

**The development of a participatory forest  
monitoring system for community managed  
forests.**

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**13<sup>th</sup> – 27<sup>th</sup> April 2003**

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The views expressed herein are those of the consultant, and do not represent any official view of the  
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## *Executive Summary*

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### **Introduction**

The ‘developing a participatory forest monitoring system for community managed forests’ consultancy was undertaken by Dr Gavin Jordan during April 2003. The main emphasis of the input was to develop and test Participatory Forest Resource Assessment (PFRA) methods that met stakeholder monitoring and information requirements and were practicable.

Forest management is based on developing management prescriptions that are designed to meet specific, defined objectives, documented in a management plan. To determine whether management is effective, there is a need to monitor whether these objectives are being met. This requires base-line information on the forest resource and its condition, which can be used to assess change in the future, by repeating the assessment. The future assessment, or monitoring, will normally involve re-measuring the base-line parameters, and reviewing the management plan with regard to the new information.

Without information on a forest resource it is very difficult to manage it, and impossible to determine whether the management is improving the resource. For community forestry, this resource assessment is conducted as participatory forest monitoring, usually known as Participatory Forest Resource Assessment (PFRA). PFRA involves the local community in resource assessment: this is essential for community forestry as objectives need to be community oriented. A conventional inventory will not work, as community involvement, information and objectives are all core elements.

This report details the activities that were conducted to address the development of a PFRA suitable for the Participatory Forest Management Project and for wider adoption and application in an Ethiopian context. A team of Government foresters, with NGO forestry input, worked with the consultant to develop a PFRA method. There was an initial period of review discussion and method development, followed by field-testing of the method. This was then reviewed by the group and other interested parties, and this feedback was used to develop a refined method.

### **Main Issues Identified**

There have been a number of attempts at inventory and resource assessment to support community forestry in Ethiopia, but these have not been fully successful. The main problem has been their complexity, which has led to a lack of replicability. This is a common occurrence in community forestry, and international experience has shown that assessment methods have to be simple if they are to work effectively in reality (see section 1.2). It was quickly determined that if a method was to be workable and replicable it needed to be simple and practical.

Monitoring and resource assessment have largely been concerned with a perceived need to ‘police’ resources: there is an assumption that communities will not manage resources responsibly. This view is not supported by community dialogue or other East African experiences (for example Tanzania). Additionally, it is far more beneficial to collect information that can provide base-line data (and be used to

identify changes in the resource condition) and can inform management. An aim of PFRA should be to provide the community and Government with information to produce a better management plan with more practical and detailed management prescriptions.

It was felt to be important that the Government representatives (District forestry staff and Natural Resources workers) and the community conducted the PFRA together, to ensure that the objectives of both parties were met. It was also felt that conducting the exercise together would help to build a better relationship and understanding between these stakeholder groups.

The PFRA field-testing was generally successful. The method and methodological approach both worked and seemed appropriate. There were a number of areas that needed improving and refining, and these have been addressed in the improved method (see Annex 6). This improved method is the main output from this consultancy, and incorporates the discussion and recommendations from all parties. It requires field-testing and final refinements.

The overall view of the process of developing the PFRA was positive. The view of the PFRA development group was that the approach is an appropriate compromise between technical and social forestry, and largely meets the requirements of both groups. The technical foresters felt that the PFRA is realistic in terms of time, cost and level of skill required, and produces the required data. The social foresters felt the approach was participatory, transparent, understandable, and above all useful for the community. The development group unanimously endorsed the PFRA.

## **Summary of Main Recommendations**

### ***General***

1. Institutions for moving the PFRA/community forestry process forward need to be strengthened, activated and supported. These include the PFM working group which has not been very active recently. These institutions should be supported by donors, and should also include community representatives.
2. The communities need to be actively engaged in the finalisation and further developments of the PFRA method. So far, they have not been involved in any of the design processes.
3. The institutions need to endorse and/or formally support the new PFRA method, as the (potential) model. This is desirable prior to any further training or detailed trialing.
4. Review and trial the 'new improved' method
5. The trialing of the method should be combined with a training programme on how to conduct the resource assessment. This is necessary for both institutionalisation and replicability reasons.
6. Methods need to be identified and adopted for speeding the process up. The handover process has been very slow up to date, and there appears to be some disillusionment amongst involved communities.

### ***Participatory Forestry Management Project Specific***

1. Supporting the PFM working group (and similar organisations). It is suggested that PFMP finance meetings of the working group, with supporting and endorsing a PFRA method as a high priority. PFMP may also feel that a wider discussion is required to ensure that all stakeholder comments are considered at this stage, rather than negative views coming to light later in the process.
2. Liaise and coordinate with other donors to ensure that adequate support is given to the Government, and that the donors coordinate their approaches.
3. Fund the further trialing of the modified PFRA, to test its suitability and practicality. This should have a more formal training role, and consideration should be given to involving the colleges in this training, and attempting to incorporate some of the elements into the forestry curriculum. This activity will probably require external consultancy input.
4. Purchase and ensure that the required equipment for the PFRA is available at District/community level.
5. Work with local communities to ensure that they are actively involved in the processes of PFRA design. So far they have been largely excluded, which may weaken any PFRA approach.
6. It is also seen as a role of the PFMP to 'push' forward community forestry. The project should be pro-active in developing pilot community forests, incorporating the PFRA and management planning processes discussed in this report. The project should also share the experiences of Tanzania, perhaps through exchange visits, and certainly through information dissemination.

## *Acknowledgements*

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I would like to thank all the staff at Farm Africa who helped me during this consultancy, and all the participants in the development and testing of the PFRA, and those who attended our briefings and close-out meeting, particularly as it was in the middle of a holiday. Thank's to GTZ for inviting us to work closely in the development of an appropriate method, and giving us a detailed briefing of their work.

# 1 Introduction

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## 1.1 The Consultancy approach

This report is based on an input by Dr Gavin Jordan for the Commission of the European Communities/DFID funded FARM Africa/SOS Sahel Participatory Forest Management Programme, Ethiopia, between 13<sup>th</sup> and 27<sup>th</sup> April 2003. The original terms of reference are included in Annex 1, and the itinerary in Annex 2.

The methodological approach employed was to critically examine PFRA in terms of the information required, and the practical limitations on specific techniques. This allowed a draft method to be developed, which was field-trialed and critically evaluated. The evaluation allowed a more detailed improved method to be developed with a series of guidelines to support its use.

The above are all documented in this report. Additionally, the work conducted during this consultancy has raised awareness amongst a range of both Governmental and non-Governmental stakeholders regarding the potential for a community oriented PFRA process.

## 1.2 Defining the issues

There have been previous attempts at developing a suitable resource assessment method for community-based forestry in Ethiopia, which have generally not been replicable (see section 2.2). Therefore a lot of time was spent examining the ‘reality’ for a PFRA that would be used and replicated. Figure 1 illustrates the constraints and considerations that influence the assessment method.

