution | **Significant rights for defined local communities to manage forests and access and use forest products. Generally some government authority and oversight.**
Rights to manage and use forests devolved to local communities, generally subject to the development of a management plan. Rights include harvesting of timber and selling forest products into the open market.

<table>
<thead>
<tr>
<th>Indicative rights:</th>
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</thead>
<tbody>
<tr>
<td>- Access: Rights to access forest</td>
</tr>
<tr>
<td>- Withdrawal: Rights to harvest NWFPs and timber (generally prescribed in a management plan)</td>
</tr>
<tr>
<td>- Management: Rights to make forest management decisions (generally prescribed in a management plan)</td>
</tr>
<tr>
<td>- Exclusion: Rights to determine who will have access to the forest</td>
</tr>
<tr>
<td>- Alienation: No right to sell or lease either or both of the management or exclusion rights or to use them as collateral</td>
</tr>
<tr>
<td>- Duration of rights: Generally defined term fixed by a management plan</td>
</tr>
<tr>
<td>- Rights to compensation: No rights to obtain compensation if rights are withdrawn</td>
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</table>

| 5. Own | Private forest ownership | **Most rights to access and use forest products held by forest owners. Government may or may not exercise authority over some aspects of forest management, including harvesting and marketing forest products.**
Ownership and use rights held by individuals, households, groups or communities to manage forests and receive benefits. (Includes smallholder forestry)

<table>
<thead>
<tr>
<th>Indicative rights:</th>
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<tbody>
<tr>
<td>- Access: Rights to access forest</td>
</tr>
<tr>
<td>- Withdrawal: Rights to harvest NWFPs and timber</td>
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<td>- Management: Rights to make forest management decisions</td>
</tr>
<tr>
<td>- Exclusion: Rights to determine who will have access to the forest</td>
</tr>
<tr>
<td>- Alienation: Rights to sell or lease either or both of the management or exclusion rights or to use them as collateral</td>
</tr>
<tr>
<td>- Duration of rights: Generally perpetual</td>
</tr>
<tr>
<td>- Rights to compensation: May be rights to obtain compensation if rights are withdrawn</td>
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</tbody>
</table>

Sources: Guidelines for field testing; FAO July 2015
Module 1: Adapted Forest Management Techniques

The following techniques and guidelines are not exhaustive and need flexible application depending on country context. Additional ones will be added whenever new techniques are tested and new experience is made in the field. Since climatic, site, and socio-economic conditions vary within the country and from country to country, use the techniques and guidelines in a flexible way and adapt them to the felt needs and local conditions.

**Fire breaks**

The establishment of `green’ fire breaks requires considerable labour inputs and follow-up maintenance. On marginal sites (laterite, rocks, etc.) and on areas with high livestock density, planted trees hardly grow. Depending on the local situation, fire breaks may be not necessary even from the technical point of view (e.g. if the forest borders the river, farmland or any other land use). Therefore, the establishment of fire breaks is not compulsory and has to be decided with the concerned forest committee on a case to case basis. If the establishment of a fire break is found not to be necessary then the minimum requirement will be to establish a demarcation planting see box 1.

Whenever the establishment of fire breaks is planned consider that:

- fire breaks must be part of PFM area and, thus, located within the forest border (therefore it is very important to think on fire break establishment already when identifying the forest border);

- fire breaks are to be established with the objective of maximum protection and minimum destruction (in dense forests with a closed canopy generally no fire break shall be established; do demarcation planting instead);

**Box 1: Fire Breaks and Demarcation Planting**

**Fire Break**

*A ‘green’ fire break consists of a 20 to 25 m wide strip around and / or within a forest on which tree species are planted which are preferably evergreen and which develop within a few years a closed canopy in order to suppress grass growth. When established, such fire breaks are just a barrier for approaching fires but do not necessarily stop fires. Only in combination with controlled burning of a 100 m wide strip outside of the fire break, the system has proved to be effective. ‘Green’ fire breaks constitute at the same time a permanent forest demarcation.*

**Demarcation Planting**

*A demarcation planting is done by planting 1 or 2 rows of trees along the border of the community forest. Since these trees have to fulfil the purpose of a permanent demarcation, they should be fast growing, produce coppice, and noticeable.*

*Note* that based on the PCFMA and CFMA terms and conditions, the establishment of a permanent forest demarcation is obligatory. This can be done by establishing fire breaks or demarcation planting, or by erecting any other permanent structure.
**Surveying:** use pacing in order to achieve an equal width;

- mark those trees which are to be felled; leave mother trees;
- deviate the fire break around big trees or valuable trees
- 20 cm diameter; see diagram below.

![Diagram of planting line](image)

**Felling:** in the case of intended ploughing, ensure that all stumps are cut

**Clearing:** at ground level;

- clear and remove all shrubs, branches, etc..
- ensure that the planned width of the break, i.e. 20 m, is respected. During clearing operations villagers often clear more area than necessary.

**Ploughing:** encourage oxen ploughing (avoid tractor ploughing since this support is mainly provided by foreign assisted projects).

**Planting:**

- ensure that the tree species fits to the site condition and suppresses grass growth;
- ensure that the tree species are not subject to browsing especially from goat, i.e. gmelina will not grow if planted close to a village because of the roaming goats. In that case use cassia siamea or cashew.
- align planting rows according to the shape of the border (start with the outer planting row and ensure that this row is aligned 3 m inside of the border line);

**Spacing:**

- between the planting rows: 3 m - within the row:
  - 1 to 1.5 m for stumps
  - 0.5 m for seeds
• use ropes to align the planting lines.

**Planting**

- at least one month before planting, the forest committee should

**Supervision:** designate one person to be responsible to supervise the planting operation;

- train the identified supervisor. This will reduce the demand on the support and service staff which cannot simultaneously supervise all planting operations at the same time;
- if the fire break is too large (actual width exceeding planned width) do not plant the entire area as the number of stumps will not be sufficient (see felling/clearing);
- make clear arrangement for people participation. Ensure that **villagers are on the site** when the plants are delivered. Delays in planting can seriously affect the viability of plants;
- If villagers’ participation is poor (i.e. only 5 people) then do not hesitate to cancel the planting exercise.

**Inter-cropping:**

- agree on clear modalities of seed procurement

- ensure that no additional trees are felled in order to increase the cropping area and/or extend or to drag out the inter-cropping

**Weeding/**

- weeding/tending is done for 2 reasons:

  **Tending:**
  - to enhance tree growth by removing competitive vegetation
  - to reduce the risk of fire hazards;

  - total weeding of the firebreak is highly recommended. In case of fire, strip or spot weeding are inefficient to protect the plants.
  - in area with a high cattle population the weeded firebreaks might become a natural cattle path which will result in the trampling of all plants. In that case you will have to leave obstacle or barriers (heaps of thorny shrubs or branches) to deviate the animals.

  - ensure timely implementation (the best time is during September/ October; optimal results are achieved with hoe weeding in September; hoe weeding has an advantage over cutlass weeding because it removes the grass roots and therefore prevent any re-growth before the dry season; be careful of doing the weeding too late because you expose the seedling to full sun light with the risk of a high mortality); all weeds should be removed from the fire break.
Fire Management Process

Fire management is a continuous process and planning should be on a cooperative basis covering national, regional, district, ward, and village levels. A realistic schedule should be prepared ranging from budget, self commitment for achievement of the objectives in a participatory planning process in order to minimise dependency on financial shortfalls and not to forget the timely implementation of the plan activities.

Controlled burning

Fire can be used as a forest management tool provided that:

· an at least 2 m wide small strip with clear ground is established around the area which is intended to be burnt in order to control the fire;

· the cut grass has to be heaped on the side to burned (see drawing on next page);

The burning is coordinated with controlled burning of surrounding forest and/or farmland (depending on the situation, controlled burning might not necessarily take place along the forest border)

· within forests, the strip to be burnt does not exceed 100 m in width;

· the burning is done in the early stage of the dry season. Avoid late burning by all means and be extremely cautious once it should be necessary;

· neighbouring villages and the concerned forest officer have been informed at least 4 days before;

· the burning is carried out in the evening or during the night (less wind, low temperature);

· proceed the burning in two steps:
  when the heaps of cut grass are dry and the uncut grass still green, burn the heaps;
then burn the standing grass when it is dry;
· the concerned forest officer is present during the burning;
· the burnt area is checked the following day and remaining fire is put out.

When organizing the burning consider:
· to use roads, and trails as fire barriers;
· an appropriate number of villagers (usually not more than 10 to 15 persons);
· to take enough cutlasses and water;
· to set fire principally against the wind (only when there is absolutely no wind, you can set fire from both sides).

<table>
<thead>
<tr>
<th>Calendar</th>
<th>Preparedness, Prevention, Suppression, Response</th>
<th>Level</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>JULY</td>
<td>- Regional review meeting on Bush Fire situation</td>
<td>District/Regional</td>
<td>RAINY SEASON</td>
</tr>
<tr>
<td></td>
<td>- Regional Fire reports,</td>
<td></td>
<td>Review/Planning/Preparedness</td>
</tr>
<tr>
<td></td>
<td>- District FMP July 15th and</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Regional Fire Report July 30th</td>
<td></td>
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<tr>
<td>AUGUST</td>
<td>- Elaborating Fire Management Plan for the Districts involving Local Authorities and other stakeholders</td>
<td>District</td>
<td>District/Regional</td>
</tr>
<tr>
<td></td>
<td>- Fire equipment Inventory (FMP)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Strengthening inter sectoral cooperation in fight against bush fires</td>
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<tr>
<td>SEPTEMBER</td>
<td>- Sensitization and Training</td>
<td>District</td>
<td>District</td>
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19
<table>
<thead>
<tr>
<th>MONTH</th>
<th>Activities</th>
<th>Location</th>
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<tbody>
<tr>
<td>OCTOBER</td>
<td>Village Meetings for Controlled Early Burning (CEB) planning/discussing FMP with Committees</td>
<td>Village</td>
</tr>
</tbody>
</table>
| NOVEMBER | - Village Meetings for CEB planning  
- Training of Fire Management Coordinators  
- Controlled Early Burning of fire breaks -> Report | Village/Village/District |
| DECEMBER | - 10th National Anti-Bush Fire Day Commemoration  
- Public Relation activities | National/Regional |
| JANUARY  | - Focus of efforts on “fire hot-spots” and Problem areas (low participation, high fire risk areas, prosecution of culprits) -> with LAs  
- Sensitization activities  
- Fire equipment inventory | District/Regional/District |

Chart 1: Fire Management Process Seasonal Calendar Gambian Experiences
Fire Management Plan

Fire management plans are key planning documents supporting effective bushfire management. At regional planning meetings, the previous fire season will be reviewed and evaluated with the help of the FMP forms and regional land-Use maps. By use of Participatory Rural Appraisal/Participatory Learning and Action tools Identify with the community members the following.

**Bushfire prevention measures includes**

- Sensitization and information workshops
- Train community members on the following organizational, legal, and technical skills.
- Explore the possibility of traditional communicators and village promoters at the community level to raise awareness fires
- Review past regional fire management plans and develop new ones.
- At the field/ implementation level involve all relevant stakeholders.
- Promote collaboration with both the public and the private sector.
- Seek for multi-sect oral funding plan
**Demarcation Planting**

· agree on suitable species to be planted (preferably trees which grow fast, **suppress grass growth**, produce coppice, and are noticeable);

· usually 1 or 2 rows of trees fulfill the purpose of demarcation;

· prior to planting, a strip of 3 to 5 m is to be cleared;

· encourage oxen ploughing or hole digging;

· align planting rows according to the shape of the border (start with the outer planting row and ensure that this row is aligned 3 m inside of the border line);

**Forests Patrolling**

· needs to be done regularly (including surrounding forests and other forest on village land);

· everybody in the village should be/feel responsible;

· any offense has to be reported immediately to the forest committee and the forest officer in charge (ensure that the villagers are adequately informed).

