Department of Agriculture and Rural Development
Quang Binh Province

Guideline

Community-based Forest Management in Quang Binh Province

(Attached to Decision No. 1330/QD-SNN, dated 16/072009,
Department of Agriculture and Rural Development,
Quang Binh Province)

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Department of Agriculture and Rural Development in Quang Binh

Guideline

Community-based Forest Management in Quang Binh Province

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Preface

This Guideline on Community Based Forestry Management (CBFM) is developed by the project "Sustainable Management of Natural Resources in Central Vietnam" (SMNR-CV), which is supported by GTZ and implemented by GFA Consulting Group. The guideline builds on existing CBFM experience in Vietnam, including GTZ's former "Social Forestry Development Project", GTZ's current "Rural Development Project Dak Lak", the Project on "Forest Rehabilitation and Forest Management in Quang Nam, Quang Ngai, Binh Dinh and Phu Yen" supported by the Kreditanstalt für Wiederaufbau (KfW) and the TFF funded pilot program on community forest management by MARD.

The guideline is designed as a manual for the specific situation of Quang Binh province with forest land allocation implemented on a provincial scale in 2008 by the project on "digital mapping and issuance of forestry land use right certificates" following Decision 672/QĐ-TTg. Under this project, natural forests and barren forest land are allocated to individual households for protection and sustainable development.

Consequently, the term Community-based Forest Management (CBFM) as used in this manual has to be understood as a form of management in which individual forest owners are forming groups for joint forest management. However, the individual land titles and possibly benefit sharing still remains at the individual household level. We would like to express our sincere gratitude to those who contribute their valuable experience, which helps us to achieve this achievement

In order to help CBFM be effectively applied in villages, contents of the Guideline on CBFM have been adjusted for several times by the SMNR-CV project in collaboration with Quang Binh's DARD-FPD and members of the Provincial Forestry Consultative Group (PFCG) and then have been agreed in the Provincial Workshop organized on 18th May 2009 in Dong Hoi city. The guideline was officially promulgated by the Director of the provincial DARD with the Decision No. 1330/QD-SNN, dated 16/072009.

We hope that this manual can contribute to the development of practicable and relevant follow-up procedures after forest land allocation to ensure a sustainable and economic viable development and utilisation of natural forest resources in Quang Binh province.

Comments from relevant institutions, and colleagues working on different aspect of CBFM are highly appreciated to contribute to the development of CBFM planning procedures for Quang Binh province and Vietnam in general.

Please send your comments and contributions to the following address:

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Abbreviations

CBFM	Community-based Forest Management
CFMB	Commune Forest Management Board
CPC	Commune Peoples' Committee
DARD	Department of Agriculture and Rural Development (at provincial level)
DBH	Diameter at Breast Height (1.3 m)
DPC	District Peoples' Committee
FLA	Forest Land Allocation
FPD	Forest Protection Sub-Department (at provincial level)
FPDR	Forest Protection and Development Regulations
FPU	Forest Protection Unit (at district level)
GIS	Geographic Information System
GPS	Global Positioning System
GTZ	Gesellschaft für Technische Zusammenarbeit (German Agency for Technical Cooperation)
Hh	Households
KfW	Kreditanstalt für Wiederaufbau (German Financial Cooperation)
NTFP	Non Timber Forest Product
NREO	Natural Resources and Environment Office (district level)
PLUP	Participatory Land Use Planning
SFM	Sustainable Forest Model
SMNR-CV	Sustainable Management of Natural Resources in Central Vietnam
VFMB	Village Forest Management Board

Introduction

The Guideline at hand reflects the specific situation in Quang Binh province and provides i) an introduction to the concept of Community-based Forest Management, and ii) technical as well as administrative procedures for facilitating CBFM planning procedures together with the local population. The Guideline consists of two parts. The first part provides an overview of the steps for CBFM. The second part offers practical guidance and exercises for the participatory implementation of the forest resource assessment and the elaboration of the 5-year CBFM plan. Furthermore, formats required for CBFM (forms for the establishment of the village and commune forest management boards, CBFM plans, application forms and proposals etc.) are provided in the respective appendices.

It is important to recognise that planning procedures as described in this manual are only part of a participatory planning process starting with Forest Land Allocation[1] and the development of Forest Protection and Development Regulations[2]. This manual therefore builds on the outcomes of previous planning procedures to be completed before CBFM can be initiated. The user therefore needs to assess the planning status of the respective village before implementing any CBFM related activities as detailed in this document.

Before any forest management can be initiated, information about the total forest area, ownership, function and spatial distribution of forest types have to be identified and legally recognised. This process is facilitated through participatory forest land use planning and land allocation

Following the results of PLUP-FLA, increased rights and obligations are transferred to local communities to protect and sustainably manage forests within their village boundaries. Consequently, a legal framework has to be developed to regulate and enforce the newly gained ownership rights over the allocated forest resources.

CBFM is relatively new to Vietnam and especially Quang Binh province. Therefore, CBFM should be carefully piloted and monitored in order to assess its potential to strengthen forest management, including forest development and forest protection, while at the same time increasing people's (legal) benefits from the forest resources they manage.

This manual is written as a tool for those who will work with villagers in developing, elaborating and implementing their CBFM plans. This can be project staff, extension workers or staff from supporting agencies of the district and/or commune level who act as facilitators and support local villagers in CBFM.

Context of Community-based Forest Management in Quang Binh

The term ***community forestry*** normally refers to a form of forest management in which entire village communities are handed over (allocated) long-term user rights over State forest resources and are protecting, sustainably managing and utilizing forest resources for their environmental benefits and as contribution to their livelihood development.

In the context of Quang Binh province however, forest land has been almost entirely allocated to individual households resulting in rather small forest plots under one land use certificate per household (some below 0.5 ha in size). Forest allocation to entire communities has not yet taken place or rather scarcely.

In view of FLA allocation procedures such small forest plots are ensuring a high level of equity of sharing natural forest resources among community members. However, management, protection and monitoring of such fragmented forest patches is extremely difficult to handle for individual forest owners and the local administration alike.

[1] See province guideline on Participatory Land Use Planning and Forest Land Allocation (Decision 2311/QD-SNN, dated 16/12/2008)
[2] See province guideline on Forest Protection and Development Regulations (Decision 261/QD-SNN, dated 20/3/2008)

Under these circumstances, the formation of forest user groups with joint planning, reporting and approval procedures are proposed as a practicable management concept and is described in the manual at hand.

This concept of individual ownership but joint management and protection is in the following referred to as ***Community-based Forest Management*** (CBFM) to be distinguished from the conventional concept of Community forestry as defined above.

Justification for Community-based Forestry Management

In the past, the state was the main body via its SOEs responsible for the development, conservation and management of the national forest resources. It was thought that proper forest management can best be assured by the state, because 1) forest management is complicated and forests fulfil many functions in terms of production of essential raw materials and environmental services, 2) forests are not only of importance for the locality but can also exert their environmental services to the region (e.g. watershed protection) and because 3) the production cycle in forestry can take up to several decades.