Figure 1: The Reality Framework



An appropriate method has to be within the reality framework parameters, and needs to demonstrate adequate technical reliability, and be participatory. The following need to be considered:

**Technical.** The PFRA needs to be:

- Understandable to stakeholders and implementers
- Based on a justifiable and acceptable method
- Be robust

**Participatory.** The PFRA must have:

- Genuine community involvement
- Assessment and monitoring that addresses community management objectives
- Understanding within the community
- Community involvement in the development of the PFRA

Most initial efforts at PFRA fail. For example, in Nepal, one of the countries with the longest track record of community forestry, it has taken over a decade to develop a workable method of PFRA. The reason for failure is generally due to over-complexity: collecting too much information, and over estimating the capacity for conducting the PFRA, and (crucially) the capacity for analysing and interpreting the information.

### **1.3 Activities**

The following activities were core to this consultancy and are detailed in the report:

1. Initial determination of the scope, requirements and meaning of Participatory Forest Resource Assessment (PFRA) in an Ethiopian context.
2. Development of an outline draft methodology for PFRA, addressing the management planning and monitoring needs for community forestry.
3. Field-testing the method
4. Review
5. Refining the method

## **2 Background**

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### **2.1 A Brief Overview and Understanding of Past Attempts to Develop Participatory Forest Monitoring Systems in Ethiopia**

There are no previous examples of successful Participatory Monitoring Systems in an Ethiopian context. Attempts have been made at resource assessment and monitoring, but they have been largely unsuccessful. Previous attempts at monitoring have either focussed on classic inventory approaches (Farm-Africa) or assessing specific forest variables, such as tree cover (GTZ/IFMP).

GTZ have produced perhaps the most detailed attempt at developing a workable Forest Resource Assessment Method. They developed a Tree Cover Assessment method (IFMP, 2000), designed to annually assess the conservation status of forest blocks allocated to user groups. This was found to be largely unworkable owing to complexity and expense, and not transferable to other situations (IFMP, 2002). The need to modify this approach was realised (IFMP, 2002), and a new method is currently being developed. The new method is largely based on sub-dividing the forest into five categories, based on tree density and size-class distribution. Additionally, annual monitoring is conducted for the whole area, counting the number of stumps to determine the number of trees felled that year. This method still has to be field-tested. However, the method is still focussed on providing the forestry department with information to assess the conservation status of forest blocks allocated to the forest dwelling user groups. There is no monitoring for community management, or community involvement beyond providing manpower.

A conceptual problem with previous assessment procedures was *designing a resource assessment for participatory forestry*, rather than a *participatory forest assessment procedure*. Therefore the emphasis tended to be on technical issues, rather than the information needs to support management and monitoring. The mindset behind resource assessment has been the monitoring of indicators to determine whether the community is abiding by contractual rules and requirements, with an assumption that the community may well over-exploit and degrade the forest.

In addition to the conceptual problems outlined above, there have been practical issues, which have impacted on sustainability and replicability. Previous systems have largely failed due to:

- Excessive time
- Excessive cost
- Over complexity
- Low levels of participation
- Confusion over what needs monitoring
- Confusion over the objectives of resource assessment and monitoring

### **2.2 The Community Forestry Management Planning Process**

Figure one shows the community forestry planning process, and the role of resource assessment.

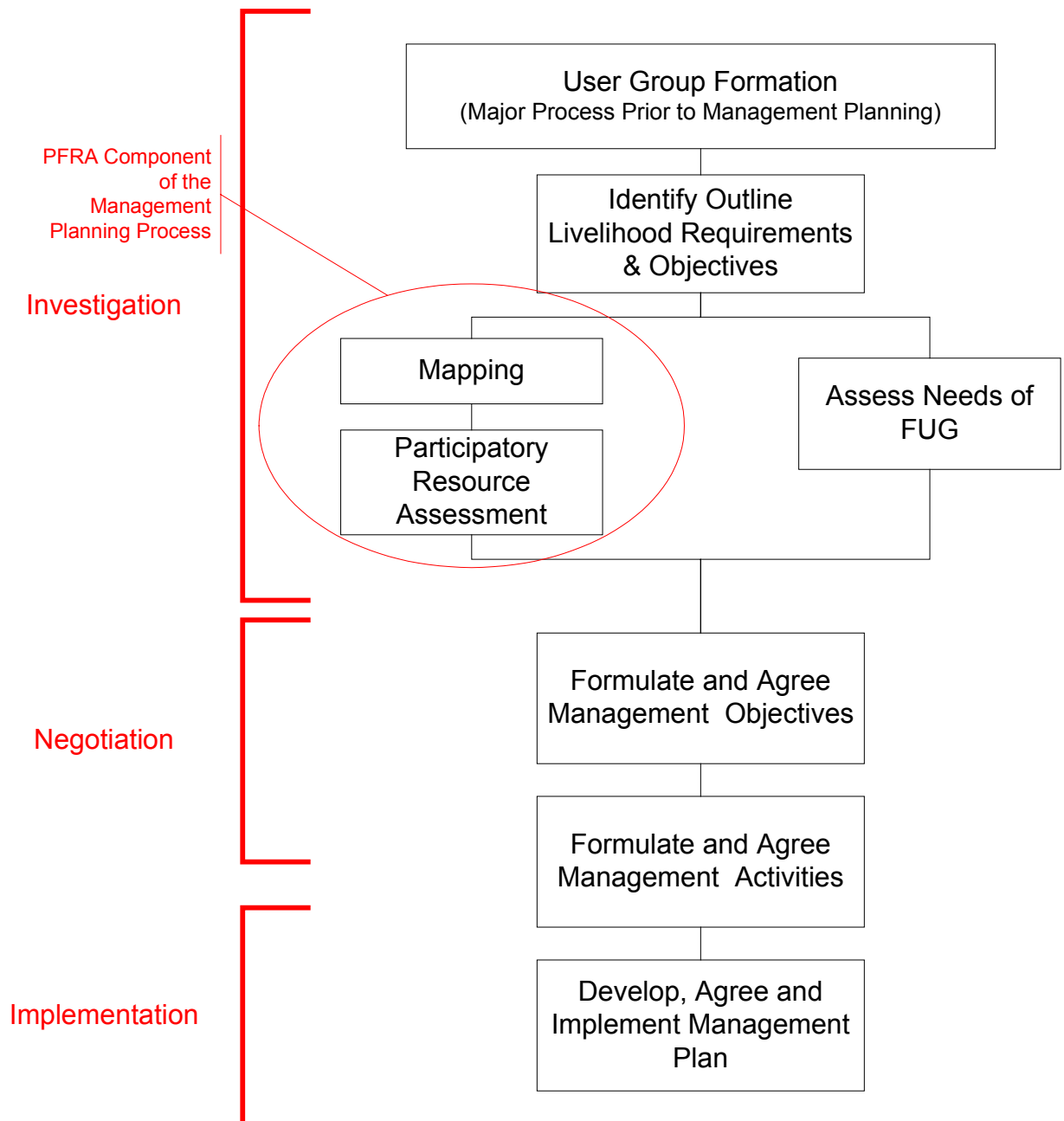


Figure 1: The Community Forestry Management Planning Process

Following on from the management planning process is the need for monitoring. Monitoring is necessary to determine whether the management plan objectives (agreed by the forest department and community) are being met and implemented effectively. Therefore the primary role of PFRA is to gather enough information to develop effective management prescriptions addressing the stakeholder objectives, and to monitor their implementation. This does not appear to have been fully accepted in Ethiopia. There is still an understanding that monitoring should address the *prescription* rather than the objective. For example, the objective may be conservation of forest productivity. The prescription may be to only fell twenty trees per annum. Indicators of tree cover could be community perception, basal area, amount of regeneration etc. The number of stumps observed is an indicator of the prescription,

rather than the objective. The prescription may be incorrect, and not effectively addressing the objective. What needs to be monitored are *objectively verifiable indicators* to determine whether the prescriptions are achieving the desired results. In the example above, the monitoring would include some or all of the basal area, the community view of the resource productivity, and the volume and types of product coming from the forest (through community discussion).