·

**Controlled Grazing**

· as far as possible use grazing as management tool in order to reduce grass growth around and within PFM areas;

· be aware that a high animal density may negatively affect your planting results as well as the natural regeneration (a solution would be controlled grazing).

**Establishing village nurseries**

**Why a nursery?**

In the past, as experienced in all the ECOWAS countries, Forestry Services/Commission or Department of Forestry always supplied plants for the firebreak plantation free of charge. The support and service institutions also bought all plants of good size and quality from any village nursery, paying a reasonable amount per stump or seedlings.

Now, there is a shift in paradigm where local communities who already realized some income through PFM are requested to meet the costs of plant production for the plants they are going to use (we should remember that at least reasonable amount of their income have to be spend on forest development activities). For matters of sustainability, all PFM committees should discuss ways to meet their
future demands - either by running a village nursery (paying for any material, tools and possibly labour) or by buying plants from other PFM Committees or Forest Stations.

The quantity raised will depend on the area you would like to plant at the next rainy season. An extra number of plants should be raised to face any kind of problems or destruction (30 to 40 %).

For the same 800 meters firebreak, between 2900 and 3000 seedling should be produced in the nursery, to be sure that enough seedlings will be available on the very day of the plantation.

Selection of the nursery site

Water: it should be easily accessible. The site should be chosen close to a well or a bore hole. Good quality water is important, and saline water must not be used to water the seedlings.

Sun / Wind: the site should ideally be protected from drying wind by using, for example, a life fence or a palm leaves fence. If it is exposed to the sun, shading mattresses will have to be used to protect the young seedlings. The presence of a shade tree is an advantage.

Ground configuration: the ground must be flat to avoid the water to flow away. Marshy or frequently flooded area should be avoided as well.
Fence: young trees have practically no chance to survive without protection from animals: the area must be fenced to stop any kind of domestic animal (particularly goats) to enter and destroy the plants. Thorny branches or palm leaves can be used efficiently.

Access: easily accessible and not too far from the nursery manager’s house.

Material needed

- Rakes and spade
- Bucket or any kind of container
- Sticks to make support for the grass mattresses
- Grass-mattresses to provide shade to the young seedlings, they should be removed after a few weeks

Preparation of the beds

Size and location: the width of a bed should be not more than 1or 1,2 metre to ensure an easier work when sowing and weeding. The length will depend on the quantity of seedlings you need.

As an indication, to raise 1000 seedlings (at a 10 x 10 cm spacing), you will need an area of 10 m², that means a bed of 10 meters long. Ideally, the length of the bed should be oriented West-East, because of sun exposure.

To follow our example, 2000 seedlings, sown at 10 x 10 cm will required the preparation of 2 beds of 10 meters long each.

Note: the seeds are sown at the beginning of the rainy season (June) to produce seedlings to be planted the following year around middle July. Therefore, you will need two sets of beds because of the overlap between sowing und uprooting. If 800 meters of firebreak are planned to be planted every year four beds of 10 meters long each should be prepared in the nursery (see organization, calendar of activities).

Soil mixture: ideally, the soil must be loamy with a bit of sand. The soil must be ploughed at least 30-40 cm deep (like a vegetable garden). Ashes should be mixed with the mixture to try to withdraw the termites. Another way to fight termites is to water the beds with a mixture based on Neem leaves: cut the Neem leaves and soak them in water for sometimes then use the dark mixture to water the beds.
Level: the bed must be perfectly leveled to permit the water to be distributed equally for every seedlings. If there is a slope, the water will not stay on the higher side of the bed and the seedlings will dry.

If there are some holes in the beds, then the water will be stagnant and certain seedlings will be flooded.

If the nursery has to be set up on a sloppy terrain, you will have to follow the contour to minimize the effect of the slope.

One possibility to ensure that the level is right is to water the beds before the sowing and see if the water flows out normally. This will also permit the germination of the weeds and you will be able to remove all of them before the sowing.

Shading: to obtain a good germination rate and a good survival rate the beds must be protected from the direct exposure to sun. Support for the shading mattresses must be built simply with sticks and grasses to link. It should be approximately 50 cm higher than the ground level.

Sowing

It is advisable to sow shortly before the beginning of the rainy season to benefit from the rainfall thus decreasing considerably labour input due to watering.

The beds must be moistened before the sowing. The seeds should be placed regularly, every 10 or 15 cm along a straight line. It’s advisable to use a long stick to sketch the line and a smaller one to measure the distance between the seeds.

The seeds must be place in a small hole, dug with the finger or a small stick. The seed should be covered by a quantity of soil equal to the size of the seed. The seeds
must not be buried too deeply but should be covered by a layer of soil thick enough to keep the moisture and avoid desiccation.

**Watering, cultivation and care**

- weeding;
- watering for the first 3 months if necessary during dry spells (water only in the morning and/or in the evening; the *surface soil should never dry out*);
- provide shade;

![Diagram showing weather conditions and watering frequency](image)

- transplant seedlings growing in a dense cluster whenever the first leaves have developed

The seedlings must be watered regularly; the frequency should be evaluated according to the seedlings needs. It is for this reason that frequent controls must be done. The watering must be done in the morning or in the evening but not in the middle of the day.

If there are not enough rains, watering cans or buckets should be used to provide enough water for the seedlings.

As long as the rainy season is not well started shading mattresses must be used to cover the beds during the germination time and the first weeks of the development of the seedling, when stem and leaves are still tender. This will avoid them to dry out because of the transpiration.

Regular visits must be done to control that nothing attacks or affect the seedlings.
**Organization, calendar of activities**

It is necessary to have one person responsible of the nursery: he/ she will take care of the tools, if any and will make sure that the seedlings receive enough water. He will ensure the good sharing of the tasks and the organization of the working teams when needed (particularly during the transplantations).

To help him to organize the work, a calendar of activities should be prepared before establishing the nursery. This calendar should be followed carefully.

**Calendar of activities**

S: sowing        W: weeding

L: lifting

**Note:**

Because the two crop of seedlings are overlapping in July, you will need two sites (site1 and site 2). Make sure that **sufficient space** is available for two sets of beds when selecting the nursery site.

**Supervision**
Village nurseries are requiring your close supervision at least during the first 2 to 3 years. Your supervision is especially critical to ensure a timely preparation of the beds, during sowing and the first days of watering. Regular visits to the site will motivate the responsible person.

**Plantation in the forest**

One year later and after a few rains, when the seedlings are tall enough, it’s time to transplant them in the forest or in the firebreak. The diameter of the stem at the collar should be at least the size of a thumb (1.5 - 2 cm diameter).

Two types of plants can be used, either stumps or bare-rooted seedlings.

**Stumps**: to prepare stumps, the seedlings must be big enough. The diameter at the collar must be not less than 1 cm: the size of the thumb is advisable. The top is cut with a sharp knife or machete and only 5 cm of the stem is left, without leaves. The roots are also cut sharply and 15 cm should be kept.

Before transplanting, it is advisable to deep the stumps in liquid mud to recover the roots with a protective layer.

This can be done by digging a small hole in the nursery, filling it with water and deep the stumps in the mud:

The transplantation must take place as soon as possible after the lifting. It is advisable to work in three teams: one to lift the seedlings and to pack them in a moist cloth, one to transport them quickly but carefully to the site and one to plant them.

If the stumps have to be stored, you will have to dig a small hole and heal them in a very moist soil:
**Transportation of stumps and naked root plants**

- at the same day as the planting;
- early in the morning;
- cover the plants with a wet sac;
- heal those plants which you could not plant at the same day and compact the soil afterwards.

**Planting**

- only on a rainy day;
- organize villagers into groups and specify the task or each group (e.g. transporting the plants, demarcating the planting rows, digging holes, planting, etc.);
- demarcate the planting rows by using the string or pacing method;
- ensure that the soil is compacted.

**Direct seeding**

- use only the best seeds (seeds which float in the water should be never used);
- pre-treat the seeds as shown in box below
- be aware that seeds of some species require a proper orientation when seeding.

**Seeds (selection, treatment, storage)**

Seeds should be harvested under the best trees: straight bole, big crown, healthy, tall. An identification of the best mother trees should be embarked on in all the countries. Information could be obtained in the Forest Stations and accessible to relevant stakeholders.

Seeds must be harvested when ripe directly on the tree or shortly after they have dropped. If seeds are staying too long on the ground, they will be attacked by insects.

The germination rate varies from species to species and sometimes can be low, thus it is important to harvest enough seeds to compensate the failures and to be sure to obtain the good amount of seedlings. The best results are achieved with fresh seeds.

Treatment before sowing will depend on the species (see below), e.g

- *Cassia siamea*: soak in boiling water for 24 h;
- *Gmelina arborea*: depulp when pulp gets yellow to black, dry it for 3 to 4 weeks. Soak in water for 24 h before sowing;
- *Anacardium occidentale*: soak them in cold water for 24 hours;
· *Khaya senegalensis*: no special treatment;
· *Ceiba pentandra*: soak in warm water for 24 hours;
· *Erythrophleum guinense*: soak in boiling water for 24 hours then rinse to remove the jelly;
· *Afzelia africana*: no special treatment.

It is not advisable to keep seeds from one year to another. But if some seeds have to be stored, they should be perfectly dry and stored in a dry and cool place, protected from rodents.

**Seed collection**

· Assist villagers in selecting appropriate mother trees and mark the trees by using paint;
· Collect the seeds according to the time table provided below;
· Treat and store the seeds according to the information given below;

. Don't store seeds over a rainy season; always use seeds which have been collected in the same year.