In other words, local people were considered to lack the capacity and technical skills to manage forests properly, and of being unaware of the regional importance of forests resulting in low level of effectiveness in forest management and protection.

However, it is gradually recognized that people living in remote areas require access to forest products to meet their basic daily needs and are able to manage forests sustainably. Small timber (for e.g. house construction), fuel wood, medicinal plants, forest fruits and vegetables etc. are all essential for the survival of people living in marginalized forested areas. Furthermore, forest resources are mainly managed by SOEs, which causes conflicts between SOEs and forest dependent population. It is the main reason resulting in low level of effectiveness in forest management and protection as mentioned above.

Therefore, forest land classified as production forest is increasingly allocated to individual households, groups of households or entire villages for their direct management with the aim to improve both the forest management and livelihoods of those who need the forest resources for their livelihood. Forests classified as “Special Use forest” or “Protection Forest” will remain under the management of the state in order to safeguard the maintenance of the environmental services of these areas.

Basic Principles

This manual is based on the following basic principles:

1. **Participatory** - an independent follow-up of planning procedures can only be expected if the people concerned have been fully involved in all decision-making processes and fully understand the planning results. If people do not develop a self-interest in forest management and a sense of ownership in the decision-making process, implementation will be half-hearted, probably misunderstood and will more likely fail.
2. **Simple** – to allow everybody to understand what is happening and to be able to do it
3. **Cost-effective** – to ensure that locally available resources are sufficient to implement CBFM procedures
4. **Relevant** – to ensure that CBFM planning produces only information which is really needed for forest management
5. **Strengthen** the **sustainable management** of forest resources while mitigating potential negative impacts on provision of forest products and environmental services
6. **Reflect local peoples’ needs** to access and use forest resources
7. CBFM can only be sustainable if procedures are **in line with** the **current legal policy frame**.

Role of the Facilitator

Depending on the local situation, different organizations can take the initiative and facilitate CBFM in the field. Organizations at the district level such as the Office of Natural Resources and Environment (NREO), the Forest Protection Unit (FPU), and Section of Agriculture and rural Development can provide support and facilitate local people in the development and implementation of CBFM plans in cooperation with staff at the commune level and with overall backstopping support from the provincial level. It is of major importance that CBFM plans are developed according to the interests of the user-group/village and are based on the available forest resources. Long-term objectives of CBFM, such as improved forest management and livelihood improvement can only be realized if CBFM is carried out according to the interests of the villagers and is based on the actual forest status. The people who support CBFM in the field should therefore ensure the participation of all user-groups in the development of CBFM plans and guarantee the compliance with technical and legal procedures during field implementation.

Part I: Methodology for CBFM

The major CBFM planning procedures towards a legal approval of a 5-year forest management plan, plan implementation and benefit sharing arrangements are illustrated in the flowchart below.

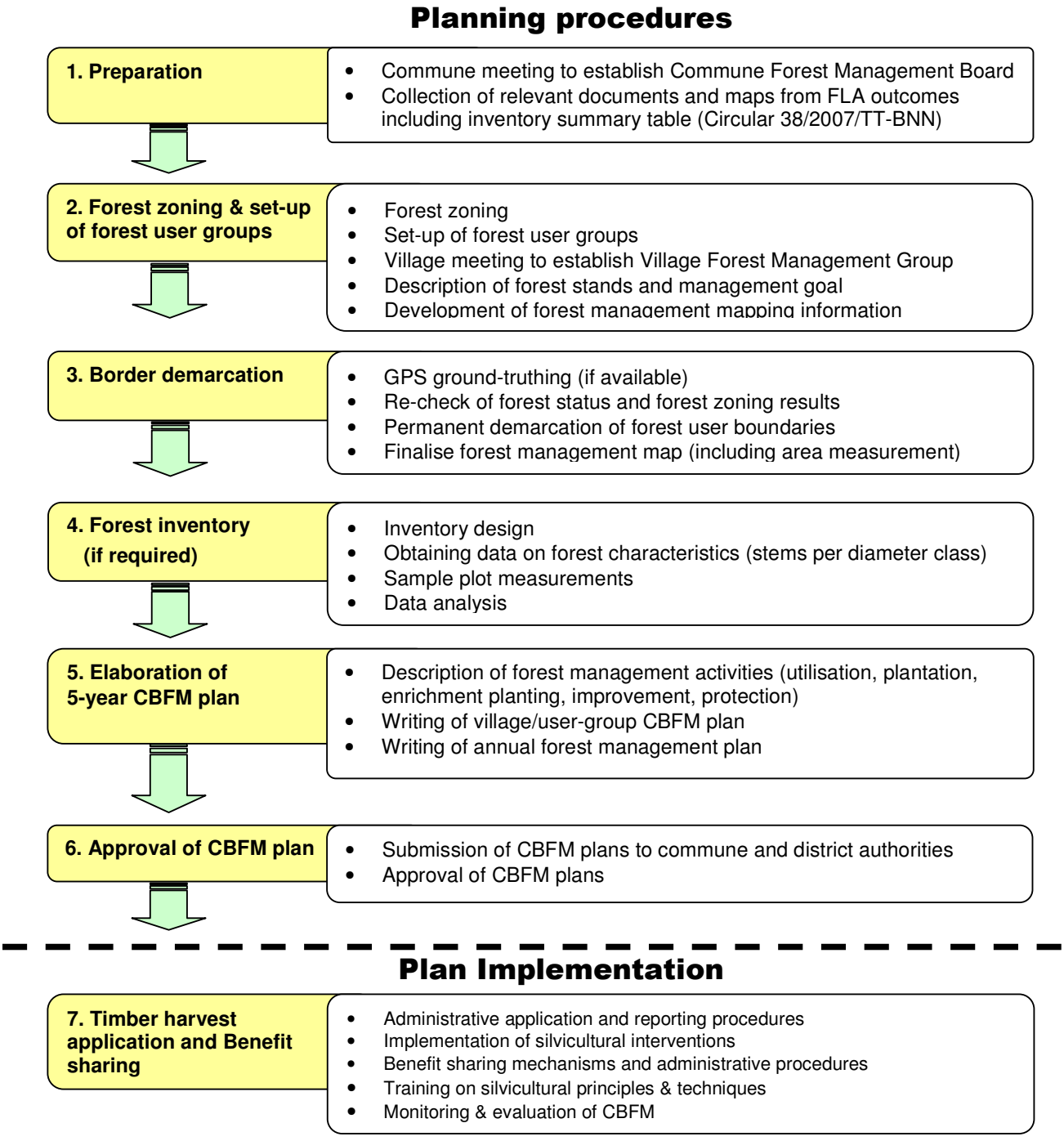

Figure 1: Steps and activities under CBFM

1. PREPARATION

Activities:

1. *Commune meeting and set-up of Commune Forest Management Board (CFMB)*
2. *Collection and analysis of relevant documents and maps*
3. *Training of commune staff, village leaders and key villagers*

1.1. Commune meeting and set-up of CFMB

A commune meeting is conducted to establish the CFMB including representatives of the CPC, the commune cadastral and forestry staff, FPU and leaders of all concerned villages.