### 2.3 Mapping

Figure One illustrates the important role of mapping as a pre-cursor for PFRA. Although mapping was outside the TOR's for this consultancy, a little background is required.

It is very difficult to conduct a PFRA without spatial information on the forest resource, unless the forest area is small (under *ca.* 25 ha). Spatial information is required on the size, layout and internal boundaries (for stratification) of the resource. It is also important to know the size of the resource so that assessment information from the sample can be converted to information for the resource as a whole (for example, determining sustainable production levels). Additionally, usage patterns and zoning from participatory mapping processes may be important for identifying areas where the PFRA should be focussed or more intense.

For small forest areas, the PFRA can also be used for mapping. If the PFRA is conducted at known sample points (through using a systematic sampling grid and/or GPS), the internal and external boundaries of the resource can be mapped during the PFRA. This becomes problematic with larger forest areas, as prior spatial knowledge is important for planning the PFRA.

Topographic maps provide basic spatial information for planning resource assessments, and may allow boundaries and compartments to be identified. If accurate topographic maps (1: 25000 – 1:50000) are available these will generally provide sufficient information. Aerial photographs (particularly if ortho-rectified to provide spatially accurate images) may provide more detailed information on external boundaries and internal features. If they are available in large-scale format they can be used as a tool for participatory mapping. Participatory sketch mapping obtains excellent information on spatial and temporal relationships, but is of limited use for providing spatially accurate information, and does not generally produce a map that is appropriate for planning and conducting a PFRA (although elements of the information may be of great use in identifying priority areas from a community perspective).

GPS is a useful survey tool for obtaining spatial information and generating maps of internal/external boundaries. Where little or no mapped information is available it may be the only practicable way of obtaining the necessary spatial information. It is a rapid method of surveying, and can be participatory by involving members of the FUG in the surveying process, and can identify areas of potential conflict over boundary positioning and ownership.

### 3 The Method

#### 3.1 The Process of developing a draft PFRA

A working team of government foresters, Farm Africa/SOS Sahel staff and the consultant examined the issues for PFRA. This focussed on the information needs for management planning and monitoring, and what the minimal information levels were to address these needs. The working group attempted to identify an approach and method for community forestry resource assessment that was within the ‘reality framework’ (Figure 1) and provided appropriate information at the required level of detail. It was felt that both the community and the forest department had information needs, although in many cases these were quite similar. The advantages and disadvantages of the three main types of resource assessment were examined in detail by the group (Table 1). Based on this analysis the group felt that a PFRA approach was generally best, although the level of technical reliability was too low. Therefore an approach based on PFRA using sample plots for more detailed resource assessment was felt to be appropriate.

Table 1: Advantages and Disadvantages of three types of Resource Assessment

	Inventory	Sample Plots	Qualitative PFRA
Time	High	Medium/Low	???
Cost	Very high	Medium/low	Medium/low
Capacity: Government Community	Medium Very low	Medium Medium	Low High
Equipment requirement	High	Medium	Low
Reliability: Technical Social Community	High (??) Medium/low Low	??? ??? ???	<b>Low</b> High High
Participation	Low	?	Very High
Replicability and sustainability of assessment	Low	Medium	High

There was also discussion over who should conduct the resource assessment (Table two). This resulted in clear advantages of involving the community and district level staff in the assessment. It was felt that community involvement should not be just as labour or assistants: community participants need to be key in both devising the specific questions, and in answering them. The district foresters should facilitate the process, ensuring the technical aspects are being conducted correctly, conducting some of the work and advising the community.

Table 2: Advantages and Disadvantages of conducting the Resource Assessment

	Advantages	Disadvantages
Central/Regional Gov't	-Appropriate Technical Skills -Likely to be accurate	-Non-participatory -High Cost -Time requirement too high -No staff available
District/Woreda Gov't	-Appropriate Technical Skills -Likely to be accurate -Staff available	-Non-participatory -High Cost -Time requirement too high
Community	-Participatory -Low cost -Maximises ITK -High trust/ownership	-Excludes Gov't -Reliability questions -Not trusted by Gov't -Information gap for Gov't -No capacity
District/Community	-Appropriate Technical Skills -Likely to be accurate -Staff available -Participatory -Low cost -Maximises ITK -High trust/ownership for both Gov't & community	-Cost still high? -Time still high?

### 3.2 The Draft PFRA

Based on the above, an initial method was devised. This was based on methods that have been widely employed in PFRA globally, (see Carter, 1996). The method is based on fixed-point sampling techniques, incorporating ocular assessments of key indicators for the resource. The sample plots are systematically arranged on a 100m grid (for forests less than 50 ha, with a progressively larger grid as forest area increases).

The form used for the resource assessment is shown in Annex 4.

### 3.3 Justification of method and methodological detail

The method is based on standard resource assessment techniques that are widely used for forest surveying.

Fixed point sampling methods are used instead of fixed area sampling to reduce the time required and the skills necessary for laying out plot boundaries. Fixed point sampling provides information on basal area, allowing stocking density to be determined, and with the development of appropriate standard tables for Ethiopia, standing volumes can also be calculated (although this information may not be required for effective management). Basal area is one of the fundamental characteristics of a forest resource, and provides a sound general indicator of the

stocking. When combined with other ocular indicators a reliable and replicable picture of the resource can be developed, providing basic base-line data for future comparison. This is sufficient detail to determine whether objectives are being effectively met.

No diameter at breast height (dbh) measurements are made. Dbh measurements require some form of fixed area plot, and require more time for data collection (particularly when ground flora shrubby growth is extensive). Another major consideration is that measuring dbh quickly generates a large data-set that is quite daunting to analyse for non-inventory based foresters. An ocular assessment of size-class distribution is made instead, providing a descriptive rather than quantitative record of the resource.

Systematic sampling is employed. The sampling grid recommended is a 100m grid (as used by GTZ) for forest areas or compartments/strata less than 20 ha in size (see Annex 6). This is a fairly standard sampling intensity and appears suitable for initial evaluation.

### **3.4 The PFRA and Results**

The methodology was field-tested at Bonga and Borana. Bonga is comprised of extensive areas of sub-tropical moist forest. The first day of field-based assessment was used in familiarisation with the techniques, in an area of predominantly *Eucalyptus* spp. The method was found to be effective. The next day the method was tested in an area of quite dense sub-tropical forest with an extensive under-storey. Here it was found that the pacing between sites was difficult, and the cutting of the under-storey laborious. Additionally, it was difficult to use the relascope because of the dense under-storey. It was generally felt that the method was acceptable, although it was felt that the use of a systematic sampling grid in this forest type was impractical, and made the assessment too time consuming.

The method was trialed in Borana, in montane *Juniper/Olea* forests. A total of 14 plots were surveyed to provide a data set for analysis. The data from each plot was compiled to produce a resource assessment report (see Annex 5). It should be noted that for this trial exercise the assessment was *not* participatory: the methods were trialed without the involvement of the local community.