**Seed Collection, Storage, and Pre-treatment**

<table>
<thead>
<tr>
<th>Tree species</th>
<th>Maturity of seeds</th>
<th>Processing (all seeds have to be stored in a dry and ventilated place)</th>
<th>Pre-treatment prior to seeding</th>
<th>Exp. germination rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia albida</td>
<td>March, April</td>
<td>extract seeds from the pulp and sort out all attacked seed</td>
<td>soaking in warm water for 12 h</td>
<td>30-50</td>
</tr>
<tr>
<td>Afzelia africana</td>
<td>February, March</td>
<td>sun-dry</td>
<td>remove orange cup</td>
<td>70-90</td>
</tr>
<tr>
<td>Albizia ferruginea</td>
<td>March, April</td>
<td>sun-dry seeds</td>
<td>soaking in warm water for 12 h</td>
<td>40-50</td>
</tr>
<tr>
<td>Borassus</td>
<td>June, July</td>
<td>sowing after</td>
<td>extract the 3</td>
<td>60-80</td>
</tr>
<tr>
<td>Species</td>
<td>Collection</td>
<td>Treatment</td>
<td>Soaking Method</td>
<td>Duration</td>
</tr>
<tr>
<td>--------------------------</td>
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</tr>
<tr>
<td>aethiopum</td>
<td>collection</td>
<td>seeds from the nut</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cassia siamea</td>
<td>sun-dry</td>
<td>soaking in warm water for 12 to 18 h</td>
<td>50-60</td>
<td></td>
</tr>
<tr>
<td>Ceiba pentandra</td>
<td>March</td>
<td>remove the cotton</td>
<td>soaking in water for 12 h</td>
<td>10-30</td>
</tr>
<tr>
<td>Celtis integrifolia</td>
<td>March, April</td>
<td>extrat seeds from the fruit, sun-dry seeds</td>
<td>soaking in warm water for 12 h</td>
<td>10-30</td>
</tr>
<tr>
<td>Chlorophora regia</td>
<td>April, May</td>
<td>dry the fruits in order to extract the seeds</td>
<td></td>
<td>40-50</td>
</tr>
<tr>
<td>Cordyla africana</td>
<td>May, June</td>
<td>sowing after collection</td>
<td>extract the seed from the fruit pulp</td>
<td>40-60</td>
</tr>
<tr>
<td>Detarium senegalense</td>
<td>December to May</td>
<td>extract the seed from the hard fruit pulp</td>
<td></td>
<td>50-60</td>
</tr>
<tr>
<td>Diospyros mespiliformis</td>
<td>January to March</td>
<td>soaking in water for 24 to 48 h</td>
<td></td>
<td>50-60</td>
</tr>
<tr>
<td>Erythrophleum guinense</td>
<td>February, March</td>
<td>soaking in boiling water for 12 h, remove the jelly</td>
<td></td>
<td>10-30</td>
</tr>
<tr>
<td>Khaya senegalensis</td>
<td>March</td>
<td>extract and sun-dry the seeds</td>
<td></td>
<td>80-90</td>
</tr>
<tr>
<td>Parkia biglobosa</td>
<td>April to June</td>
<td>sowing after collection</td>
<td>extract seeds from the pulp</td>
<td>40-50</td>
</tr>
<tr>
<td>Tree species</td>
<td>Maturity of seeds</td>
<td>Processing (all seeds have to be stored in a dry and ventilated place)</td>
<td>Pre-treatment prior to seeding</td>
<td>Exp. germination rate (%)</td>
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<tr>
<td>Prosopis africana</td>
<td>February, March</td>
<td>extract seeds from the pulp and sort out all attacked seed</td>
<td>soaking in hot water for 24 to 48 h</td>
<td>10-30</td>
</tr>
<tr>
<td>Sclerokarya birrea</td>
<td>July, August</td>
<td>sowing after collection</td>
<td>extract seeds from the fruit pulp</td>
<td>50-60</td>
</tr>
<tr>
<td>Anacardium occidentale</td>
<td>May, June</td>
<td>extract nut from the fruit and sun-dry the nut</td>
<td>soaking in water for 24 h</td>
<td>70-90</td>
</tr>
<tr>
<td>Eucalyptus camaludensis var.</td>
<td>March, April</td>
<td></td>
<td></td>
<td>30-40</td>
</tr>
<tr>
<td>Gmelina arborea</td>
<td>March, April</td>
<td>extract seeds from the pulp and sun-dry seeds</td>
<td>soaking in warm water for 12 h</td>
<td>40-50</td>
</tr>
<tr>
<td>Tectona grandis (Teak)</td>
<td>February, March</td>
<td></td>
<td>water and dry the seeds for 7 days</td>
<td>10-30</td>
</tr>
</tbody>
</table>
### Calendar of Forestry Activities

<table>
<thead>
<tr>
<th>Activity</th>
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<tbody>
<tr>
<td>Survey, felling/clearing of firebreaks</td>
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<td>Ploughing</td>
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<tr>
<td>producing stumps, planting, intercropping, direct seeding</td>
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<tr>
<td>Weeding/tending</td>
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<td>Controlled burning</td>
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<tr>
<td>Nursery establishment</td>
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<tr>
<td>Selecting mother trees</td>
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<tr>
<td>Seed collection</td>
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<tr>
<td>Seeding</td>
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<tr>
<td>Seedling maintenance (watering, weeding, transplanting)</td>
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</table>


Box 2: Methods Applied in Sensitisation

- district and village meetings involving the local authorities, religious leaders, other key-persons, representatives of other organizations operating at local level, and community members
- informal meetings and discussions with groups and individuals
- application of elements of Participatory Learning and Action (PLA)
- project and field visits
- farmer-to-farmer extension
- film and slides shows
- role and theatre plays
Module 2:

Sensitization in Participatory Forest Management Concept (General and Specific)

General sensitization is usually the first activity you have to carry out in areas where PFM Concept is not yet known or where the idea is not yet appreciated; and specific sensitization which focuses on achieving a common understanding of various Sustainable Forest Management issues and the need to carry out certain forest related activities see box 2.

Objectives of general sensitization are:

- to disseminate the PFM concept and its principle features at the national, regional district and village level, and
- to raise environmental awareness and to promote the sustainable use of natural resources (don’t forget to bring in aspects of controlled population growth and gender issues during discussions) see box 3.

The target/focus group of general sensitization are villagers, in particular:

- local authorities (the chief, the village head, religious leaders, advisers, etc.)
- forest user groups
- village elders both male and female
- other key-persons (‘clan heads, tribal leaders, politicians, etc.)

The expected result of general sensitization is that villagers express their interest of entering into PFM either verbally or by writing an informal letter of interest addressed to the Forestry Service or preferably endorsed by the district chief.

There are numerous suitable methods and tools that can be applied in sensitization work. Disregarding the method/tool you intend to use, keep always in mind the basic aspects in working with villagers. Among the methods mainly used in PFM (see box below), the method of Participatory Learning and Action (PLA) is of special interest. Note that we don’t apply this method in an exhaustive way. Depending on the specific situation you find in the village, you may apply just some PLA elements.
### Box 3: Common Fears and Questions of Villagers in participation on PFM

**You have to have the right answer to the following fears and questions prior to visiting the village**

- after some years of forest protection and development, the government will claim back the forest from us
- after some years of forest protection and development, the forest will become dense and host animals which destroy our crops
- we are just a few people; how can we manage the big forest area?
- the area will be fenced; where should our cattle graze?
- the forest you see is the farmland for our children; we don’t have other forests
- the forest you see is claimed by all surrounding villages; if we manage it, this village will become serious problems as there will be nowhere where the others can go
- can farmland be included and can we continue farming?
- we have no tools and materials for planting trees and working in the forest; how do you expect us to carry out forestry work?
- if the forest burns we will be fined; we don’t like this kind of management
- you want to restrict the use of the land we are using since many years; therefore, we don’t like your programme
- the Forestry Service has been not supportive and promises have been not keep; we don’t like to work with them
- you want us to work but there are no immediate benefits; this does not match
- drought is the reason and the ultimate problem; degradation is outside our influence; strangers destroy our forest anyway
- can we include bare land in our PFM Area?
- can a district boundary cross a PFM Area?
- ...
## List of currently used participatory tools (PRA, PLA, OOPP etc.) in Participatory Forest Management initiation and implementation

<table>
<thead>
<tr>
<th>Participatory tool</th>
<th>Purpose/objective</th>
</tr>
</thead>
</table>
| Option Assessment-ranking              | • to identify different options  
• to prioritize options  
• to identify the most suitable option                                                                                                                     |
| Scoring-Ranking                        | • to be able to give out priorities with respect to different factors (criteria)                                                                                                                                |
| Wealth Ranking                         | • to determine the social rank  
• to assess the wealth distribution in a community  
• to determine community’s contribution to development  
• to identify potential investors/entrepreneurs Market Analysis and Development (MA&D)                                                                          |
| Problem and Solution Analysis          | • to identify problems  
• to analyze the relations between existing problems  
• to understand the causes and effects of problems  
• to find solutions to the problems  
• to develop a basis for planning (Community Action Plan, PFM Plan and others)                                                                                 |
| Calendars                              | • to assess the work schedule of the community  
• it helps to plan the programme (when to organize activities)  
• to avoid overloading the communities                                                                                                                         |
| Village History                        | • to identify existing problems in the village  
• to increase the knowledge on land ownership  
• entry point  
• to sensitize on certain issues (deforestation, etc.)  
• to discuss about patterns (population growth, forest degradation, arrival of new settlers, etc.)                                                       |
| Tree change                            | • sensitization on the importance and value of trees  
• to compare the past and present abundance of tree species                                                                                                   |
| Institutional analysis                 | • to know the different organizations (internal and external to the village)  
• linkage and relationship of these external organizations with the village  
• identify organizations for possible collaboration                                                                                                           |
| Resource Mapping                       | • to know the location of the potential Forest area  
• to know the location of the neighbouring villages  
• to learn about the other village resources (farmlands, river, etc.)  
• access road to forest  
• possible extension of forest                                                                                                                                   |
| Patterns/Trends          | • gather information  
|                         | • create awareness on a certain issue  
|                         | • evaluation  
| Participation Analysis  | • identify different stakeholders  
|                         | • learn about criteria that the villagers use to evaluate  
|                         | • evaluate participation (for a certain activity, in the PFM committee, etc.)  
| SWOT analysis           | • evaluation of an activity, of an organization, etc.  
| Theatre play            | • sensitization  
|                         | • ice-breaking  
|                         | • presentation  
| Semi-Structured Interview | • gathering of information  
|                         | • creating a relationship of trust  
| Focus Group Discussion  | • information gathering  
|                         | • comparison  
|                         | • evaluation  

**Identification/development of participatory tools for specific situations**

**Which tools can you apply to form a “quality” Forest Management committee?**

<table>
<thead>
<tr>
<th>Tool</th>
<th>Reasons/purpose</th>
</tr>
</thead>
</table>
| Institutional Analysis | • to know how many groups/clans exist in the village, their interaction and functioning  
|                         | • to learn about the external organizations that work with certain groups/clans and what kind of collaboration they have  
| Village History        | • to identify the leadership and ownership in the village  
|                         | • to know who are late comers in terms of settlement  
|                         | • to have some insight in the changes in terms of population, migration, etc.  
| Stakeholder Analysis   | • to identify the stakeholders for PFM  
|                         | • to identify their attitude, interest, potential contribution  
|                         | • to assure that certain stakeholders will be represented in the committee  
| Focus Group Discussions| • to sensitize certain groups on the importance of them being represented in the committee  
| SWOT Analysis          | • to assess group (groups/clan) qualities  
|                         | • to get information on individuals with specific
Which tools can you apply to remind/encourage people to start nursery activities?