Meeting objectives:

1) Agreement on CBFM procedures (steps and activities)
2) Agreement on organisational arrangements for development of CBFM schemes in the commune
3) Establishment of Commune Forest Management Board
4) Assignment of staff to collect relevant documents and maps
5) Agreement on suitable areas/villages for CBFM
6) Information of communal staff and village leaders on establishment of CBFM schemes
7) Preparation of commune working plan

Agreement on CBFM procedures

Prior to the implementation, all involved stakeholders have to reach an agreement to strictly follow the CBFM procedures as described in the manual. It has to be emphasised that the **process** (the way on how things have been conducted) is of equal importance as the **outcome** (what has been developed).

Agreement on organisational arrangements for CBFM

CBFM comprises a number of planning, reporting and monitoring procedures at different administrative levels (grass roots up to district or even province level).

Consequently, clear responsibilities for functional organisations have to be in place to support effective cooperation at different levels and to help local forest user groups during administrative and technical procedures.

Communal forestry staff and *FPU* are responsible to provide technical support and to monitor the development of CBFM plans and its implementation;

Village leader and *head of the user group* (to be set up in Step 2) are responsible for facilitating the development of the CBFM plans, their implementation including the organization of meetings and timely reporting to communal and FPU staff.

Furthermore the head of the user-group and the village leader should ensure that the CBFM plans are submitted to the commune authorities and that permission is obtained for selective timber harvesting once the plans have been approved by the district authorities.

Establishment of Commune Forest Management Board

The Commune People Committee forms the lowest recognised administrative unit in Vietnam and is the direct communication link for grass root level up to higher authorities. Consequently, a steering organisation comprising relevant commune authorities has to be established to guide CBFM implementation in the field. The CFMB has to be established by legal decision of the DPC (see Appendix 2 for a format for a legal decision on the establishment of CFMBs).

Main tasks and responsibilities in the context of CBFM comprise:

- advisory support in the elaboration of the 5-year CBFM plans
- monitor and evaluate the implementation of CBFM in the villages
- assess, review and approve the submitted proposals for timber harvest for self-consumption and commercial sale
- assess, review and submit 5-year CBFM plans to the district authorities
- ensure that CBFM activities are carried out according to Vietnamese law (including payment of natural resource tax in case of commercial timber extraction)

Proposed members comprise:

- Chairman or Vice-chairman Commune Peoples' Committee - Head
- Cadastral staff - Member
- Local Forest Ranger - Member
- Commune Forestry staff - Member
- Village Heads - Member

Agreement on suitable areas/villages for CBFM

The success of CBFM schemes depend on a number of criteria to be considered during the selection process such as:

- Availability of forest resources from which people can obtain benefits in form of forest products for self-consumption or sale;
- Dependence of local population on forest resources and awareness for the need for sustainable forest management;
- Social cohesion among the community or user group.

Community based forest management cannot be imposed upon forest users but has to be requested by the people. Therefore, forest users have to be properly introduced to the main ideas and objectives of CBFM before they can make an informed decision.

Especially long-term benefits and rights, which may be out of the planning horizon of stakeholders, have to be revealed in details. Based on this meeting the village representatives then pass the information on to their people and support them during the decision-making process. Prepared leaflets can help as reminder to provide guidance and to ensure that no information will be left out during the dissemination in the village meetings.

Preparation of commune work plan

After the selection of villages has been completed, a general implementation schedule has to be drafted with clear responsibilities, locations, and required budget for stationary and organisation of meetings.

For the field work on CBFM it is useful to prepare village maps based on the communal/village FLA map. The village map should show the plots allocated to the households/groups of households, the areas and the location of the forest blocks and compartments. This village map will be used as a reference for the development of CBFM plans and will be used to select the sites for the participatory forest inventory.

Collection and analysis of available information

After the assigned staff from the CFMB has completed data collection, a preliminary data analysis is conducted in form of aggregating all information per village into the table form as provided below:

Table 1: Overview of the allocated forest land per user group

Village: Commune:

Forest user (hh, user group, village)	**Local name of area**	**Unit**	**Compartment**	**Plot**	**Area (ha)**	**Forest status**

Work plan for CBFM plan elaboration in the village

Prior to the implementation a rough work plan and time schedule needs to be developed and agreed upon by the community. A suitable period during the year should be selected avoiding high season for agricultural harvest or any village festivities especially for ethnic minorities.

1.2. Collection of relevant documents and maps

To assist each village in elaborating their CBFM schemes, and making the village meetings effective and successful a number of documents and maps need to be collected by an assigned CFMB member beforehand.

The following documents and maps should be collected if available:

- Socio-economic development plan of commune
- Forest Protection and Development plan of commune (if any)
- Cadastral documents related to forest land allocation, including lists of individual households and groups of households that received forest land detailing area and forest status.
- Forest land use certificates and attached forest management profiles as stipulated in the inter-ministerial circular on forest land allocation by MARD-DoNRE from 2009.
- Forest vegetation result map based on the provincial re-classification of three types of forest from 2006.
- Relevant forest policies such as Forest Protection and Development Law (25/2004/L-CTN), Decision 178/2001/QD-TTg, Decision 186/2006/QD-TTg, Decision 40/2005/QD-BNN…
- "Forest Protection and Development Regulations" as formerly developed and approved by the DPC of all villages where CBFM will be executed.
- Any sketch maps developed during the elaboration of Forest Protection and Development Regulations

1.3 Training to members of the CFMB and VFMGs

Organize training course for CFMBs and VFMGs on the entire procedures towards the elaboration of forest management plans requires substantial technical and communication skills.

Training should cover the following contents:

- Basic principles of CBFM and its practical implications
- Steps, activities and procedures in CBFM
- Policies and decrees related to CBFM (Forest Protection and Development Law (25/2004/L-CTN), the Decision on rights and benefits for households with allocated land (178/2001/QD-TTg) and the decision on harvesting forest products (40/2005/QD-BNN).
- Participatory tools for CBFM plan elaboration

2. FOREST ZONING AND ESTABLISHMENT OF USER GROUPS/ VFMB

Activities:

1. *Forest Zoning*
2. *Forest block description and re-assessment of forest status*
3. *Set-up of forest user groups*
4. *Village meeting and set-up of Village Forest Management Board (VFMB)*
5. *Forest user group boundary demarcation*

2.1. Zoning

The first and most important step is to re-check areas of different kinds of forests and the respective type of ownership for each area as defined during FLA procedures. This will form the basis for the development of user groups, plan elaboration and benefit sharing arrangements after timber harvest.

Forest Zoning refers to the identification of forest areas with similar **forest status** and **forest type** which will be treated as independent management unit for which a separate forest inventory has to be conducted and a separate forest management plan to be developed.