## ***4 An Improved Method for PFRA***

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After the resource assessment was conducted, there was a detailed discussion and evaluation conducted by the group at the SOS Sahel office in Borana, followed by a further discussion during the close-out meeting in Addis Ababa at the end of the consultancy. This process provided for a critical review of the assessment method and technique, and rapidly moved the development of the assessment further on. The following identified the main issues raised during these discussions.

It was felt that the resource assessment report in Annex 5 provides the core detail required for assessing change in the condition of the resource (base-line data), and therefore meets the main Government objective of providing resource monitoring data. However, there are some areas which need further improvement. It was felt that more information on regeneration could be collected quite easily, providing an increased understanding of the dynamics of the forest resource. There were concerns with the measurement of grazing intensity: it was difficult to convert the data and descriptions recorded during the assessment into a reliable report. The measurement of crown cover was too simplistic.

The resource assessment report needs further detail if it is going to be of direct assistance to the community and User Group in supporting their forest management. It needs to be converted into management prescriptions.

The resource assessment cannot be replicated without training from persons already familiar with the techniques: the replicability is low. Additionally, it is unclear what the role of the community is in providing information.

Based on the above comments, the following changes have been made to the PFRA:

### **Additional Information**

- Regeneration data is more detailed
- Grazing intensity assessment changed
- Crown cover assessment improved

### **Additional Analysis**

- Information on harvesting levels
- Products/types to harvest
- What uses are acceptable?
- What grazing level should be adopted?

### **Additional Guidance**

- The Assessment Team
- Preparation for the Resource Assessment
- How to fill out the form
- How to conduct the assessment
- Analysis of the assessment information

The PFRA report should provide base-line data for monitoring change to the resource, and it should also provide information which can support management planning and prescriptions. This is mentioned above under 'additional analysis'. Currently it is hard to provide solid, reliable information on this. Harvesting levels would normally be based on an Annual Allowable Cut, based on standing volume and some estimate of rotation length (reflecting increment). These are not available. Therefore some form of 'thumb-rules' need to be developed. These are used internationally for PFRA data interpretation, and have been shown to provide reliable estimates.

### **Harvesting levels:**

It is suggested that the following are used until more reliable information can be obtained.

Basal Area < 5, little felling of mature trees

If Basal Area 5-10, limited felling of mature trees

If Basal Area 10-20, controlled felling written into management plans, intensity of 1m<sup>3</sup>/ha/yr.

If Basal Area >20, controlled felling written into management plans, intensity of 2m<sup>3</sup>/ha/yr.

Until there is reliable research data available, the above figures should be employed. These are based on estimates of productivity with consideration of stocking density. 1m<sup>3</sup>/ha/yr is the international, conservative 'ball-park' figure usually used for sustainable harvesting rates of low-medium productivity forests. If the stocking is much greater than this, then higher harvesting levels can be employed. See the Sustainable Forestry Handbook (2000) for more detail on calculating sustainable harvesting rates.

### **Product types:**

Product types should be based on the size-class information and general description. If the forest is over-mature, some large trees can be felled even if they are widely spaced. If the forest is mature, and widely-spaced, these trees should be left standing to act as seed sources. If there are few small trees, these should be left and not harvested.

The product types should reflect the type of vegetation that is in particular abundance.

### **Acceptable uses**

Acceptable uses are those which have little negative impact, and should result in a maintenance or improvement to the resource. These need to be determined by the PFRA team in discussion with the wider community. If there is excessive grazing pressure which is preventing effective natural regeneration, this needs to be addressed in some way. If there is a non-sustainable use of the larger trees or pole stage trees, this needs to be considered in management prescriptions, and agreed by the community and Government.

### **Grazing levels**

It is difficult to determine (or monitor) grazing levels. If grazing is identified as a problem from the resource assessment, this needs to be discussed with the community, and if possible a strategy for reducing the pressure should be developed. There is no point in a management prescription that cannot be implemented: for example, if an area is heavily grazed, banning grazing is unlikely to have any effect. However, the community may be able to modify grazing patterns, and perhaps have small grazing exclusion areas or some form of rotation. There are no quantified, recommended grazing levels: this has to be determined by repeat monitoring against the base-line situation, and is dependent on the objectives. The optimal grazing level is where regeneration objectives are just being met.

## ***5 Moving the Process Forward: A Plan of Action***

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### **5.1 Introduction**

So far, there has been development of an outline method, testing of the method, and based on the testing and group feedback, the development of an improved method. There is still a significant amount of work left to develop a finalised and fully endorsed method.

### **5.2 The plan of action**

A six point progress plan is proposed:

1. Institutions for moving the PFRA/community forestry process forward need to be strengthened, activated and supported. These include the PFM working group which has not been very active recently. These institutions should be supported by donors, and should also include community representatives.
2. The communities need to be actively engaged in the finalisation and further developments of the PFRA method. So far, they have not been involved in any of the design processes.
3. The institutions need to endorse and/or formally support the new PFRA method, as the (potential) model. This is desirable prior to any further training or detailed trialing.
4. Review and trial the 'new improved' method
5. The trialing of the method should be combined with a training programme on how to conduct the resource assessment. This is necessary for both institutionalisation and replicability reasons.
6. Methods need to be identified and adopted for speeding the process up. The handover process has been very slow up to date, and there appears to be some disillusionment amongst involved communities.

### **5.3 The role of the Participatory Forest Management Programme**

The PFMP has some important roles in supporting the further development of PFRA and community forestry:

1. Supporting the PFM working group (and similar organisations). It is suggested that PFMP finance meetings of the working group, with supporting and endorsing a PFRA method as a high priority. PFMP may also feel that a wider discussion is required to ensure that all stakeholder comments are considered at this stage, rather than negative views coming to light later in the process.
2. Liaise and coordinate with other donors to ensure that adequate support is given to the Government, and that the donors coordinate their approaches.
3. Fund the further trialing of the modified PFRA, to test its suitability and practicality. This should have a more formal training role, and consideration should be given to involving the colleges in this training, and attempting to incorporate some of the elements into the forestry curriculum. This activity will probably require external consultancy input.

4. Work with local communities to ensure that they are actively involved in the processes of PFRA design. So far they have been largely excluded, which may weaken any PFRA approach.
5. It is also seen as a role of the PFMP to ‘push’ forward community forestry. The project should be pro-active in developing pilot community forests, incorporating the PFRA and management planning processes discussed in this report. The project should also share the experiences of Tanzania, perhaps through exchange visits, and certainly through information dissemination.

## ***References***

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The following are core PFRA related references and it is recommended that the programme purchases copies of them:

The forest certification handbook (1995), Chris Upton and Steve Bass, Earthscan  
Tapping the Green Market: Certification and Management of Non Timber Forest Products (2002), Patricia Shanley, Alan Pierce, Sarah Laird, Abraham Gullen, Earthscan

The Sustainable Forestry Handbook (2000), Sophie Higman, Stephen Bass, Neil Judd, James Mayers, Ruth Nussbaum, Earthscan

Participatory Action and Learning: A fieldworkers Guidebook for Supporting Community Forest Management. Yam Malla, Peter Branney, Hari Neupane, Pryag Tamraker, Livelihoods and Forests Programme, Nepal

Action Research for Community Forestry. DFID, March 1998

Carter, J. (ed.) (1996) *Recent approaches to participatory forest resource assessment*. ODI, London

## ***Annex 1 - Terms of Reference***

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### **FARM Africa / SOS Sahel Participatory Forest Management Programme**

#### **Terms of Reference**

Primary focus of consultancy work : developing a participatory forest monitoring system for community managed forest.