<table>
<thead>
<tr>
<th>Tool</th>
<th>Reasons/purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year work plan</td>
<td>• to remind them of the activities that they have agreed upon</td>
</tr>
<tr>
<td></td>
<td>• to recall the time/the moment they planned nursery establishment</td>
</tr>
<tr>
<td>Seasonal calendar</td>
<td>• to identify the most suitable period of the year to start their nursery activities</td>
</tr>
<tr>
<td>Farmer-to-farmer extension</td>
<td>• to show what others have done and achieved with their nursery activities</td>
</tr>
<tr>
<td></td>
<td>• let the farmers share experiences on economic and social value of this activity</td>
</tr>
<tr>
<td>Institutional Analysis</td>
<td>• to identify potential collaborators</td>
</tr>
<tr>
<td></td>
<td>• to check if they have similar activities with other organizations (vegetable garden, school garden, etc.)</td>
</tr>
<tr>
<td>Theatre groups</td>
<td>• to remind them of the forest status in the past compared to the present situation</td>
</tr>
<tr>
<td></td>
<td>• to stress on the values of some important disappearing tree species</td>
</tr>
<tr>
<td>Tree change</td>
<td>• to remind them of the disappearing tree species and their importance</td>
</tr>
<tr>
<td></td>
<td>• to determine the tree species to be raised in the nursery</td>
</tr>
<tr>
<td>Village Map</td>
<td>• to identify a suitable site if a new nursery has to be established</td>
</tr>
<tr>
<td>Marketing Analysis</td>
<td>• to identify and analyze the marketing possibilities for seedlings</td>
</tr>
<tr>
<td></td>
<td>• to prioritize the tree species to be raised</td>
</tr>
<tr>
<td>Problem and Solution Analysis (specifically on this issue)</td>
<td>• to identify constraints in the establishment of a nursery</td>
</tr>
<tr>
<td></td>
<td>• to make them aware of the amount of work involved</td>
</tr>
<tr>
<td></td>
<td>• to develop solutions for the nursery related problems</td>
</tr>
<tr>
<td></td>
<td>• to come up with sustainable proposals for nursery management</td>
</tr>
</tbody>
</table>
### Do’s and don’ts of Extension Workers

#### The perfect moderator

<table>
<thead>
<tr>
<th>Do’s</th>
<th>Don’ts</th>
</tr>
</thead>
</table>
| • respect different opinions  
• be tactful  
• respect norms (prayers, greetings, dress code, etc.)  
• explain purpose of meeting  
• make link with previous meeting  
• clarify doubts before proceeding  
• respect time  
• share tasks and responsibilities with participants whenever possible  
• seek permission or consult all participants before making changes | • be too authoritative  
• act as a giraffe (look down on participants)  
• block participants tactlessly  
• condemn, accuse or judge participants  
• speak to the board during sessions  
• be insolent, impolite or rude  
• impose your view  
• ignore local knowledge  
• quarrel or get too much emotionally involved  
• demand for gifts (make abuse of hospitality) |

#### The perfect presenter

<table>
<thead>
<tr>
<th>Do’s</th>
<th>Don’t s</th>
</tr>
</thead>
</table>
| • explain purpose of presentation  
• agree on common language for presentation (make use of interpreter when necessary)  
• develop a clear presentation (readable handwriting)  
• have respect for norms  
• control emotions | • turn your back to the audience or face the board all the time  
• talk too fast  
• talk loud enough  
• shock audience by appearance (dressing, haircut, etc.)  
• shock audience by bad manners (peak your nose, etc.)  
• smoke while presenting  
• force audience to accept or agree |
**The perfect organizer**

<table>
<thead>
<tr>
<th>do’s</th>
<th>Don’t s</th>
</tr>
</thead>
<tbody>
<tr>
<td>• make realistic appointments (assure that you can be present)</td>
<td>• outnumbering participants (might intimidate group)</td>
</tr>
<tr>
<td>• explain the purpose of the planned activity when making appointments</td>
<td>• be too numerous as field workers (unless the roles are clearly agreed upon)</td>
</tr>
<tr>
<td>• staff should organise themselves: identify and agree on roles (moderation, recording, visualisation, etc.) beforehand</td>
<td>• making false promises</td>
</tr>
<tr>
<td>• make sure that you have all necessary materials with you (markers, cards, tape, etc.)</td>
<td>• coming too late</td>
</tr>
<tr>
<td>• take care of your appearance (approach, driving style, dressing, etc.)</td>
<td>• overloading your agenda</td>
</tr>
<tr>
<td>• use alternatives for visualisation when possible (symbols instead of cards, drawing on the ground, etc.)</td>
<td>• taking vehicle right up to the meeting place</td>
</tr>
<tr>
<td></td>
<td>• having meetings without sufficient participants</td>
</tr>
<tr>
<td></td>
<td>• staff quarrels in front of participants</td>
</tr>
</tbody>
</table>

During PFM start-up, specific sensitization encompasses to sensitize community and/or forest committee members and local authorities on:

- identifying an adequate forest area and establishing a reasonable boundary
- forming a forest committee and determining the functions and tasks of the committee members
- the need for conducting forest assessments and establishing work plans
- implementing work plans
- development of marketing and transformation strategies
- regulating the access to and use of the forest

In later PFM stages, specific sensitization has to focus on issues such as:

- record keeping and monitoring of forest management activities including financial administration
- devising and enforcing management rules and regulations
- applying sustainable and adapted forest management techniques
Therefore, specific sensitization is an activity which you need to carry out throughout PFM start-up and implementation. Suitable methods are mentioned in the respective modules.

**Extension Worker’s Checklist**

- Have you informed the chief about your extension programme?

- Have you all material for adequate visualization?

- Have you made all relevant appointments right on time and according to villagers’ schedule? Are you sure that the people you want to see are informed and aware of the agenda?

- Have you allowed sufficient time for feedback and joint analysis?

- Have you properly documented meetings and other exercises and submitted the documents to the village file and the forest station or field office?

- Have you informed other relevant institutions about your activities?
Module 3:
Participatory Identification of proposed forest areas as Participatory Forest Management Area

Procedure

Identification and demarcation of PFM Area involves the following steps:

· check possible constrains from villagers’ side and, if necessary, develop with your team members an approach strategy (based on the insights gained during general sensitization)
· sensitize villagers on technical forestry criteria and make them aware of an appropriate forest perimeter
· pre-identify and pre-assess the forest with a group of villagers
· jointly analyse the findings and feedback the results to the local authorities and probably to neighbouring villages which did not take part (use a resource map)

Technical Forestry Criteria to be Considered

The following criteria are to be mainly applied in those areas where communities have the possibility to select the proposed PFM Area among two or more forests or as portion of a larger coherent forest area. By considering these criteria, we will preserve those forests which still have a good stocking and structure.

In areas where these possibilities no more exist, particularly the criteria regarding the forest size and condition have to be adopted in a flexible manner in cooperation with the PFM unit. Although PFM approaches first of all aims at bringing forested areas under controlled management, PFM may also include or consist of non-forested land bond to be afforested by the communities.

There is no strict limitation of the number of communities which intend to jointly manage one forest. However, experience made in the past has shown that PFM hardly works if more than three villages are involved. Larger forests surrounded by several villages should be broken down into smaller areas. The management
responsibility of these areas should then be shared among the villages. The concerned community members need to be adequately sensitized on this issue by explaining the advantages of sharing the forest in terms of better communication, control, and work organization.

**Forest condition:** If there is a choice to select a PFM Area among different forests or as part of a large forest area convince villagers to go for the best one or the best part. Do not accept all proposals which might be made by them.

**Forest perimeter:**
- preferably, the forest should have a more or less round or square shape;
- the perimeter should follow as much as possible physical features such as river banks, creeks, roads, and farmland boundaries.

**Note:** The shape and nature of the forest perimeter essentially determine the inputs necessary for fire protection (especially fire break establishment). Therefore, you have to adequately advise and sensitize villagers on an appropriate forest perimeter (visualization!!). The forest officer in charge shall not to accept all proposals made by the community members on forest boundary issues. Rather this officer has to intervene unless compromises are reached which are acceptable to both parties (i.e., the Forestry Services and the villagers).

**Pre-identifying and Pre-assessing Forests on Village/ Communal Land**

**Participants:** the village chief, village elders, land owners who own farm land adjacent to the forest, other interested villagers (max. 10 to 12 participants; ensure that the participants are acquainted with the area)

**Methods/Tools:** transect walk, resource mapping by applying participatory tools.

**Issues:** clarify: what is the extent of the forest (where should be the corner points)?
- who traditionally owns it?
- who is using it at present?
- what are the main products presently used?
- does the situation match the technical forestry criteria?
who shall be the future managers?
who else should benefit from this forest?

**Next Steps:**

确保结果的联合分析结果被邻近的村庄以及地方政府（这是您陪同村民小组评估共同认识的职责）沟通。

如果之后没有达成一致，进一步确定采取的措施（如会议、小组讨论、实地考察等；相关人员：村长、省森林管理局等）。

**Identifying the PFM Area**

**Participants:**

村长和乡长及其代表、来自村庄、邻近村庄和其它机构的代表（最多10到12人）

**Methods/Tools:**

森林实地考察、利用参与式工具绘制森林地图

**Issues:**

确定并同意与小组确定的森林管理区域的边界；

标记出边界线（确保它尽可能直）

**Next Steps:**

- 绘制森林管理区域的初步地图
- 向村民解释森林实地考察的结果，以进一步优化森林边界
- 如果必要，在另外一次实地考察中重新调整边界
- 需要完成边界调查，森林委员会成立后将进行。

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Extension Worker’s Checklist

■ Have you adequately informed and involved the local authorities? (If the chief does not have time to visit the forest, ask for the badge messenger or representative of Council of Elders to join you)

■ Have you adequately sensitized villagers on technical forestry criteria especially those referring to the forest perimeter? (think on fire breaks which may be established later; avoid an area increase step by step)

■ Have you adequately informed and involved neighbouring villages who may claim forest user rights? (don’t forget the village heads have to sign a Statement of the Neighbouring Village Heads) of the Forest Management Agreement

■ Have you properly discussed and documented issues relevant for forest management especially fire protection?
Module 4:

Forest Committee Formation

Functions and Tasks of a Forest Committee

Forest committees are responsible for administering and managing the PFM Area on behalf of the communities they represent. They have the task of:

- supervising all necessary procedures in passing tenure rights from the government to the community;
- general forest administration;
- information and communication with the various authorities and within the community or the communities;
- planning and work organisation (providing labour and local tools and materials);
- monitoring of PFM activities;
- making and enforcing rules and regulations;
- operating and accounting of the Local Forestry Fund.

Forest committees should automatically be registered with the Forestry Service upon conclusion of a Forest Management Agreement.

Forming the Management Committee

Requirements

Whenever the PFM Area is identified and its boundary determined, villagers have to be encouraged to set-up the forest committee. Latest at this stage you need to know the organizations and groups present in the village. In order to get this information, carry out an institutional analysis with both men and women.

In addition you should have a basic knowledge about the village (size, development, composition, structure, level of organisation, etc.). Collecting this socio-economic data can partly be done by applying participatory methods such as the village history, resource mapping, etc.. The other part is collected by having informal discussions with the village head, the imam/religious head, the youth leader, the lady president, and other resource persons.

Another important point is to contact the different forest user groups like cattle owners, licence holders, carpenters, woodcarvers, etc. Initially they can be reluctant to PFM Concept but often they are just bothered by a lot of unanswered questions and doubts. In such a case an open discussion can change their sceptical attitude.

Although the gathering of this information and the development of these exercises may be time consuming, they are indispensable for you to get an idea of what is
going on in the village as they allow the villagers to look at their own situation from another point of view. At the same time it is an occasion to build up a relationship of trust and understanding with the villagers.

You should also try to confirm or cross-check your information with institutions which are present in the locality.

**Women participation**

It is necessary that women are involved in PFM because they are the main collectors of firewood for home consumption and sale, fruits, leaves, etc. A sustainable management of the forest resources can have considerable positive effects on their daily lives.

Besides, women are an important labour force for certain PFM activities e.g. fire protection, planting, weeding. It has been experienced that active women participation also pushes men to get more involved. Women participation should be encouraged and at least one third of the forest committee should be female members.

A quite common problem is that although women are present during meetings they do not really participate. You cannot force participants to talk during meetings but you can create a stimulating atmosphere of involvement by addressing women with concrete questions. Or else, a separate meeting can be organized for women only and the results will be presented during a general meeting by a delegate who speaks for the women group.