2.2. Description of the forest management block

The identification of forest management blocks as conducted in the previous step requires a field verification regarding the forest status and type following a standardised forest block description form. The process is supported by the local forest ranger and the VFMB.

The description form is further intended to analyse potentials and problems for the specific forest blocks which have to be considered during the plan development.

Field verification is required as available mapping information regarding forest status and type might be not detailed enough and/or outdated.

In case the field verification requires changes to the results of the previous step, adjustments on the mapping information have to be done accordingly.

During field verification forest ownership boundaries as stated in the red books need to be re-checked and if required marked again to ensure a conflict-free starting point for CBFM.

2.3. Set-up of forest user groups

In case village forest resources are issued to the entire community during the forest land allocation process (one red book per village) no user groups have to be defined for a specific forest block.

However, in case of individual red book certificate holders a discussion has to be facilitated in which the advantages and disadvantages of forest user group management will be introduced to villagers.

After villagers have understood the concept of joint forest management, the formation of user groups (e.g., based on personal preference) is supported by the facilitators (CFMB and VFMB members).

It is recommended that forest owners with forest plots adjacent to each other form a group to manage the forest land together. Especially land that is located relatively far away from the residential area and which is thus difficult to manage on an individual basis should be merged into a larger user group for effective protection and development.

The process has to be facilitated during a village meeting with participation of all households who have been allocated forest land. During this meeting the formation of groups will be discussed and agreements need to be made about the organisation of the groups and a head of group to be elected.

Box: Formation of user-groups

In many areas of Quang Binh province, long and narrow strips of forest land have been allocated to individual households. Although this ensures the equal distribution of forest land among villagers, it hampers practical forest management because plot boundaries are often unclear or difficult to maintain. Therefore, it is recommended to form forest user-groups. Households with allocated forest land adjacent to each other should be encouraged to form groups for the management of their forest land and to share duties such as protection and benefits. Each group should appoint a head, who is the contact person and responsible for facilitating the elaboration and implementation of a CBFM plan together with the group members. The group members should discuss among themselves the arrangements of sharing duties and benefits. Protection duties can for example be shared through rotational patrolling.

2.4. Village meeting and establishment of Village Forest Management Group (VFMG)

Before starting the CBFM process in a village, a village meeting needs to be organised in which all organisations, unions, all heads of the allocated individual households and heads of user-groups are present. The facilitator (member of the CFMB) moderates the meeting with support from the respective village head.

Meeting objectives:

1) introduce CBFM to the village
2) discuss the organizational arrangements for CBFM implementation and establishment of the VFMB
3) develop a work plan for CBFM plan elaboration in the village

Introduction of CBFM to the village

The facilitator provides a brief introduction of CBFM to the meeting participants and explains main steps and activities involved. Special attention has to be paid to properly introduce benefits and obligations (as stated in the respective village FPDRs; Decision 178/2001/QD-TTg) of community members in CBFM.

Organizational arrangements for CBFM and establishment of the VFMG

The village is the key unit for CBFM in terms of protection, planning, reporting, and utilisation of forest resources which requires a functional organisation to guide and coordinate the individual activities of individual households or user groups.

In villages were forest is solely managed by group of households, the formation of a Village Forest Management Group (VFMG) is **optional** and depends on the request of the user groups.

In villages were forest resources are jointly managed by the entire community the establishment of a VFMG is **compulsory**.

The VFMG forms the contact point for any higher administration to obtain information on the real implementation in the field.

The VFMG has to be established by legal decision of the CPC (see Appendix 3 for a format for a legal decision).

Main tasks and responsibilities comprise:

- Assist user-groups in the preparation of CBFM plans and timber harvesting applications
- Submit 5-year CBFM plans to the CFMB
- Monitor and evaluate CBFM in the villages in cooperation with the CFMB
- Collect, aggregate and submit proposals for selective timber cutting for both domestic use and commercial purposes to the CFMB
- Maintain a logbook on implementation of CBFM activities

Proposed members comprise:

- Village head
- Representatives of mass organizations
- 2-3 key villagers

The key villagers should be selected based on the following criteria:

- Good understanding of forest resources and forest management
- Respected by other villagers, honest and reliable
- Motivated and interested in CBFM

2.5. Forest user group boundary demarcation

Forest resources can only be managed, protected and monitored if clear boundaries, visible for in- and outsiders, are marked in the field.

Only the outer boundary of the respective forest management block needs to be demarcated in the field as the same management, protection and utilisation will be applied by the user group and monitoring and evaluation will also be conducted at the level of the user group.

In case the user group has defined specific regulations for individual benefit sharing based on the individual red books, the members should themselves find suitable ways to further demarcate the individual household boundaries inside the forest management block.

Marking of outer boundaries is conducted by use of GPS hand receivers based on the mapping information from the Forest Land Allocation.

In case all boundaries are following clearly visible landmarks like rivers or roads no GPS ground-truthing is required and boundaries can be directly demarcated in the field.

3. PARTICIPATORY FOREST INVENTORY

Activities:

1. Sample plot measurements
2. Data analysis and definition of sustainable harvest level

3.1. Sample plot measurements

Reliable data about existing forest resources is crucial to ensure sustainable forest management and the only technical way to obtain such data is to conduct a precise forest inventory.

In case a comprehensive forest inventory has been recently conducted during the process of forest land allocation as stipulated in Circular 38/2007/TT-BTT, sufficient planning data is already available to elaborate the first 5-year forest management plan after FLA. Forest areas of IA, IB and IC are classified as bare land do not require any forest inventory as no standing volume has developed yet.

In case forest land allocation has just recently been completed, inventory data from the FLA inventory database is used to elaborate the first 5-year CBFM plans. All coming 5-year plans are to be based on a new inventory conducted by the local people under supervision of district agencies.

CBFM inventory design is mainly based on the technical concept as defined in Annex 7 of Circular 38/2007/TT-BTT. However, as no stand volume figures are required for CBFM no height measurements are to be conducted in the field and tree diameters are only to be measured in diameter classes defined by different colour bands (see provincial PLUP-FLA for further reference). Field implementation is supported by local forest rangers in cooperation with the respective forest users.

Sample plot distribution can either be based on a systematic grid net and by use of GPS technology if available or by simply laying out transect lines against the main geographical gradient (up or down the slope). Sample intensity is defined by forestry technicians and should be around 0,75 -1.5% depending on the heterogeneity of the forest resource.

Data collection is conducted in rectangular sample plots of 500m² (20x25m) delineated in the field by use of nylon ropes. In mountainous areas slope corrections are further conducted to calculate the required length of the sample plot on the slope. Inside the sample plot all trees from 8 cm DBH and above are assessed by tree species, diameter class and timber potential. It is important that the measurements are carried out accurately and carefully, because the sample plot outcomes will determine the quantities that can be extracted from the forests without having a negative impact on the resource base.