Due to reduced time this is now optional - Secondary focus of consultancy work : opportunity study for local level forest certification systems in Ethiopia.

#### **Primary focus : Forest monitoring**

Working with a counterpart team of Regional Government Forest Officers and Programme employed PFM advisors, carry out the following tasks;

1) Build up a rapid overview and understanding of past attempts to develop participatory forest monitoring systems, drawing out lessons of which systems are appropriate and which systems are not. This overview should be written up as a short section in the final consultancy report

2) Link up with the GTZ Adaba Dodola project team / external consultant who are also currently working to develop participatory forest monitoring systems for community managed forest. It is proposed that we should develop compatible / complimentary systems (the government requires one monitoring system).

3) Building on the positive aspects of current monitoring systems under development, clearly define the objective(s) of forest monitoring within Participatory Forest Management systems. Focus should be given to a forest monitoring system that the community (forest managers) can use as a forest management tool, and in fulfilment of their contractual obligations under Government / Community Forest Management Agreements.

4) Develop an appropriate system for monitoring forests under community management that meets the defined objectives of the ToR 2, above. By "appropriate system" we mean a system that seeks to incorporate and merge scientific principles with indigenous / traditional knowledge.

5) Field test the monitoring system(s) at a minimum of 2 of the programme's 3 forest implementation sites, including the introductory training of local site forestry staff

6) Present findings of the Forest Monitoring study, new methodology to Regional forestry partners and programme management in working sessions/meetings.

7) Write up the methodology for monitoring forests under community management as part of the full consultancy report, to be submitted by 10th May 2003

**Secondary Focus : Certification**

8) Through opportune meetings and discussion, as well as drawing on knowledge from other country experience, develop a terms of reference for developing local level forest certification systems in Ethiopia.

## *Annex 2 - Itinerary*

### **Forest Monitoring Consultancy - Activity plan**

<b>April</b>	<b>Activity</b>	<b>Comment</b>
Sun 13 <sup>th</sup>	Arrival of consultant Review documentation pack - to be left at Hotel	
Mon 14 <sup>th</sup>	Introductory day - Meetings and discussions - Ben and Zelalem, Meetings with Federal and Regional (Oromiya) Forest Departments Methodology Development	
Tues 15 <sup>th</sup>	Continue discussion as above	
Wed 16 <sup>th</sup>	Afternoon:- Monitoring meeting with GTZ - Sharing Approaches Methodology development	
Thurs 17 <sup>th</sup>	Drive to Jimma	
Fri 18 <sup>th</sup>	Drive to Bonga	
Sat 19 <sup>th</sup>	Field testing - Bonga Forest	
Sun 20 <sup>th</sup>	Travel to Awassa	
Mon 21 <sup>th</sup>	Travel to Yabello Meeting - Monitoring team and forest site team - Methodology development / explanation	
Tues 22 <sup>th</sup>	Field testing - Yabello Forest	
Wed 23 <sup>th</sup>	Field testing - Yabello Forest, travel to Awassa	
Thurs 24 <sup>th</sup>	Travel to Addis Ababa	
Fri 25 <sup>th</sup>	Preparation for summarisation meeting - Methodology write up - Initial Draft	
Sat 26 <sup>th</sup>	Summarization / presentation meeting	
Sun 27 <sup>th</sup>	Flight to UK	Early morning flight

	<b>Forest Monitoring Consultancy team</b>	
	External consultant Regional NR Dep. Forester GTZ IFMP Forest Monitoring Advisor PFM unit Technical Manager Bonga PFM Advisor / Government foresters Borana PFM Advisor / Government foresters	

	Chilimo PFM Advisor / Government Forester	
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### ***Annex 3 – Persons Met***

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Ziyemu Lemma, Farm Africa, PFM Officer

Negussu Feyissa, Orimia Rural Land & Natural Resources Administration Authority,  
Team Leader

Endale Woruu, SOS Sahel, Development Facilitator

Olaini Edessa, Farm Africa, Team Leader

Genzebu Berako, SOS Sahel, Development Facilitator

Zelalem, Farm Africa, Team Leader

Ben Irwin, Farm Africa, Technical Manager

Dida Wako, SOS Sahel, Development Facilitator

Hussein Miyo, SOS Sahel, Development Facilitator

Worku Chibassa, SOS Sahel, PM&E Advisor

Talew Dheressa, NR and RL Administrator, Office Head

Jatani Sora, SOS Sahel, Development Facilitator

Aklilu Michael Dendi Woreda RLANR

Meskni, SNNPR Deputy Head

Tsegaye Tadesse O. Rural Land and Natural Resources Administration Authority,  
Deputy Head

***Annex 4- Draft Participatory forest Assessment form***

**Draft Participatory forest Assessment form**

Forest/compartament name:	
Plot number:	

<b>Plot: Fixed Point Sample (Ocular and Basal Area)</b>					
1. Basal area (No. of trees through viewing stick)					
2. Fire evidence:	Yes (comment):			No:	
3. Soil exposure:					
4. Felling intensity:					
5. Grazing intensity:	Terracettes	Droppings		Grazed plants	
6. Crown cover:	Closed	Moderate (<80%)		Open (<20%)	
7. Natural Regeneration: (Below 2m height)	Species:	Plentiful	Moderate	Scarce	None
8. Main commercial species:					
9. Dominant species:					
10. Forest/land class: 1 = open land (< 10 old trees (50cm dbh+)/ha) 2 = forest with 10-20 old trees/ha, & < 20 PCT (<40cm dbh) 3 = forest with more than 20 old trees/ha, < than 20 PCT 4 = forest with 10-20 old trees/ha and more than 20 PCT 5 = forest with more than 20 old trees/ha and more than 20 PCT					
11. Forest/land class: Description of forest and size class structure:					

<b>Participatory information:</b>	
12. Quality of the forest	
13. Main uses	
14. Problems	

***Annex 5: The Assessment Report for Borana***

**Borana trial PFRA**

**Date of assessment: 22<sup>nd</sup> April 2003**

**General description:**

The area is predominantly Olea/Juniper woodland, with Acacia Spp. dominating at the base of the hillside. Olea is the dominant species in many areas of the woodland. In many places there is a distinct low canopy, with an open upper canopy of mature Juniper.