**Committee composition**

There are two cases of committee composition; either for one village managing one forest or two or more villages managing one forest. In the latter case the villagers should organize themselves in workgroups at village level and select committee members to represent them in the (central) forest committee. The village based workgroup shall be in charge of organizing the work at village level.

**Identifying positions, tasks and responsibilities of committee members**

During a village meeting, you have to explain the purpose, function and tasks, and the typical composition of a forest committee. Villagers should be then asked to identify the body who will select the committee members. Most often this will be the entire community but it could be also the village council/elders, the Village Development Committee (VDC), or any other well established village organization.

Together with the villagers you need to discuss what PFM work includes and which positions can be identified for a committee. It is of utmost importance to advise the
villagers that only positions which really have a function are to be filled in. If not, they may create a huge committee with unclear responsibilities which may result in a lack of organisation and communication and thus leading to de-motivation. For example a sales & scales agent is not always necessary during the start-up phase. If need arises, new positions and committee members can be defined later on.

Once the committee positions and the number of persons are identified, they are visualised on cards and stuck on a big sheet. The next step is that the committee forming body agrees on the corresponding tasks and responsibilities for each position. Most positions also require specific skills or attitudes of the person who will be selected. Don’t forget to elaborate on such attitudes or competent requirements.

All results have to be documented on a chart which you leave in the village. Ask the villagers to review the findings among themselves. Based on this review they should propose during the next meeting persons who qualify for the different positions. Finally, schedule the meeting during which the committee members will be selected.

**Selecting the management committee members**

The selection of committee members is a process that has to be properly prepared by the responsible body and guided by the extension worker. Together, you should review all existing clans, ethnical groups and other active groups (women, youth, etc.) present in the village. It has to be emphasized that the forest committee should represent the entire village and not just a selected group. Next, you can give some advice on “democratic” selection: persons can be proposed but there should be a possibility to oppose with good argumentation or for the proposed person to refuse when he/she does not feel able to fulfil the tasks.

The final selection of the committee members is entirely left up to the committee forming body. The names of the selected committee members are written on the big sheet next to their respective positions. During the first forest committee meeting, each member should be individually asked to explain his/her tasks and responsibilities.
Review of forest committee positions

Committee positions are reviewed during the annual work planning session.

Training of Forest Committee Members

As important as a sound organizational structures is putting forest committee members in the position to administer and sustainable manage the PFM Area, and to formulate and enforce local forest management regulations. This requires a certain level of both managerial and technical skills, as well as a substantial knowledge on procedural and legal issues relevant to PFM.

Most managerial and technical skills training will be provided during carrying out the activities as described in the management and work plans. This on-the-job training or learning-by-doing takes place during the start-up and consolidation phases.

However, committee members need a sufficient knowledge on different steps of the PFM start-up procedure, on the parties involved in PFM and their roles and functions, on legal instruments and their implications. In particular, they must be made acquainted with the terms and conditions of Forest Management Agreements.

Therefore, you have to conduct 1 or even 2 training seminars once the committee is constituted. Discuss and agree with the committee members on the training topics. Properly prepare yourself and discuss with your co-workers beforehand how best to convey information on legal issues such as the terms and conditions of PFM Agreements. Jointly evaluate the training and take note of further training needs.

Extensionists’ Tasks and Pitfalls in Setting-up the Committee

Setting-up the forest committee is a vital step during PFM start-up. If this local organization is not well functioning, the PFM procedure and the passing on of tenure rights may be considerably delayed or even have to be stopped. On the other hand, community members shall enjoy their freedom in making decisions and in establishing an organization they trust and have confidence to.

Therefore, your role in the forest committee formation must be mainly that of an observer and a catalyst, but also that of an adviser and an animator. You should closely observe the processes of decision making, realize and make villagers aware of organizational shortcomings and constraints, and advise and motivate villagers how to avoid them.

The forest committee is the link between the Forestry Service and the involved village(s). PFM is not just a co-operation between the forest committee and the extension worker. Rather, committee members need to facilitate and encourage the information flow from the villagers to the extension worker and vice versa as they
have to continue to involve the whole community and keep the villagers informed of whatever was decided or discussed during the meetings. You need to encourage committee members to document meetings and discussions and to present the results to the rest of the villagers so that they can give a feedback.

**Monitoring of Committee performance**

The experience of PFM implementation has shown that committees do not always perform well. As we have seen before the Committee is an essential structure for the success of PFM, therefore it is extremely important that you make a quick assessment of the Committee’s performance during each of your regular contact. The poor performance of a committee can be easily identified. The following examples are typical symptoms for a committee which will need your attention:

- Planned meetings do not take place or take place after considerable delay;
- Meeting attendance is very poor (i.e. no more than 3 or 4 members);
- Committee members do not seem to be informed about the agenda;
- Records are not kept, documents have been lost;
- The work plan is not implemented;
- Just few villagers take part to the PFM activities;
- etc.

If you observe such problems you should react immediately to correct the situation.

**Measures to be taken to improve Committee performance**

Once you are convinced that a committee doesn’t function as expected the first step is to stop PFM implementation in the concerned area. The second step will be to organize a SWOT analysis or capacity scoring exercise with the PFM Committees.

SWOT is the acronym for the systematic assessment of: **Strength** - **Weakness** - **Opportunities** - **Threats**.

Capacity Scoring is a participatory process where CFCs give scores to the on performances of the committee based on agreed roles and responsibilities.

These exercises should be conducted with all committee members and other villagers as well. During the meeting the following questions will be asked and discussed:

- What are our major internal strengths?
What are our major internal weaknesses?

What major external opportunities do we have?

What major external threats do we have?

What are our collective roles and responsibilities?

What has been achieved?

The answers to these questions will provide valuable information on the internal strengths and weaknesses of the committee in relation to the external opportunities and threats it faces and will help you to identify capacity gaps of the PFMCs.

**Note:** During the discussions, you will have to stress the importance of a good functioning committee especially in view of committee evaluation during which it constitutes one of the main criteria of assessment. It should be made very clear that a PFM Agreement and its associated rights can be easily cancelled by the Forestry Service if the problems are not solved.

The SWOT analysis and Capacity scoring will indicate where the problems are lying and how they can be solved. The action to be taken can range from a simple clarification of misunderstandings or capacity strengthening or the change of a committee member to a complete change of committee or even to the revocation of the PFM Agreement.

As seen in the committee formation you should encourage the committee members to share the results of the SWOT analysis and Capacity Scoring results with the rest of the villagers.
Module 5:

Planning Sustainable Forest Management Activities

Purpose, Principles, and Requirements of Management Planning

Purpose

At the beginning of a planning period:

- control mechanism for the Forestry Service and as well for the community to see whether the selected forest committee has the intention to use the forest resources in a sustainable way (e.g. the Decentralized Forest Officers, for example, will not approve the plan if a forest clear cut/felling is planned);
- estimation of the required inputs (labour and expenses) and the expected outputs (income and benefits) for an easier mobilization of the labour force in the village because people want to know what they are supposed to do in the next years and what benefit can be expected.

During the planning period:

- reminder for the committee and the forester when, where and how to implement the planned activities;
- annual revision and probably adaption to new situations.

At the end of the first planning period:

- tool for the external evaluation which will decide if the PFM program will continue or not.

At the end of each planning period:

- internal evaluation of the plan implementation and development of an improved plan for the next period;
- internal evaluation of the benefit management (bookkeeping, benefit sharing);
- internal evaluation of committee performance over the past planting period and effectiveness on fire management.
Principles

Participation:

- the planning process must be participatory so that committee and community members identify themselves with the plan; PLA elements to be applied include: problem analysis, solution analysis, priority ranking and scoring;
- the planning process is the most important step towards self-management because it determines labour input and forest use, and it is the basis for an evaluation before the final ownership will be awarded;
- different interest and user groups which are ideally represented in the forest committee must be considered during the planning so that the result is going to be excepted by everybody in the community;
- the planning and later on, the carrying out of certain management activities shall never be imposed to communities; nor shall the concerned Forestry Service staff accept all activities, the committee or community member may propose.

Requirements

Information and achievements required beforehand include:

- a mutual understanding and acceptance of PFM by the committee has been constituted;
- the forest has been demarcated and assessed;
- information about the available labour force;
- information about other commitments of the village;
- information from other agencies working in the village (NGOs and other local organizations);
- about work motivation, communal working days, problems, etc..

Box 4: Steps of Forest Management Planning

Preparatory work:

- explaining the purpose of management planning, the processes involved, and the need for realistic work planning
- identifying the members of the technical working group and agreeing on time schedule and venue

Problem and solution analysis:

- review previous findings
- identifying of problems
- developing the problem tree
- turning the problems into solutions by developing a solution tree
- identifying forest development goal and objectives

Work planning

- transforming solutions into concrete and realistic activities and earmarking issues which need to be regulated
- priority ranking and scoring of activities
- specifying and further describing those activities to be carried out during the planning period
- developing the planning matrix by specifying for each activity the location, the time schedule, necessary inputs, expected outputs, assumptions and risks
- re-drawing and re-viewing the planning charts

Compilation of the management plan:

- processing and writing-up the results of the planning sessions
- presenting the results to the committee and final review
- compiling the management plan
- signing by the President
Preparing and Carrying-out Planning Workshops at Village Level

Logistical arrangements

The whole planning exercise in the village requires at least 2 to 3 separate sessions. The results of each meeting are linked with each other so that there should not be more than two weeks in between. Otherwise people will forget what was discussed.

In the village the usual arrangements for visualization have to be considered. Eventually, a second blackboard/pin board is helpful or use walls of buildings as improvised boards for visualization see box 4.

Participants

Participants are forest committee members who represent the village and all user groups. However, if the committee is rather big (more than 15 members), a smaller technical working group should be selected by the committee to avoid unnecessary and delaying discussions and disputes. Ensure adequate women participation. Further ensure that at least participants were involved in the forest assessment. Where a strong Village Development Committee exists, invite 1 or 2 representatives.

The moderation/facilitation of the planning workshop is quite complex and important issues are easily forgotten. Therefore, at least two moderators/ facilitators (forester and extension staff) should guide through the meetings. At least one of them must be experienced in such moderation/facilitation.

- agree on schedule and venue
- ensure the availability of sufficient aids for visualization
- explain the purpose of management planning and the planning procedure;
- explain the different plans to be developed (3- (5)-year management plan, annual work plan)
- review the findings and results of previous exercises (in particular forest assessment);
- explain the need for realistic work planning
Problem and Solution Analysis

Problem Analysis

Prior to defining the activities to be carried out in the forest, the actual problems which have to be solved have to be detected. The problem analysis is an exercise which helps identifying and qualifying the problems which affect the forest and the village/community.

The exercise aims at developing a problem tree. The trunk is the major/core problem, the roots are the causes of this problem and the branches are the effects on the forest or the village caused by the major/core problem. The major/core problem and its effects can be solved by finding solutions for the roots. If you kill the roots the whole tree will die.