Data collection is carried out by a measure team of one technical staff (recorder) and two villagers (measurers). Full participation of villagers is considered crucial to ensure that forest users will understand the outcome of the inventory, create a sense of ownership over the inventory outcome and are willing to comply with the results during implementation of CBFM plans. Furthermore, it will result in a significant reduction of the workload for the administration (e.g. Forest Protection staff).

3.2. Data analysis and definition of sustainable harvest amount

Timber harvesting is the most important silvicultural intervention in forest management and has to be based on clear and practicable benchmarks which can easily be assessed, monitored and enforced by local forest users and the administration.

In community forestry, simple but reliable indicators for sustainable utilisation levels are needed which can a) satisfy the varied demand of the local forest user and at the same time b) ensure sustainability of the forest resource.

In conventional forestry, the volume in cubic meter of solid timber is used as unit for planning, implementation and controlling. Harvest levels are defined in volume per hectare or as percentage of the total standing volume.

In contrast to conventional inventories in which harvesting levels are defined by volume of solid timber, the CBFM concept only applies number of trees per each diameter class (no volume estimates!) as practicable criteria for planning, implementation and controlling within the capacity of farmers and supportive commune and district staff.

Providing quantifiable options for timber utilization throughout all diameter classes is crucial to reflect the divers demand of forest users which would not be possible by use of a conventional method, e.g. minimum harvest diameter concept.

Stem number per diameter is a very transparent and accountable unit which can be easily measured by local people and field staff and allows for a very precise description of planned silvicultural interventions which cannot be achieved by use of general volume figures only.

Inventory results are visualised in form of stem number-diameter class histograms and harvest amounts are quantified by comparing actual stem numbers as obtained during the forest inventory with stem numbers defined by a so-called sustainable forest model (SFM). The SFM is representing the structure of a well-developed, productive forest under sustainable management. For a detailed description of the SFM concept refer to Appendix 4.

The SFM approach is currently applied in the community forestry pilot program under MARD and an official project guideline has been issued as official letter 815/CV-LNCD, dated 12th June 2007 for an application within the 40 project communes.

In case the stem number of trees (as measured during forest inventory) for a given DBH class exceeds the respective number as defined in the SFM, the surplus trees are allowed to be utilised. Any timber extraction is therefore aiming at **improving the current forest structure** towards the desired SFM structure in an iterative process of repeated thinning cycles. All silvicultural interventions will consequently lead to an improved stand structure after utilization instead of a degradation of forest resources as often seen under large concession forest management.

A SFM provides an effective monitoring tool within the capacities of both local field staff and local communities which helps to improve transparency, accountability and improves villagers confidence in dealing with government agencies e.g. for timber harvest application.

Aggregated inventory results form the basis for the forest management plan development, estimation of sustainable harvesting levels as well as information for future marketing and trade.

A SFM sample is provided below. Colours are referring to the diameter class index colours as applied for the tree diameter measure tape.

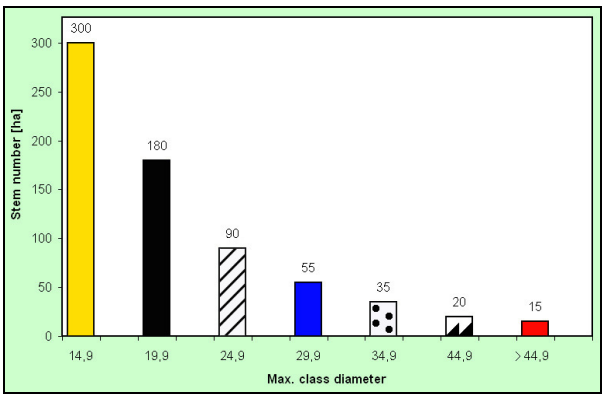

Figure 2: Sample of a Sustainable Forest Model

4. ELABORATION OF 5-YEAR CBFM PLAN

Activities:

1. Identification of forest management goal
2. Identification of five-year harvest amount
3. Description of forest management activities
4. Writing of the village/ user-group CBFM plan

Based on the inventory data analysis, CBFM plans are developed for each forest management unit supported by local forest rangers and the VFMB. CBFMPs are elaborated for a period of five years to provide the medium-term stability that is needed to guide consistent implementation of sustainable forest management activities as prescribed in the plan.

Activities in the CBFM plan elaboration include the identification of objectives for forest management, the description of major activities related to selective cutting, plantation & enrichment planting, stand improvement techniques and protection, and finally the writing of the CBFM plan.

CBFM plans provide clear benefits for villagers as well as supporting staff. On the one hand, administrative procedures e.g. application for timber harvesting can be approved on the basis of reliable quantitative information about the condition of forest resources and monitoring can be based on the fulfilment of the annual work plan as prepared by the community/ user group.

4.1. Identification of forest management goal

As the potential of natural forest stands differ in terms of species distribution, productivity and functions, the management system has to be tailored based on the existing resource.

Consequently, a clear vision of the future forest structure has to be defined and a consistent management applied during the entire production period. The management goal for each zone can differ and not all the plots/zones need to be transformed into high value mature forests. A management goal could for example also include a woodlot for the extraction of fuel wood, e.g. "*Castanopsis* forest for acorn and firewood production"..

A management goal is mainly defined by asking: "what products you want to produce in your forest and how should your forest look like in 20-30 years to provide these products?"

The differences between the present forest status and the desired future forest structure will then define the management regime to be applied.

Table 2: Examples for potential management goals and related activities based on the actual forest status

Actual forest status	Management goal	Activities
> IIA- poor, medium and rich forest	Medium and rich forest (> IIIA2) for timber harvesting, fuel wood & NTFP collection and biodiversity conservation.	▪ Selective cutting (based on DBH class distribution figures) ▪ Protection ▪ Stand improvement (especially in forests of < IIIA1)
IIA-III A1 Poor forest	Poor forest (IIB/IIIA1) for fuel wood & NTFP collection and selective cutting of small timber	▪ Stand improvement (including thinning + pruning for fuelwood collection & some removal of undesired species) ▪ Protection ▪ Enrichment planting with NTFPs and timber trees

Facilitating this planning through a participating approach helps local people to understand how and why management decisions are made and ensures that their demand and expectations are incorporated into the results. It is assumed that forest user groups who have the opportunity to express their needs and incorporate their local knowledge into the process have an increased sense of ownership and are willing to take over management responsibilities in the long run.

It is recommended to have no interventions other than protection for the sake of biodiversity conservation in limestone forests because limestone forests are very susceptible to exploitation and regenerate very slowly. Limestone forest is therefore not to be allocated to local people (see PLUP-FLA guideline).