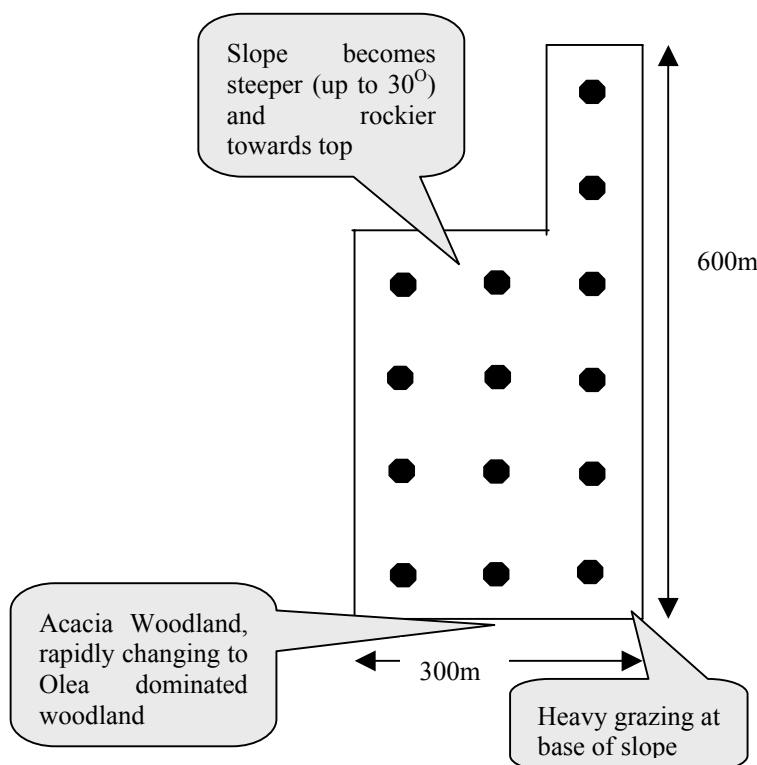
The forest is generally open in character, with widely spaced mature Juniper, which have been quite heavily utilised. There are few young Juniper, and the size-class distribution is heavily skewed towards mature/over-mature trees.

There are patches of scrub and grassland within the forest. There is evidence of extensive grazing, with a dense network of trails.

The hillside gets increasingly stoney and steep as height is gained.

**Area assessed and sampled**

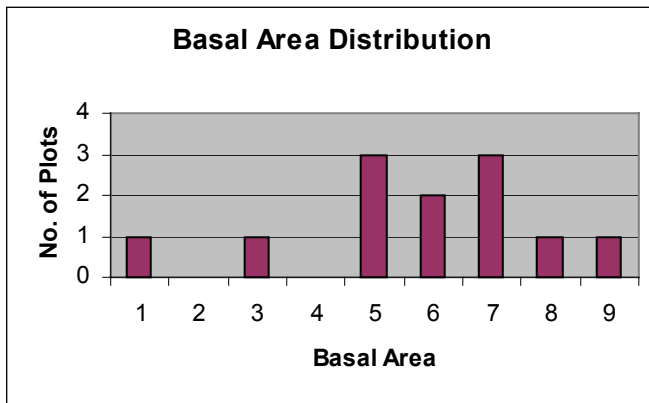
Total area assessed: 14ha



## Basal Area

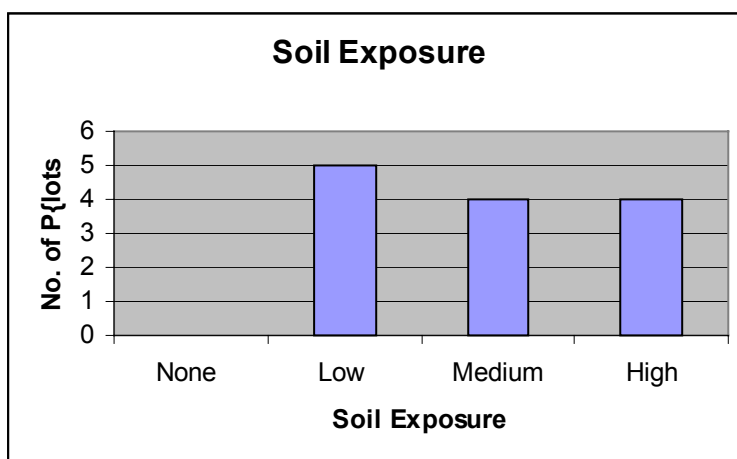
Average Basal Area: 5.6

Range: 0-9



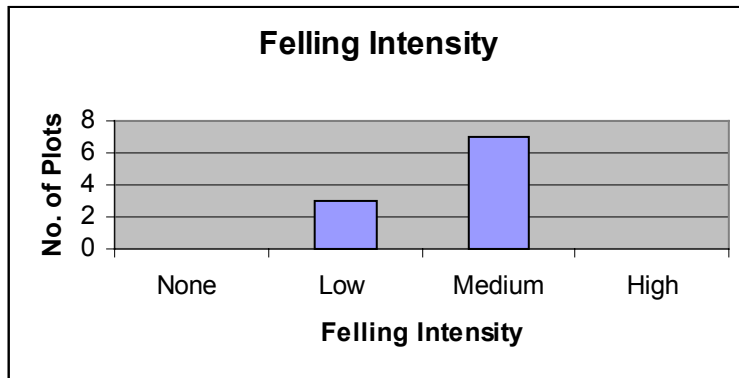
## Fire:

1 plot had slight fire evidence. Fire is not a significant management issue.



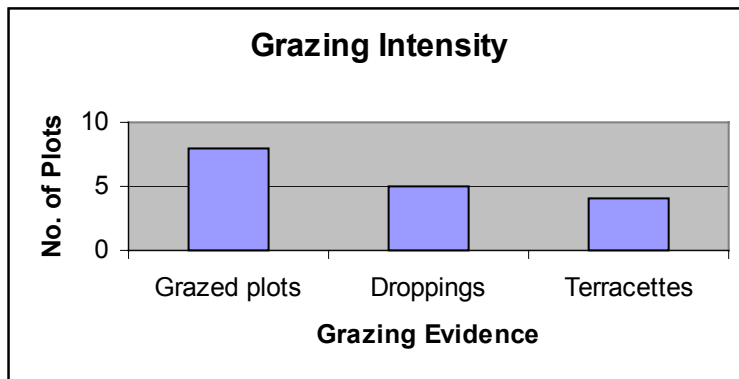
**Felling:**

‘Big juniper trees felled. Lots of lopping. Pollarding’



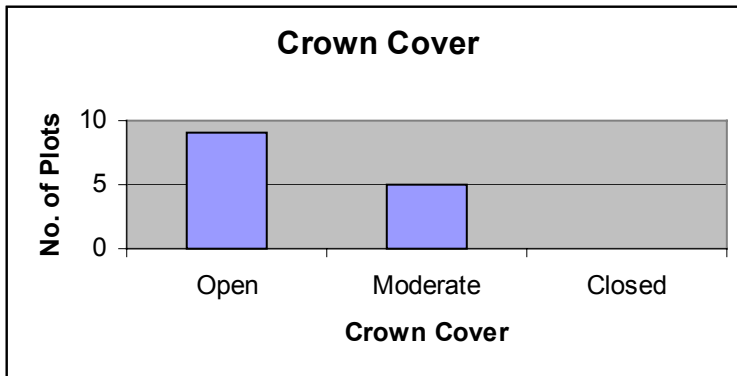
**Grazing:**

‘Could not reliably tell. Wrong time of year. Grazing pressure low this time of year.’



**Crown Cover:**

‘Lower or upper canopy? Both? Often moderate low canopy and open upper canopy.’