Procedure:

· review of findings during the forest assessment; especially the impacts on the forest through fire, cattle, illegal activities, etc. should be discussed but not yet the management options;

· ask for serious problems concerning the forest, make drawings on cards of each and put them on a blackboard;

· ask for the major/core problem (usually forest degradation or lack of forest resources);

· ranking of problems: ask which of the mentioned problems lead directly to the major/core problem (direct causes: e.g. bush fires);

· ask if there are more direct causes (felling, over grazing, over utilization of fire wood, etc.);

· ask for the problems which lead to the direct causes (causes of causes, e.g. smoking, careless clearing of fields, hunting with fire, honey collection with fire, etc., lead to bush fires);

· develop the root of the problem tree until there are no answers from the villagers any more (always use "but why...?" questions);

· refer to the findings made during the forest assessment, whenever you think something important is missing, not put straight forward, or out of the context

Attention!! problems which cannot be solved through proper forest management such as "decreasing soil fertility on farmland, over population, Allah`s will, etc." should be discussed immediately, identified as unsolvable and put beside the problem tree; don`t hide or ignore them completely.
the branches of the problem tree (effects) can be found out by asking:” What will happen in the future if the major problem is not solved ?";

· ask first for the direct effects (less forest products, soil erosion, less wildlife, etc.);

· ask for effects of effects (less forest products lead to poorer living quality or higher expenses for buying substitutes)

· it’s enough to develop only few effects because they won`t be used in the further planning process; it`s just a verification that ‘cause - effect’ relationships have been understood.

Solution Analysis

After having identified the problems, they have to be turned into solutions. A second blackboard is required to develop the solution tree in the same way as the problem tree.

Procedure:

· start with the lowest problems of the root system of each direct cause and develop solutions (e.g. if all the causes for bush fires are solved then the direct cause "bush fire" is solved as well);

· more than one solution for a problem are possible;

· develop the solution tree in the same structure than the problem tree;

· whenever you put a new solution on the board, examine the ‘means - end’ relationship, if necessary revise, add, or delete;

· refer to the findings made during the forest assessment, whenever you think something important is missing, not put straight forward, or out of the context

· only discuss the causes but not the effects

Identifying forest development goals and objectives

This is the last step of the problem and solution analysis. Development goal and objectives are to be derived from the solution tree.

Procedure:

· look at the solution that solves the ‘major’ problem and phrase the forest development goal (e.g. if the major problem is "forest degradation", the solution would read "the forest condition is improved“ which could be phrased into “restoring of our forest resources for the benefit of our children” as overall development goal);

· look at the solutions under the ‘core’ solution and cluster them on the basis of:
similarity in sector, activity, or expertise (for instance, clusters may be named: forest protection, forest improvement, regulations to be made, training issues, procedural issues, etc.); these clusters reflect medium-term development objectives or main activities;

- if you result in too many clusters, focus down the choice of forest development objectives by making explicit the priorities for forest management (solutions which are not realisable or desirable at the present stage should be excluded and probably considered in the next planning, e.g. activities aiming at improving the forest condition such as reforestation, enrichment planting/sowing, etc.);

- phrase the forest management objectives out of the remaining clusters and display them;

- develop a list of realistic solutions by stating the overall development goal, the medium-term development objectives, and the activities which contribute to achieve the objectives.

**Work Planning**

The work planning session should be done a few days after the analysis session. It starts with reviewing the results of this session Box 5.

**Identifying forest management activities**

The identified priority solutions are not always directly practicable. During this exercise these solutions have to be transformed into realistic forest activities. Don’t forget to ask for alternatives. You may find more desirable solutions which, of course, must fit into the ‘means - end’ relationship (e.g. if the solution for honey collection with fire is honey collection without fire, activities could be: make and enforce adequate regulations which stop or condition the collection of wild honey, or, as an al There are some activities which are necessary to fulfil the duties described in the Forest Management Agreement (data collection and bookkeeping). You have to insist on their inclusion.

The session should result with a list of activities grouped according to main activities or medium-term development objectives. It is advisable to produce a separate list
displaying the rules and regulations to be made by the forest committee (e.g. participation in fire fighting, no smoking in the forest, controlled grazing, etc.;

**Ranking of forest management activities and developing the 3(5)-year planning matrix**

Not all listed activities will have the same priority towards achieving the medium-term development objectives. Therefore, the PFM committee is asked to rank the main activities according to the importance for the village and, if necessary, skip some. The responsible forest officer has to advise and check on a realistic selection.

The main activities are then transferred into the first column of the planning matrix. The other column is filled activity by activity. Each square of the matrix has to be thoroughly discussed by the group until a common understanding is achieved, and the results are properly documented. Display the survey map in order to specify the location where the activities will be carried out in the forest (Management Map).

The same planning matrix structure is to be used for both the 3-year and 5-year management planning.

**Detailed work planning - 1-year planning matrix**

In order to keep the management planning flexible and to provide forest committees with a handy and practical management tool, each forest committee shall prepare annual work plans.

**Chart 2: Structure of Planning Matrix**

<table>
<thead>
<tr>
<th>Main Activities</th>
<th>Location</th>
<th>Time Schedule</th>
<th>Required inputs</th>
<th>Expected results/outputs</th>
<th>Responsibility</th>
<th>Assumptions'/risks</th>
</tr>
</thead>
</table>

**Location** refers to the place where the activity takes place in the forest (display the survey map)

**Time Schedule** refers to the planning period

**Required Input** includes seedlings, seeds, tools, etc. (try to quantify and indicate provided by whom)
**Responsibility** refers to the person or group of persons the committee makes responsible for carrying out the activity

**Assumptions/risks** refer to external factors that may have an influence on result achievement (e.g. material support provided by NGOs, the Forestry Services, projects, etc.)

The 1-year matrix is derived from the 3(5)-year planning matrix and further details and specifies the management activities as much as villagers’ understanding requires. There is no specific period to start the work plan but it should coincide with the 3(5)-year planning matrix. However it is advised to choose a period of low field activity to get a better participation of the committee members and a better availability of the forestry and extension staff.

The 1-year matrix has almost the same structure as the 3(5)-year matrix. However now, the sub-activities shall be listed and put in chronological order *(e.g. establishment of green fire break: 1. marking of trees to be felled on the strip, 2. felling of trees, 3. processing into marketable wood products, 4. clearing of shrubs and grass on the strip, 5. ploughing, 6. planting, 7. weeding, 8. beating up)* so that committee members can easily see what to do next. The main activities must be not mentioned in this detailed planning since they most often last over several years.

Just as the 3(5)-years planning matrix, the 1-year matrix shall indicate but further specify:

- the location where the sub-activity takes place within the forest (use the management map);
- the time when the sub-activity is carried out;
- expected results or outputs at the end of the year;
- necessary inputs;
- clearly assigned responsibilities of all parties involved by naming the persons in charge.
There is no need to repeat assumptions/risks in the detailed work planning.

Joint review of findings and results

Although the planning was done in a participatory way, the committee should have the chance to think it over and eventually change some details. The presentation of the re-drawn tables is a good opportunity for last corrections and probably changes.

This presentation and final review also reduces unnecessary compilation work in the case the committee wants to add, delete, or modify some activities.

Compilation of Management and Work Plans

Management plans (3 or 5 years)

Who compiles?

The first plan: the head of Decentralized Forest Management Unit or PFM coordinator from the collaboration institution

All other plans: the forest committee assisted by the DFA or PFM coordinator

When?

The first plan: within 2 weeks after the joint analysis and final review of the planning (see above)

All other plans: 2 months prior to the expiry of the actual plan

Content and Structure: see box above

Procedure: prepare the draft plan

Box 6: Structure and Content of Management Plans

1. Introduction
   brief overview of the PFM history, procedure of plan establishment and persons involved, achievements in forest work, committee members and their positions

2. General Information
   village history, professions, cultural groups, infrastructure, population, labour force, local and external organizations, information on the village resources and use including livestock

3. Results of Forest Assessment

4. Management goals, objectives and development priorities (results of analysis session)

5. Planned activities and management directives (results of planning session)
   brief verbal description of each activity, it’s implementing procedure and schedule, necessary inputs, responsibilities
· present the draft plan to the forest committee for last comments and final review (consider enough time in explaining the monitoring form-sheets and adapt the sheets as planned activities and committee members’ understanding may require)

· prepare the final plan

· ensure that villagers are adequately informed about the plan content

· ensure that the committee president/ chair person signs the plan

· submit the plan to the DFA (the first or preliminary plan has to be submitted together with the filled Forest Management Agreement form

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**Box 7: Structure and Content of Annual Work Plans**

1. Introduction
   - procedure of plan establishment and persons involved

2. Evaluation results of the previous plan
   - brief description of the performance of the committee and of the activities carried out including plan deviation and its reasons, problems and conflicts accrued, and how they have been solved

3. Planned forest management activities
   - 1-year planning matrix and brief description of each new activity which is not part of the management plan

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**Annual Work Plans**

Annual work plans are committee and village internal management and monitoring tools established within the frame of the management plan. As such, they do not require approval by the Forestry Service, but the committee is obliged to forward a copy of each work plan to the DFA head. Without presenting a work plan of the respective period, no forest exploitation licenses or permits shall be issued.

Prior to developing the succeeding work plan, the level of achievement of the recent work plan shall be evaluated by the forest committee and compared with the expected results as set out in the management plan. Any plan deviation from the annual plan shall be explained and recorded by using the respective standard form sheet as provided in the management plan see box 7.

Who compiles? The committee, the technical working group or any other group the committee may identify, assisted by the DFA head or PFM coordinator

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When? The first plan together with the management plan; all succeeding plans at latest 1 month prior to the expiry of the actual plan

Content and Structure: see box above

Procedure: · except for the first plan, assess the performance of the committee and review forest committee positions *(whenever the assessment reveals a low performance, encourage villagers to review the posting of committee members)*

· except for the first plan, jointly assess the performance of activities carried out including plan deviations and its reasons, problems and conflicts accrued, and how they have been solved

· develop the 1-year planning matrix together with the committee based on the assessment results and the management plan; if necessary, adjust the management plan by using the respective form-sheets

· re-draw the 1-year matrix and write-up the findings and conclusions together with the committee
· final plan review by the committee
· submit a copy of the annual work plan to the DFA head.

Extension Worker’s Checklist

■ Have you collected all information and data and have you compiled and prepared all previous findings necessary for management planning?
■ Have you made yourself acquainted with the planning procedure and methods to be used?
■ Have you properly scheduled the different sessions (not too much but also not too less time in between)?
■ Have you arranged for appropriate visual aids (e.g. second board, pins, cards, paper, etc.)?
Module 6

Concluding Forest Management Agreement

The conclusion of Forest Management Agreement and the subsequent designation of the forest order mark the end of the formal transfer of ownership and responsibility of forest areas to the communities. This important agreement is signed by the relevant communities and the Minister responsible forestry, which may be represented by the Director.

At the community level, the President of the PFM management committee and all the executive committee members shall sign the agreement. The agreement shall be done in two copies, one of which is given to the forest committee while the other copy is returned to the Forestry Service. The agreement shall be witnessed at the village level by either the village head or the head of the district. The Regional Forest Officer will also sign the agreement as a principal witness for the Forestry Service.

Completion and Processing of the Management Agreement
The Forestry Service shall fill the Management Agreement form on behalf of a particular committee after it has been positively evaluated. The following activities need to be accomplished before the Forestry Service considers any request:

I. positive evaluation report from the DFA;

II. final demarcation and surveying of the proposed Forest;

III. completion of both gazette notification and order procedures; and

IV. completion of a five-year management plan, which should be approved by the Regional Forest Officer; this plan should be submitted to Forestry Service Participatory Forest Management unit for verification.

Upon conclusion of the final survey, the DFA shall develop a schedule, which is forwarded to the Minister requesting for a Forest Notice in the gazette and a subsequent Forest Order after the three months has finished.