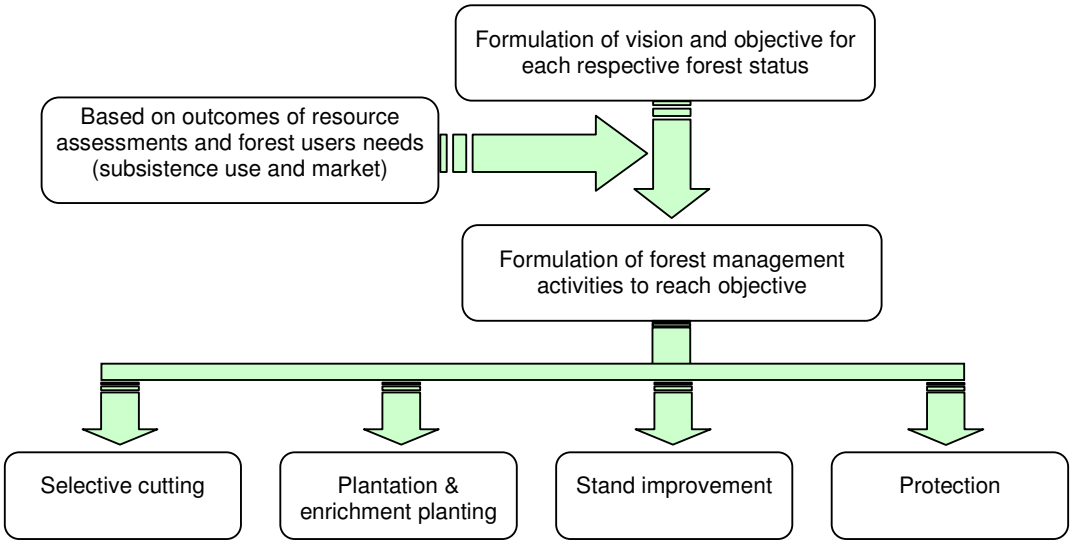

Figure 3: Decision making for the formulation of forest management objectives

4.2. Identification of five-year harvest amount

Following the data analysis of the forest inventory the total harvestable timber amount has been defined per diameter class. This amount has to be understood as maximum possible amount. However, the forest users do not need to exploit this total amount but based on their demand define the amount of timber they want to extract in the next five years.

In case of not having enough forest products, it is necessary to clearly state existing difficulties and opportunities in forest management. It is necessary to have solutions to overcome difficulties as well as to make use of other kinds of forest product.

4.3. Description of forest management activities

The most important part of the CBFM plan is the activity plan. The activities can in general be categorized into major groups including:

Utilisation: selective cutting, the removal of mature, timber-sized trees by feeling and extracting their stems

Stand improvement includes activities such as thinning, pruning and removal of non-valuable plants to promote the growth of valuable trees or competing vegetation (climber, shrubs) in densely stocked forests to create sufficient space for potential crop trees to grow into large diameter.

Enrichment planting is normally carried out in poor forest or areas that are poor in regeneration. The aims of enrichment planting are to accelerate forest regeneration and to increase the productivity of the forest in order to meet the demand for forest products. Enrichment with NTFPs, such as rattan, can furthermore increase the short-term benefits of a poor forest stand.

The selection of species depends on the aim of the plantation. Most local people are interested in fast growing tree species that can be harvested in 8-10 years such as *Eucalyptus* and *Acacia*. The negative environmental impacts of *Eucalyptus*, especially the deterioration of the soil and the high consumption of soil nutrients and deep underground water, are presently well-known and therefore the establishment of *Eucalyptus* plantations is not promoted.

At present, plantations with fast growing hybrid acacia are encouraged by the administration, but it remains to be seen if the soil and water is not negatively impacted by this species after a number of rotations. Therefore it is recommended to set up mixed plantations with valuable but slower

growing native species such as Lat hoa (*Chukrasia tabularis*), Tram do (*Aquilaria crassna*) or others in order to mitigate negative environmental impacts in the long-run.

Protection is mainly regulated in the approved village Forest Protection Regulations, however some specific activities like the construction of a fire break or further specifications on the timing or responsibilities should be added into the management plan (See provincial guideline on Forest Protection and Development Regulations for further details).

Non-Timber Forest Products utilization should not detail quantities (e.g. kg, loads, meter, etc.) but instead clearly define harvesting techniques that can ensure the sustainability of the resource as at present no reliable data of harvest levels nor techniques for inventories are available for most NTFP species.

4.4. Writing of the village/ user-group CBFM plan

After all the above mentioned activities have been discussed and it is clear how, when, and where activities will be implemented, the user village/ user group has to document all information into a comprehensive CBFM plan per forest management block. Depending on the forest resource (natural forest or plantation) two different formats are to be used as provided in Appendix 5.

Management plans are working documents and should be made available for and used by everyone who has a decision-making role. The plan has to specifically document and justify the choice of the selected silvicultural system to ensure that all management levels have a clear understanding of what they are doing and why.

5. APPROVAL OF 5-YEAR CBFM PLAN

Activities:

1. Submission of CBFM plan to CPC and DPC
2. Appraisal and Approval of CBFM plan

5.1. Submission of CBFM plan to DPC

After reaching consensus among the community/ user group members the five year village forest management plan is submitted to the Commune People Committee by the village Forest Management Group. The Commune People Committee appraises the plan with the consultation from the Commune Forest Management Board and forwards it to the District People Committee.

5.2. Appraisal and Approval of CBFM plan

The DPC is consulting the Forest Protection Unit, Section of Agriculture and Rural Development or/and Natural Resources and Environment Office (if necessary) for forestry related issues of the management plan and is issuing a legal approval for the five-year planning horizon. The signed and stamped management plan is then returned to the Commune Forest Management Board, who is further forwarding the plan to the Village Forest Management Group.

The responsibility of the VFMG is to disseminate the information to all stakeholders and to keep the signed plan as legal evidence.

6. TIMBER HARVEST APPLICATION AND BENEFIT SHARING

Activities:

1. Timber harvest application
2. Benefit sharing mechanism
3. Monitoring and Evaluation

Forest utilisation is defined for a planning horizon of five-years as stated in the approved forest management plan and clearly specifying the number of trees per diameter class proposed for harvest.

Despite an approval of the total planned harvest amount, the actual harvest and utilisation of timber requires further application and reporting procedures and in case of commercial timber extraction a detailed taxation according to national law.

The herein proposed benefit sharing mechanism in the Guideline is in line with the legal policy frame on taxation of natural resources and policies on forest protection and development.

However, some procedures as proposed in the following differ from current policies on benefit sharing as stipulated in Decision 178[3] and are understood as technical proposal to contribute to current forest policy development in Vietnam. Consequently, procedures as described in this guideline require further approval at provincial level before an application at provincial scale can be initiated.

The described benefit sharing mechanism is detailing options under i) self-consumption of timber within the community and internal benefit sharing among community members or forest user group members and ii) commercial timber sale with arrangements for taxation between forest users and state authorities.

The entire harvesting design, tree selection, implementation, and reporting is entirely based on stem number per diameter as the only planning unit. Volume calculations are only required for commercial timber sale at the log yard to be conducted by forest protection rangers in order to comply with regulations for the deduction of natural resource tax.

6.1. Timber harvest application

The decision on the scale, timing and purpose for timber harvest has to be made by the local forest users and documented in the annual forest management plan to be forwarded to commune authorities for approval and district authorities for timely information.