**Regeneration:**

(Numbers indicate number of plots)

Species	None	Scarce	Moderate	High
Juniper	10	2	2	0
Olea	7	3	4	0
Ogaru	13	1	0	0
Hamessa	13	1	0	0
Bika	13	1	0	0
Galee	10	2	1	1
Lade	12	2	0	0
Kararu	13	0	1	0
Miensa	12	0	1	1

**Main Commercial Species:**

Species	Number of plots
Juniper	13
Olea	10
Biga	1
Dhaddacha	1
Rukessa	4

**Dominant Species:**

Species	Number of plots
Olea	11
Juniper	8
Biga	1
Kararu	3
Rukessa	2
Harrassa	1
Madhasa	1
Hamessa	3
Carrissa	1
Shimpri	1
Gele	2
Miessa	2

***Annex 6: Revised Draft Method and Guidelines***

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**The Participatory Forest Resource Assessment****Why conduct a PFRA?**

A PRFA is an important core part of the community forestry process. It is important for both the Government and the community. It provides the Government with a detailed knowledge of the resource at the time of the assessment. This can be used to determine any changes in the resource over time (by repeating the assessment for monitoring purposes), and seeing if the changes are as expected from the management prescriptions. If not, then changes need to be made either to the prescriptions, or to the implementation of the prescriptions. It provides the community with information to

support the appropriate management of the resource. It is very difficult to manage a forest effectively unless you have information about the resource, which allows management prescriptions and a management plan to be developed.

The PFRA should provide information for the following:

- Monitoring: sufficient information to determine any change in the resource, and to determine whether the management prescriptions have been successful
- To help develop meaningful, realistic management prescriptions
- To help determine sustainable off take levels, products to be harvested, and how best to utilise the resource
- Provide an idea of the volume of wood, the Basal Area
- Information on different canopies

## **The PFRA Team**

A PFRA is a joint effort by the local community and local foresters. The team needs at least one Government forester or natural resources worker. They explain to the community the techniques of PFRA. There needs to be, ideally, 2-4 community members for the PFRA team, ideally a mix of men, women and older children (all these community members use the resource in different ways). It does not matter if more community members want to join the team, but it will slow the PFRA down.

## **Preparation**

The PFRA should not be conducted until the general User Group formation process (the 'social' side) is well underway. The user group formation process will provide a lot of useful background information on how the community interacts with the forest, their main uses and needs, and their forest related livelihoods. This information may well be in the form of Participatory maps, matrices and time-lines that will directly help.

Ideally, the Government worker who conducts the PFRA should have been closely involved in the user group formation process. If not, they should talk with those workers who were, and get as much background information as possible.

### ***1. Community discussion***

The first stage of the PFRA is to sit down with the community, ideally in a village near the forest resource, and discuss with them the PFRA. This involves discussing:

- The communities main objectives for the forest management (a lot of this should be known from the user group formation, and this exercise is 'triangulation' rather than detailed participatory analysis). This includes

identifying priority areas for the community (the 'best' areas, degrading areas etc.).

- The PFRA process: what will be done, why, how, and what the information will be used for
- The level of support for the PFRA. It is important that the community are enthusiastic about the PFRA and see benefits. If not, it is better left until later in the user group formation process.
- Who from the community will be part of the PFRA team
- How will the community reimburse or recompense them for the time involved
- When the PFRA will be conducted

## *2. Maps and spatial information*

Some form of map or photo's of the resource will make the PFRA much easier. They are not essential, but they help a lot. A topographic map will provide sufficient information, and allows you to plan the PFRA, know where you are during the PFRA, and record the location of the days work. Aerial photographs will also help, and provide the same information. Participatory sketch maps may be of some use, but you should remember that they are always very spatially inaccurate.

You need to determine the boundary of the community forest for the management plan. This should be done with the community and Government. This is important as it determines the area of the forest under the management plan.

If you have no maps, you may need to map the boundary (and internal divisions) of the community forest using a Global Positioning System (GPS).

You should draw the boundary of the community forest onto graph paper, so you end up with a map of the forest boundary. Mark in internal boundaries (for example, between plantations and natural forest, different ages of forests and maybe different conditions of forest. Exclude any areas of private agricultural land, and other non-forest areas. You now have a map of the community forest, and can calculate the area by counting the squares on the graph, and converting them to hectares (this depends on the scale of the map). You have also created internal compartments, based on forest type, providing different 'strata' for the assessment. This map allows you to plan your PFRA.

## *3.Planning*

You firstly need to know how frequently to sample. Systematic sampling is employed. The sampling grid recommended is a 100m grid (as used by GTZ) for forest areas or compartments/strata less than 20 ha in size. This is a fairly standard sampling intensity and appears suitable for initial evaluation of smaller areas. As the size of a forest strata increases, the spacing between samples can be increased, as you still get sufficient sample points to evaluate the forest.

The following table will help you:

Strata size	Sampling grid	Number of plots
1-20 ha	100*100 m	3 – 20
>20 – 100ha	250*250 m	3 – 16
100-500ha	500 * 500 m	4 – 45

Please note these are guides and not rules! Some common sense is required in borderline cases, dependent on the forest variability.

For very small areas (< 2 ha) you need a minimum of 3 plots. It is recommended that the largest strata you work with is < 500ha. This sampling intensity will provide you with enough data on the forest for both monitoring and management planning purposes.

The ideal situation is to use a sampling grid to lay out the plots (by compass bearing and pacing – see below). However, in dense forests, where there is a considerable understorey or shrub layer, or where the terrain is very steep, this may not be possible. In this case the appropriate number of plots from the table above need to be randomly situated.

You should then plan on where and when you will conduct the PFRA. In a large forest, you may have to camp for some of the less accessible PFRA. For other areas, you may need transport to get to the forest. All these logistics must be planned for in advance. You also need to work out how many days the PFRA will take, and where you will go each day. You will probably need to ‘test’ the PFRA in the woodland, to see how long it will take for the type of forest. In general, 12-30 plots can be measured a day on a 100\*100m sampling plot.

### *Equipment*

The PFRA is designed to use simple equipment. The following equipment is required:

- 1 relascope or similar
- 1 50 m length of rope
- 1 compass
- pencils
- PFRA forms
- A boundary map of the forest on graph paper

Additionally, a 50m tape is sometimes required, to check that the rope is still the same length (they stretch or can get cut). A clinometer is useful for checking slope angles, but is not necessary. A GPS may be required for boundary mapping and/or mapping

plot locations. A camera is also useful. If overnight stops are required, full camping/cooking equipment will be required.

## **Conducting the PFRA**

Once the planning is completed, the PFRA can commence.

### *1. The first plot location*

The first plot should be at the edge or corner of the compartment/area to be assessed, and at a location that can be marked onto the map. This will be the first plot. Before discussing what you measure at the plot, we will first discuss how you move from plot to plot.

### *2. Positioning the plots*

Depending on your grid size (which depends on the size of the compartment), your plots will be 100, 250 or 500m apart. You locate the plots by walking on a compass bearing the appropriate number of paces. You firstly have to know how many paces make up 100m. This is different for everybody, and varies depending on the terrain and vegetation. Lay out a 50m rope, and pace along it, counting the steps. Now go back, and average the paces. In general most adults have 100-125 paces for 100m, in easy forest terrain. Once you know how many paces make up 100m, you can quite accurately measure distances between plots. Compass bearings need a little basic training, but once you have been shown how to do this, it is very easy. Once you can take a bearing and pace out an accurate distance, you can reliably position plots.