**Attachments to Forest Management Agreement**

Terms and conditions specifying the administration of the Forest, along with rights and obligations of the Forestry Service and the concerned communities, shall be attached to the Management Agreement.

**Revocation of Forest Management Agreement**

Where a forest committee has been convicted under rules governing the management of the Forest more than three times within a period of one year, or the damages for which it has been convicted are found to deplete or to endanger the Forest, the Minister may instruct the Director to conduct an evaluation of the forest committee. Provided that the evaluation undertaken in accordance with regulation and rules has proven severe misconduct by the forest committee, the Minister may instruct the Director to revoke fully or partly the granted rights by de-reserving the entire Forest or part of it, and as such a de-reserved Forest or parts of it shall become a forest reserve/ State Forest.
Module 7:  
Commercialization of Sustainable Forest Management Products and transformation processes

Purpose

A Participatory Managed Forest have to be utilised in a sustainable manner. This means that forest exploitation is subjected to some conditions. Management plans, as designed for PFM Areas, are one tool to organise the exploitation of forest products but they only provide indications concerning the location, the type of product and the time of harvest. However, because a simple forest assessment is carried out and not a forest inventory, the management plans cannot provide any quantitative information, i.e. number of trees or volume of timber which can be harvested. Therefore Forestry Services has to develop guidelines to ensure rational forest exploitation without endangering the future of the forest stands. These guidelines should provide the forester and the committee members with a set of criteria which will help them to determine if a specific forest product can be harvested or not.

Roles of the Forestry Service and of Forest Management Committees

The Forestry Service is responsible for:

- providing advice to the forest committee members concerning the exploitation and marketing of forest products coming from the PFM Area in accordance with the management plan and the conditions set in the Forest Management Agreement;
- monitoring and controlling all these activities;
- delivering licenses and permits

The Forest Management committee is responsible for:

- the planning of harvesting activities;
- the recording of all quantities and types of products exploited from the PFM Area;
- obtaining and keeping valid licences or permits for products they are harvesting;
- endeavour in value addition and transformations;
- ensuring that products are sold to vendors holding valid licenses.

Forest removal permit: when transporting forest products, a removal permit is required; the permit should be issued by the Decentralized Forest Management Offices and has to be signed by the committee president, secretary, and treasurer; in the case the products are transported by a reseller or processor (saw miller),
his/her license number and the date of issuance have to be indicated on the permit. The removal permit should be issued free of charge and on special PFM removal permit forms;

**PFM vendor license:** a PFM committee willing to market the firewood harvested in his own managed forest area is free to do so. But the committee has to apply for a vendor license to the Forestry Service. This license should be issued free of charge to the committee and will mention the name of the person responsible for the sale.

**Royalties and other Taxes:** PFM Committees should be exempted to pay royalties on forest products they intend to sell in the urban areas if these products are coming from their own forest. However if they sell these products to a vendor with a valid licence, it will be the responsibility of this vendor to pay royalties when transporting the products.

**Timber (Deadwood)**

There is no constraint concerning deadwood depending on country context. It can be harvested at any time. But people have to realise the advantages and disadvantages of whole or moderate exploitation.

- **High rate of exploitation:**
  - Large quantity of wood allows negotiating with the buyer and obtaining a good price
  - Income is important at once but there will be no income in the following years
  - No risk to lose the deadwood in an accidental fire

- **Average rate of exploitation:**
  - Regular income year after year
  - Income depends on the market price (actual trend on the increase, i.e.: will benefit from increasing prices)

- **Low rate of exploitation:**
  - Difficulties to sale small quantities (less than a truck load)
  - Low income but will be sustainable in the long run
  - Risk to lose not harvested wood at once in case of accidental fire in the Forest
Factors to be considered when planning harvesting activities

The forester is there to present and discuss the advantages and disadvantages of each method. But, in any case, the final decision belongs to the Forest Management Committee.

**Live trees**

For the harvesting of live trees, some conditions and criteria must be taken into account. They are mainly related to stand density (canopy closure), the size of the considered tree (diameter) and the presence of regeneration.

**Firewood**

Dead trees or branches of trees harvested for timber will be collected. For live tree, the same criteria for timber has to be taken into account (see above).

**Fence Post**

Where there are cluster of young trees, thinning is possible. During the thinning operation always try to favour valuable trees by removing lesser species around them till you reach 30% canopy closure. Where the coppices appear, singling can be done and at least one stick (the best one) per stump should be kept.

**Non Wood Products**

An example of PALM LEAVES: no more than two mature leaves per palm should be collected in order to avoid weakening the palm

BARKS/ROOTS: collection of barks and roots is very destructive and can only be allowed on small scale for medical or traditional purposes without any commercial view. Small quantity should be collected from selected tree to avoid killing them.

FRUITS: fruits should be left on the tree until they are fully ripe. Some fruits should be left on the tree or on the ground for regeneration purpose

GRASS: Grazing activity in young firebreaks or in areas where natural regeneration of palatable species occurs should be avoided. Grass collection should first take place in stands where it helps to increase the fire protection.

LEAVES: if leaves are used to feed cattle, fodder should be collected only by loping few branches per tree.
Procedure

1. Specify the product to be harvested during the annual work planning complemented by an Enterprise Development Plan (see Market Analysis and Development sub-chapter)
2. The Decentralized Forest Administrative (DFA) head recommends to the Regional Forest Officer the issuance of a PFM license for those products specified in the annual work plan:
3. If necessary, assist the communities in identifying vendors and provide advice on organizing and supervising the exploitation activities:
4. Upon request of the PFMCs or a vendor, the DFA head issues a removal permit whenever the exploitation is completed and the products have been inspected by the DFA head (he/she have to specify the product, product serial number and quantity on the removal permit)
5. Payment of Royalties: the committee has not to pay royalties for forest products extracted from the PFM Area if the products are sold to a person holding a valid license for such products in which case this person is responsible; however, if the committee is marketing the products. It has to pay royalties as any other license holder:
6. Ensure that the production data are recorded by the committee and are available at the forest station or field office:
7. Establishment of a local fund: at least upon receiving the first proceeds from the sale of products, the PFMCs has to establish its local PFM Fund to be deposited on a bank account/village savings scheme and administered by the committee president, secretary and treasurer:

Monitoring and Control of Exploitation Activities

Monitoring by the PFMCs

PFM production and disposal have to be monitored by the PFMCs using the form sheet which should be attached to each management plan;

Monitoring by the DFA head/ Extension Agents

The forest staff should remind and assist the PFMCs to properly record all necessary information.

At each forest station or field office, PFM production and sales have to be recorded by using the same form-sheet as the Community Forests. The DFA head is responsible for reporting in the semestrial report the production data of PFM Areas to the RFO.
The same officer has to report on the revenue derived from the collection of royalties on a monthly basis.

Assessment of forest product exploitation

Since it will not be possible for the forest guard to be present for the selection of the trees to be felled in each PFM Areas, a control system has to be set up in order to make sure that the exploitation is done in a sustainable way, according to the above mentioned criteria.

The forest guard has to monitor exploitation activities from time to time and at least once every three months in PFM Areas where exploitation took place in order to check that the selection of the trees has been done properly by the committee.

Assessment criteria in areas where exploitation took place (stump visible):

- Check which species has been felled
- Check if regeneration is present and will be sufficient to re-establish the natural structure of the forest
- Check what remains from the canopy closure (at least 30%)

Marketing:

Market Analysis and Development (MA&D)

Introduction

The primary purpose of MA&D is to assist Participatory Forest Management Communities in identifying and implementing micro and small-scale tree and forest product enterprises that can significantly strengthen their existing livelihood strategies through increased household and community income and improved natural resource management.

MA&D serves as a guide to PFM communities for sustainable utilization of their forest products under the guiding principles of MA&D.

MA&D process systematically consider social and environmental concerns alongside the technological, commercial and financial aspects of enterprise development, under five areas.

Five areas of Enterprise Development

- Market/ Economy,
- Resource Management/ Environment,
- Social,
• Institutional,
• Science/ Technology.

Focus of MA&D

Four important aspects of development promoted by MA&D:

1. SUSTAINABILITY

Resource sustainability

MA&D puts emphases on the maintenance of the resource base for the development of enterprises on forest products/services. A product-based survey is conducted in phase 2 on the shortlisted products from phase 1 prior to the final selection, to ensure that the resource base for that particular product is healthy and has the regeneration potential to sustain the enterprise on long-term bases.

Market sustainability

Periodic assessment of the market environment is conducted by entrepreneurs to deal with possible changes on the products and services, in order to remain competitive and attractive to the targeted customers.

Social sustainability

MA&D assists in identifying and considering potential areas of conflicts and promotes equitable distribution of enterprise funds, through participatory decision making process. At the end of any marketing period, interest group member through the Village Development Committee organize a feedback meeting, where they will inform the entire community about the enterprise activities. Proceed from the enterprise is spent on village development activities through priority ranking by the entire community.

Institutional sustainability

MA&D ensures that institutional requirements for the production, processing and marketing are all considered for the development of enterprise on forest products/services.

Technical sustainability

Assessments are conducted during the MA&D process to identify possible skill gaps within the community in embarking on enterprises developed by interest group members, which requires training on handling equipments, production, processing and the marketing processes.
2. **PARTICIPATION:**
- The MA&D involves target group members of the community during the entire process;
- Target group members decides on the type of enterprise they want to develop;
- The selection process of a product is determined by them through setting their own criteria;
- Interest groups are formed around each product, and are responsible for the development and marketing aspects of that particular product;
- The willingness and participation of the target group is manifested throughout the entire process, for the sustainable development and successful implementation of the enterprise.

3. **CAPACITY BUILDING**
Target group members capacity is built as an ongoing process throughout the four phases of the MA&D, for communities to be able to control their own resources and to develop and implement viable enterprises.

4. **STRATEGIC ALLIANCES**
Support to natural resource-based enterprises can hardly be delivered by one service provider because several different types of expertise are needed.

**Purpose of strategic alliances is:**

- to negotiate technical assistance or business development services;
- to negotiate purchase contracts between producers and customers; and
- arrange financial support contracts/short-term loans for working capital financial institutions.

**Steps to follow in creating strategic alliances**

In order to create strategic alliances, target group members need to:

- assess their main strengths and constraints:
- list the area where external assistance is most crucial;
- select other members in the chain who could also benefit from the alliance;
- identify indirect actors in each of the target areas of enterprise development who could assist in overcoming constraints (for example, partners who could solve technical problems or develop institutional structures);
- assess the nature of existing relationships with the selected key actors; and
- eliminate from consideration or give lower priority to actors with whom a relationship is not necessary.
The Market Analysis and Development Process

Market Analysis and Development (MA&D) provides a framework for planning tree and forest product enterprises. It is a step-by-step process, arranged in four phases.

The following are the four phases in the MA&D process.

Phase 1: Assess the existing situation.

Understand the issues; define the problems and opportunities, and short list a range of products.

This is an exploratory phase that aims to generate an understanding of the key issues of the existing situation.