At least two weeks prior to the harvest, the identification, permanent marking and listing of trees to be extracted has to be completed following the instruction of the silvicultural guideline and the planning results forwarded to the CPC.

Regardless the purpose of the harvest (self-consumption or commercial sale) identical planning, preparation and harvest application procedures have to be completed as shown in table 4 under point 1 to 3.

Administrative and technical procedures for forest utilisation

Administrative and technical procedures for forest utilisation in CBFM are implemented inline with the contents of the following Table 4

[3] 178/2001/QD-TTg on the benefits and obligations of households and individuals assigned leased or contracted forest and forestry land

Table 4: Administrative and technical procedures for forest utilisation and benefit sharing in CBFM

No.	Task	Description	Responsibility
1.	**Planning and approval procedures for Forest Management Plan development**		
1.1	Development of five-year Forest Management Plan	The five-year FMP has been developed based on a technical sound forest resource assessment with full participation of villagers.	VFMB support organisation, Community implement, FPU provide technical assistance on request
1.2	Approval of five-year FMP	The five-year forest management plan requires legal approval at district level.	CFMB acknowledges and submits to DPC; DPC appraises and approves
1.3	Development and approval of Annual Work Plan	The five-year FMP is broken down into annual work plans, which only requires approval at commune level. The AWP has to be forwarded to the Forest Protection Unit for their information before implementation of silvicultural activities in the field can start.	VFMB organises and forwards to CPC to be approved. CFMB forwards a copy to FPU
2.	**Preparation for Annual Work Plan implementation; harvest application and reporting**		
2.1	Preparatory village/user group meeting	Presentation of planned harvesting activities for next planning period based on the approved five-year forest management plan and annual work plan.	VFMB is organising meeting
2.2	Decision on forest products utilisation	The VFMB is organising a village meeting to identify the demand for timber for self-consumption from all forest-user groups. In case that demand for self-consumption is high and timber supply is limited/likely to be insufficient, no commercial timber sale will be carried out for the planning period. Commercial sale has to be understood as surplus after satisfying the village demand for self-consumption of timber.	VFMB is organising village/user groups meeting; community is defining demand for timber for self-consumption and sale
2.3	VFMB identifies forest blocks for harvesting	Based on the AWP and field checks, forest blocks are defined for selective harvesting.	VFMB meeting; consultation by Forest Protection Unit and CFMB
2.4	Harvest planning, skidding network planning	A harvest plan is developed and tasks assigned for all harvest related activities (Harvest Action Plan) such as: ▪ Tree marking, climber cutting, felling, cleaning, clearing and preparation of trails for transportation, skidding, maintenance… ▪ Determining timing, responsibilities, financing and locations.	VFMB meeting; consultation by Forest Protection Unit or State Forest Enterprise technicians on request

2.5	Tree marking and writing of tree list for harvesting	Following the harvest action plan households are selecting trees for harvesting (based on the silvicultural guidelines). Trees are permanently marked with numbers at breast height and below the felling scarf. All selected trees are recorded in a tree list with number, species, and diameter class referring to the diameter at breast height (see Appendix 4, Table 5) Forest Rangers can randomly check the tree marking results if desired, however no approval of the tree marking is required.	VFMB is supervising implementation; Forest Protection Unit and CFMB is randomly monitoring the implementation
2.6	Information about planned harvest forwarded to commune and district authorities for their information	In principle, only one commercial harvesting should be carried out per year per village to limit the time and resources needed by the administration. The harvest action plan and the accompanied tree list are forwarded to the commune for their information and will be submitted to the Forest Protection Unit. No legal approval is required for the harvest action plan as long as the harvest quota is within the limits of the five-year quota and the Annual Work Plan. The harvest action plan has to be provided to the administration at least two weeks before harvest. The administration assesses this information and compares the number of trees to be cut per forest block with the annual forest management plan and five-year management plan of the respective forest block. In case no feedback has been received from the administration within the given period, the harvest activities can be implemented.	VFMB compiles tree marking and harvest planning data and forwards to CFMB; CFMB forwards to Forest Protection Unit for their timely information; If required Forest Protection Unit revises the tree marking in the field
2.7	VFMB organises the implementation of the harvesting action plan at village level	VFMB organises village meeting and discusses timing and assigns households for specific tasks.	VFMB is organising plenary village meeting; community is defining timing and responsibilities.

3.	**Harvesting operations**		
3.1	Harvesting implementation	Marked trees are harvested following the provided silvicultural guidelines. Trimming and crosscutting at the harvesting site. If required motor-manual on-site processing for large timber. Total harvest amount (including main stem, big branches and fallen trees) listed including number of trees, species, length and mid-diameter.	Logging crew implements harvesting; VFMB supervises implementation and records harvesting results
3.2	Post-harvest monitoring	Assessment of logging damage, felled trees, logging site, forest cleaning and forest status post-harvest.	VFMB is checking the harvesting site
3.3	Timber skidding	Skidding of timber to the selected log yard List of trees at the log yard compared against tree marking list.	Logging crew organises skidding to log yard. VFMB is compiling timber list and monitors transportation
3.4	Cleaning of harvest site	Cleaning of harvesting remains and collection of firewood from crown material following silvicultural guidelines	Logging crew is cleaning harvest site; community/user group collects firewood

4.	**Inspection of harvest, timber consumption and benefit sharing arrangements**		
4.1a	**Timber utilisation for commercial sale**		
4.1.1	Inspection of log yard and hammering	Forest Protection Unit together with VFMB are inspecting the log yard and hammering all logs for sale. Calculation of log volume by Forest Ranger and VFMB. Harvested trees are compared against the original list of trees. All trees are recorded in a timber list (species, mid-diameter, length, volume, tax group). FPU signs the list of registered trees that have been harvested.	Forest Protection Unit together with VFMB and commune authorities is inspecting the log yard; Forest Protection Unit hammers registered timber with seal
4.1.2	Selling of timber at log yard and transport	Timber is sold at the log yard to the buyer who is responsible for further transportation	VFMB organises sale supported by CPC, Forest Protection Unit, Financial Section
4.1.3	Natural Resource Tax	Forest user group is paying natural resource tax according to timber tax groups.	District Finance Unit issues tax receipt
4.1.4	Pay levy to CPC/CFMB	After deducting natural resource tax and actual harvesting costs (felling, forest cleaning, transporting timbers to log yard), a 5% share is deducted for CPC/CFMB.	CPC/CFMB issues levy receipt

4.1.5	Village/user group internal benefit sharing	In case **red books** have been allocated **to entire communities** the revenues are managed by the VFMB and allocated to general village development, forest development and/or distributed amongst the households of the village according to individual needs and work input. In case **red books** have been issued **to individual households** the forest user groups have to define regulations on how to share the revenues among the user group members.	VFMB and CFMB are supervising and monitoring village internal share of revenues
4.1b	**Timber utilisation for self-consumption**		
4.1.1	Distribution of harvest amount among community	Following the timber request of individual households (see step 2.2) timber is distributed for self-consumption among the community members.	VFMB is distributing timber to individual households
4.1.2	Village/user group internal benefit sharing	Based on the approved Forest Protection and Development Regulations, timber consumers are paying the defined amount to the VFMB to finance future forestry activities	VFMB is managing and keeping records on expenditures

6.2. Monitoring & evaluation of CBFM

Monitoring of the implementation of CBFM activities is important to assess whether CBFM has led to the intended impacts of improved forest management and increased legal income from forest resources. Furthermore, monitoring of the activities helps to identify difficulties, solutions and best practices. A record book of the extracted trees per DBH class and the fees paid should be kept by each user-group or the VFMB. From these records the number of extracted trees and the derived income can be calculated (see appendix 7).