### *3. Completing the Plot Assessment form*

The Plot assessment form is shown overleaf.

## Participatory Forest Plot Assessment form (version 2)

Forest/compartment name:	
Plot number:	

<b>Plot: Fixed Point Sample (Ocular and Basal Area)</b>					
1. Basal area (No. of trees through viewing stick)					
2. Fire evidence:	Yes (comment):			No:	
3. Soil exposure: High, Medium, Low					
4. Felling intensity:					
5. Grazing intensity: Class as high, medium or low, based on evidence of grazing paths, tracks, browsing etc., and discussion with the PFRA community team.					
6. Crown cover: (For both upper and lower canopy if appropriate)	Closed	Moderate (<70%)		Open (<30%)	
7. Natural Regeneration: (Below 2m height)	Species:	Plentiful	Moderate	Scarce	None
8. Description of natural regeneration. (Describe size/age and condition of natural regeneration).					
9. Main important species: (Commercial, community, fodder, NTFP's)					
10. Dominant species: (For both upper and lower canopy if appropriate)					
11. Quality of the forest (Government and community perspectives)					

12. Forest/land class: Description of forest and size class structure. Brief description of the plot, including any important features. A description of the size-class, including saplings, pole stage, mature and over mature. Is the plot young, mature or over mature trees?	
13. Main uses of the forest (mainly community, for the plot, not forest in general)	
14. Problems and issues with the resource (mainly community, for the plot, not forest in general).	

### Completing the Form

The form has to be correctly completed, and with enough information so you know what part of the forest it relates to. It is important to understand that the form is completed by *the PFRA team*. It is jointly filled out by the Government and community members of the team, reaching a consensus and agreeing what should be written down. In some cases, there may be different views, which should all be written down.

The form relates to observations for the *fixed point sample point*. There is no defined plot area, as it takes a long time to set a plot up, and still does not obtain statistically reliable information. The information recorded should be for the particular plot in general, and not for the forest in general. For visual observations, the PFRA team should walk around approximately 10m from the fixed point sample point (the exact point reached by compass and pacing).

It is important that the **forest/compartments name** is filled out, along with the **plot number**. This allows us to trace the information to the correct location.

### The numbers below refer to the numbered sections on the Plot Assessment Form.

1. The basal area is recorded from the fixed point sample point – the *exact* paced out point. Training is required on measuring basal area (it is actually very easy, but there are a few ‘rules’). It is suggested that one or two members of the community PFRA team are instructed on how to use the relascope, and work with the Government worked on this.

2. Any fire evidence should be noted on the form, along with any available explanation and detail, noted by the community members of the PFRA team.

3. Soil exposure: Looking at the soil around the sample point, how much is visible around it without disturbing the soil? Can you see any, or is it covered by leaves, humus, ground flora etc? If > 50% is visible, the exposure is high, if 10-50% it is medium, if < 10% it is low.

4. Look around from the fixed plot, and determine how many trees have been felled or had their main stem(s) lopped. If more than 25%, the intensity is high, if 10-25% medium, and less than 10% is low.

5. Is there any evidence of grazing? What do the community say? The main indicator is pathways, tracks, and browsing. If tracks are extensive, the intensity is high, if few tracks, medium, and if very few or no tracks, low.

6. The crown cover should be recorded, and if appropriate, recorded for each canopy. The canopy is recorded as closed, moderate or open, based on ocular assessment from the fixed point sample point.

7 and 8. The type and extent of natural regeneration (less than 2m) is recorded. If the area is well covered with a particular species of NR, it is plentiful, if there are several individuals of a species visible it is moderate, if isolated individuals can be observed it is scarce.

9. Important species visible and close (*ca.* within 25m) are recorded. The species may be important for a number of reasons: timber production, fodder, other community use, or cultural reasons. NTFP's should also be recorded.

10. Dominant species visible and close (*ca.* within 25m) are recorded. These may be different to the species mentioned in 9.

11. A description of the quality of the forest should be made, and if appropriate, both Government and community views should be recorded.

12. This is a general description of the forest at the plot site, noting anything that has not been recorded, such as erosion etc. The most important feature to document is the size class structure, in terms of the size of individual trees.

13. Main uses of the forest should be documented, in terms of the range of products, and potential for development of the area (perhaps for NTFP's, species enrichment etc. This information will be used to identify and support management prescriptions in the management plan.

14. The PFRA team (and particularly the community members) should finally note any problems and issues with the resource. This information will be used to identify and support management prescriptions in the management plan.

## **Producing the Resource Assessment Report**

Annex five of this report contains the resource assessment report for the original PFRA method. The report format is virtually unchanged.

The aim of the resource assessment report is to collate the individual plot data and use it to compile an assessment report that reflects the entire assessment area. It 'averages' the information, provides a description of the resource as a whole, and shows the variability. Therefore the report serves as the record of base-line condition of the resource, which can be used for monitoring future changes in the resource.

The report should be developed by the Government worker, preferable involving the PFRA team or the larger community

Additionally, the following need to be determined as best as possible. The aim of the following is not to develop ideas and prescriptions that the community have to follow, but points to raise in discussions, and that influence management planning.

#### **Harvesting levels:**

It is suggested that the following are used until more reliable information can be obtained.

Basal Area < 5, little felling of mature trees

If Basal Area 5-10, limited felling of mature trees

If Basal Area 10-20, controlled felling written into management plans, intensity of 1m<sup>3</sup>/ha/yr.

If Basal Area >20, controlled felling written into management plans, intensity of 2m<sup>3</sup>/ha/yr.

#### **Product types:**

Product types should be based on the size-class information and general description. If the forest is over-mature, some large trees can be felled even if they are widely spaced. If the forest is mature, and widely-spaced, these trees should be left standing to act as seed sources. If there are few small trees, these should be left and not harvested.

The product types should reflect the type of vegetation that is in particular abundance.

#### **Acceptable uses**

Acceptable uses are those which have little negative impact, and should result in a maintenance or improvement to the resource. These need to be determined by the PFRA team in discussion with the wider community. If there is excessive grazing pressure which is preventing effective natural regeneration, this needs to be addressed in some way. If there is a non-sustainable use of the larger trees or pole stage trees,

this needs to be considered in management prescriptions, and agreed by the community and Government.

### **Grazing levels**

It is difficult to determine (or monitor) grazing levels. If grazing is identified as a problem from the resource assessment, this needs to be discussed with the community, and if possible a strategy for reducing the pressure should be developed. There is no point in a management prescription that cannot be implemented: for example, if an area is heavily grazed, banning grazing is unlikely to have any effect. However, the community may be able to modify grazing patterns, and perhaps have small grazing exclusion areas or some form of rotation.

## ***Annex 7: Suggested Equipment List and GPS Specifications***

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Each PFRA kit should contain:

- 1 relascope or similar
- 1 50 m length of rope
- 1 compass
- pencils
- PFRA forms
- graph paper
- Camera (optional)
- 50m tape

Additionally, some clinometers should be purchased. GPS's may be useful. The choice is either more expensive 'data logger' type GPS, typically used for survey applications, or the much cheaper navigation GPS's (which also have some data logging capability). A cheaper GPS such as the Garmin Map76S should suffice – however it is important to check whether you can download the data you require