The steps in Phase 1 are:

- STEP 1 The Facilitator with the communities identify the target group of entrepreneurs
- STEP 2 The Facilitator assists the Target Group in accessing their capabilities to become entrepreneurs
- STEP 3 The Facilitator assists the Target Group in list existing available local resources and products
- STEP 4 The Facilitator assists the Target Group in identifying the main constraints of the market system
- STEP 5 The Facilitator assists the Target Group in short listing a range of potential products
- STEP 6 The Facilitator raises awareness on the fact that the group work allows a strong position on the market

The outputs are:

- A group of potential entrepreneurs willing to explore potential development of enterprises
- A shortlist of potential resources and products that will be evaluated in Phase

<table>
<thead>
<tr>
<th>The type of information collection under phase 1 includes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What are the potential enterprises?</td>
</tr>
<tr>
<td>• Who are the potential entrepreneurs and what is their capacity?</td>
</tr>
<tr>
<td>• What are the available resources and products?</td>
</tr>
<tr>
<td>• What are the opportunities and constraints with the existing value chains and market system?</td>
</tr>
</tbody>
</table>

The MA&D process starts from what already exists, considering products that are already traded and that provide income to the target group. In addition, opportunities for introducing new value-added technologies to existing products or
introducing new products are assessed. Community members will describe their experience with production, processing and trade of tree and forest products.

**The type of questions community members will answer includes:**

- What do they collect from the forest?
- At what time of the year do they collect the products?
- What income do they get from these products?
- Where do they sell them?
- Do they receive any support from the local DoF or other field offices?

You will help villagers discover viable products that are best suited to their economic expectations and yet that also offer possibilities of expansion and long-term sustainable exploitation.

As a result of the information gathered and the analysis of Phase 1, products will be short-listed for in-depth feasibility studies in Phase 2.

**Phase 2: Carry out market system Analysis**

**The steps in Phase 2 are:**

- **STEP 1** The Facilitator assists the Target Group in collecting data in the 5 Areas of Enterprise Development
- **STEP 2** The Facilitator assists the Target Group in selecting the best products
- **STEP 3** The Facilitator assists the Target Group in initiating a reflection on the most appropriate kind/form of enterprise

**The outputs are:**

- Final selection of the most promising products
- Collection of data needed for the design of the Enterprise Development Plan.
- Entrepreneurs are aware of the most appropriate kinds/forms of enterprises

**A number of problems can occur if an attempt is made to develop an enterprise without going through the steps of Phase 2. These problems include:**

- Un-sustainability of the resource and/or the market,
- Economic dependence on one product or type of product,
- Erratic supply,
- Poor product quality,
- Low income from the product (poor return),
- Lack of capital either for initial investments or for overhead costs,
- Non-compliance with current rules and regulations,
- Unawareness of important rules and regulations,
- Unawareness of sources of assistance (such as credit or technical expertise), and
Phase 2: Preparation of the Enterprise Development Plan

In Phase 2, the following questions are asked:

- Which products have the best current and market potentials?
- What kind of technology, organizational structure, capacity and capital would be necessary in order to access potential markets?
- Which products generate a net return and fit the expectations of the target group?

Phase 3: Prepare the Enterprise Development Plan.

As a result of the work carried out in Phase 1 and Phase 2, products and markets that are socially and environmentally sustainable as well as financially promising should have been identified.

Under phase 3 you will formulate a plan that integrates all the strategies and services needed by the enterprise in order to be successful. These include market, environmental, social/institutional and technological strategies.

The steps in Phase 3 are:

- STEP 1: The Facilitator assists the Target Group in analyzing the data collected in Step 1 in order to refine the Enterprise Ideas including the financial setup of their enterprise
- STEP 2: The Facilitator guides the entrepreneurs in the preparation of their Enterprise Development Plans
- STEP 3: The Facilitator in collaboration with the project team identify the needs for training and assistance

The outputs are:

- The Entrepreneurs have identify strategies for their enterprises including the financing schemes
- Each enterprise (or group of) prepares a specific EDP including yearly implementation plan for the pilot enterprises
- The needs for training and assistance are identified from the EDPs

Phase 4: Follow up and assist entrepreneurs in the starting stage

Step 1: The facilitator guides the entrepreneurs in obtaining finance internally or externally according to needs mentioned in their EDP
Step 2: The facilitator guides the entrepreneurs in getting appropriate training needs for starting of their enterprise
Step 3: The facilitator guides the entrepreneurs in starting their activities (at pilot level)
Step 4: The facilitator assists the entrepreneurs in monitoring their enterprise activities and evaluate the enterprise results (performance)

**Outputs:**
- Each entrepreneur receive a personalized assistance (financing, training, etc.) during the starting stage of his/her enterprise
- Entrepreneurs have started enterprise activities with support of facilitator
- Entrepreneurs used the tools for monitoring their enterprise activities and evaluate their enterprise results
Direct Combustion Technologies

The most available and relatively sustainable cooking fuels are split and branch wood, supplemented by loose agricultural residues. They can be used for direct combustion without further processing, if used in compatible stoves or fireplaces. Stoves and fireplaces form the connection point between fuel and cooking equipment and need to be highly attuned to both. The nationally available and affordable stoves and fireplaces for the above recommended fuels are listed below.

Improved stoves

Improved stoves are highly compatible with the respective fuels used for domestic purposes, minimize the need for fuel, reduce smoke and provide a certain degree of safety and comfort. As a technology with the potential to serve a variety of fuels and a wide range of households, due to their simple technology and affordability, improved stoves play a key role in households.

Most of the improved stoves are metal stoves, which can be produced by local welders in the countries for relatively affordable prices. Also mud and clay versions are possible, which can be produced by potteries. However, clay stoves have not found high acceptance in other countries, due to their fragile nature and weight. It also has to be regarded, that pottery stove production demand huge amounts of fuel for baking. The clay versions are therefore more affordable alternative to metal stoves. However, promotion of clay stoves might be more successful within the pottery villages and can be more sustainable, if combined with projects for improved pottery kiln technologies.

The charcoal pots and “Forno Jambar” are not listed here as they are specifically made for charcoal, which is not a considerable fuel due to its strong impact on deforestation.
“Forno Nofflie”/Rocket Stove

The Forno Nofflie, which is a type of rocket stove, is mostly made of metal. The main characteristics are the double chamber, the feeding hole, an ash dropping tray on the bottom and often ventilation holes on the side of the inner chamber. It exists in variations of sizes and proportions, and can include insulation with mud.

Picture 2: Varieties of “Forno Nofflie”/Rocket Stove

The stoves are movable and save resources and reduce smoke emission and pollution. There is less smoke during cooking process and there is less soot in the kitchen.

Mayan Turbo Stove

The Mayan Turbo Stove (MTS) is compatible to a high diversity of fuel, especially loose material as husks, but also broken twigs, corn cobs and briquettes. It cooks fast and reduces smoke. Therefore it is highly considerable as a supplement to “Forno Nofflie”/Rocket Stoves in case of seasonal shortage of branch wood.

Picture 3: Mayan Turbo stove
“Kumba Gaye” stove

Introduced in the 90’s, constructed from fermented straws, mud and cow dung mixture. The stove would form the shape of a hollowed mound with a feeding hole and through shaping around the pot for exactly fitting the pots in use. Interestingly, the women would pass on the knowledge free of charge from one village to the next, but the construction skills were not passed on from one generation to the next. Villagers complained about the short lifetime of the stove and the difficult construction process.

Malian Stove

The Malian stove has reportedly been introduced by the Bambaras. It is simply a ½ to ¾ circular mould and resembles to the “Kumba Gaye” stoves. The construction of the stove, which is made from mud and cement, is a paid service within the communities. As it is an inbuilt stove, the cook would be exposed to extreme smoke during the cooking process. An improved version with better protection of the fire and exhaust to the outside would make it a considerable technology.
Saw Dust Stove
The saw dust stove is made from used metal buckets by simply inserting an air hole on the bottom side. The sawdust or other loose material would be compacted in the bucket, whilst sparing a channel in the middle and towards the air supply hole. This technology is a very simple and affordable solution, which could still be improved through insulation layers.

Ouga
The Ouga stove is a simple and well affordable metal stove, which keeps the fire and pot in place, thus contributes to safety, but cannot be considered as fuel efficient. It is available in all the major markets. Due to its low efficiency and the continuous smoke production, it is not recommended. However, producers and traders of this
common stove can be involved in the production and trading of more improved stoves.

![Picture 7: Ouga Stove](image)

**Three Stone/Fire places**

The fireplaces are simple cooking facilities and fuel inefficient, cause a lot of smoke and are relatively unsafe and uncomfortable. They are listed here rather as a baseline, than a potential technology. However, due to the low costs and efforts involved in these settings, the majority of cooks in rural areas are using especially the three corner stone version.

![Picture 8: Three Stone](image)
**Tripod**
The tripod is basically a holder for the pot. The fire is even more open than with the three corner stone, but can be used in combination with the three corner stone setting.

![Tripod stove](image)

Picture 9: **Tripod stove**
Summary on Combustion Technologies
Stoves and fireplaces are the most potential technology for the available fuels. Following stove typologies have been recorded and evaluated in their local context through interviews and observations.

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Material</th>
<th>Efficiency</th>
<th>Smoke Reduction</th>
<th>Potential Fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nofflie</td>
<td>Metal</td>
<td>high</td>
<td>high</td>
<td>Solid</td>
</tr>
<tr>
<td>2</td>
<td>Rocket</td>
<td>Metal</td>
<td>high</td>
<td>high</td>
<td>solid</td>
</tr>
<tr>
<td>3</td>
<td>Mayan</td>
<td>Metal</td>
<td>high</td>
<td>high</td>
<td>Solid and loose</td>
</tr>
<tr>
<td>4</td>
<td>Kumba Gaye</td>
<td>Mud</td>
<td>medium</td>
<td>medium</td>
<td>Solid</td>
</tr>
<tr>
<td>5</td>
<td>Sawdust</td>
<td>Metal</td>
<td>medium</td>
<td>medium</td>
<td>loose</td>
</tr>
<tr>
<td>6</td>
<td>Malian Stove</td>
<td>Mud/cement</td>
<td>low</td>
<td>low</td>
<td>Solid</td>
</tr>
<tr>
<td>7</td>
<td>Ouga</td>
<td>metal</td>
<td>low</td>
<td>low</td>
<td>Solid</td>
</tr>
<tr>
<td>8</td>
<td>Tripod</td>
<td>metal</td>
<td>low</td>
<td>low</td>
<td>Solid</td>
</tr>
<tr>
<td>9</td>
<td>Three Corner Stone</td>
<td>Stones or bricks</td>
<td>low</td>
<td>low</td>
<td>solid</td>
</tr>
</tbody>
</table>

Efficiency and smoke have not been technically measured, but only the perceived and observed impressions have been analyzed. The positive performance of the potential stoves is clearly visible and the positive impact has been felt and reported by users. It is striking, but also logical, that the most efficient and smoke reducing stoves are the ones, which had been distributed by the active NGOs, as they have undergone a screening, selection and improvement processes.

Thus, the Nofflie and the Rocket stoves are highly compatible with the main available fuel and convince the users through efficiency and smoke reduction. Therefore they were graded with high potential for further replication. Also the Mayan Turbo Stove is highly efficient, but the compatible fuel is not as abundant and in competition with other uses. The Kumba Gaye Stove also received appreciation, however, their replication can only be recommended, if improvements are undertaken towards more efficiency and smoke reduction. The only disadvantage of efficient stoves over the locally common solutions is the relatively high prices.

The price plays a significant role in the potential of adoption of stoves. It could be observed, that most households would prefer an improved stove, but could not afford it. Therefore, as the commonly used three corner stone is basically free of charge, it is difficult for improved stoves to compete with the three corner stone, despite all social, economical and environmental long term advantages. Movable metal stoves are preferred and their potential to be replicated is high due to the presence of well skilled and equipped welding workshops in the Region.