Forestry inventories are needed in order to monitor the impacts of CBFM on the forest status. Every 5 years a participatory forest inventory will be carried out, which includes the presentation of the results in histograms of the DBH class distribution. The new inventory results can then be compared with former figures and against the SFM. In this way the progress towards a better forest structure can be evaluated.

Part II: Practical guidance on CBFM planning procedures

This part offers practical guidance and exercises for the implementation of participatory forest inventories and elaboration of 5-year CBFM plans as briefly summarised in Part I. Although exercises are described in detail, the facilitator should be flexible in the use of these materials for the elaboration of CBFM plans. Some exercises might work better than others in different villages, and the facilitator needs to be able to respond rapidly to the developing situation rather than sticking rigidly to the detail of each exercise.

The exercises are designed to encourage full participation of villagers and to provide clear guidance on the process for facilitators. Full participation means that everyone is involved in all the activities. However, it does not mean that villagers have to do everything on their own nor that facilitators have to do everything for the participants.

Local people will not be able to prepare their own CBFM plans without the technical skills and abilities of supporting staff to help them. On the other hand, supporting staff cannot prepare a CBFM plan alone because they do not know the local conditions well enough and they do not know enough about the needs of the local stakeholders.

Each session plan describes the objectives, the required time and materials and provides step by step guidance for the facilitator to conduct the exercise (including formats for A0 posters and handouts for participants). The facilitator needs to become familiar with each session before implementation and also needs to have an overview over the whole CBFM process.

Participants of the CBFM planning process can be representatives of each forest user group or selected key-villagers in case the forest land is allocated to the entire village. It is important that women are also selected as one of the representatives of the user groups as men and women have often different forest management/products priorities.

Table 5: Tentative implementation schedule for CBFM schemes

Session	Objectives
Introduction *(30 min)*	▪ Introduce the concept of CBFM ▪ Introduce participants and supporting staff ▪ Get expectations from participants
Forest Zoning and Establishment of Forest user group *(~3 hours, depending on the available information)*	▪ Divide village forest into forest management blocks each with a specific management goal and user ▪ Develop a sketch map on distribution of forest management blocks ▪ Identify size of forest management blocks
Set-up of VFMB *(~3 hours)*	▪ Develop regulations for a VFMB ▪ Select members for a VFMB
Forest Block description and Re-assessment of forest status *(~3 hours; depending on walking distance to forest)*	▪ Describe each block based on existing knowledge ▪ Discuss major opportunities and challenges of present forest management ▪ Conduct an ocular assessment on the forest status
Forest user group boundary demarcation *(Depending on the number and size of forest blocks)*	▪ Conduct GPS ground-truthing of user group boundaries ▪ Permanently mark boundaries in the field
Participatory Forest Inventory *(Depending on forest status and size of the forest block)*	▪ Provide quantitative information on forest resources ▪ Form measure teams and instruct teams ▪ Develop forest inventory design ▪ Conduct forest inventory
Data analysis *(~3 hours; depending on the number of measured sample plots)*	▪ Compile and summarize sample plot data for each forest block managed by a user group/community ▪ Present the data in an understandable way for user-groups using histograms/user group ▪ Discuss on implications for forest management and forest product utilization
Elaboration of 5-year CBFM plan *(2 hours)*	▪ Describe in detail activities for each user-group that will be carried out during the 5-year management plan in the forest under their management ▪ Develop 5-year CBFM plan
Evaluation and closing *(30 min)*	▪ See whether participants expectations have been met ▪ Identify improvements required for next implementation

1 Introduction

An independent follow-up of CBFM planning procedures can only be expected if the people concerned have been fully involved in all decision-making processes and by this developed a sense of ownership over the planning results. If people do not develop a self-interest in forest management and are not fully involved in the decision-making process, implementation will be half-hearted, probably misunderstood and will more likely fail.
Therefore, full participation throughout all planning processes is as equal important as the planning result itself.
The process as described in the following is intended to guide forest users through all required planning procedures to develop their forest management plan as legal basis for sustainable forest management.

Objectives
- To introduce the concept of CBFM
- To introduce participants and supporting staff
- To get expectations from participants

Time needed 30 min

Material A0 paper, markers and colour cards, copies and A0 poster of the tentative schedule for implementation, copies of the steps and activities in CBFM

Steps
1. Welcome participants. Present the objectives of the work, the steps that will be followed, the time that might be required and the expected role of participants. Show the agenda of the CBFM planning and briefly introduce all steps.
2. Let participants introduce themselves. Ask participants to agree on certain ground rules – starting and finishing times; arrangements for lunch and any other rules which might be necessary.
3. Briefly introduce the concept of CBFM
4. Explain that forest management plans will be developed by a user group or the entire village depending on the form of land allocation that has been implemented.
5. Explain that this implementation will only focus on the development of CBFM plans and not on silvicultural techniques to improve forest management. Training on silvicultural techniques should be provided once the CBFM plan has been approved.
6. After this introduction on CBFM, ask participants to write down on a colour card what they expect from the CBFM process. Collect the colour cards and present the main content to all. Explain which expectations are correct and which ones are beyond the agendas objectives.
7. Note the expectations on an A0 poster and keep results for later reference during the session. Handout the copies of the main steps on CBFM to participants.

2 Forest Zoning and Establishment of Forest user group

Forest status block is understood as an area of forest in which the vegetation (timber trees) is uniform in composition of species, age, size, and stocking (uniform in forest structure).

Forest Zoning refers to the identification of forest areas with similar **forest status** and **forest type**. The identified forest areas will be treated as independent management unit for which a separate forest inventory has to be conducted and a separate forest management plan to be developed.

Objectives

- To divide the village forest resources into separate areas (forest status blocks) each with a specific management goal
- To develop a sketch map showing the distribution of forest management blocks in the village area
- Identify the size of each forest management block

Time needed 3 hour (depending on the available information)

Material A0 paper, markers, clips, white board markers, permanent markers, transparency sheets, Forest status map, forest land allocation map, available red books & attached forest management profile, copy of table on forest land areas received by household groups (part of the cadastral documents), summary table of forest characteristics if available (based on Circular 38).

Steps

1. Present the objectives of the exercise.
2. Show the forest status map as prepared during the PLUP-FLA process.
3. Give an overall explanation of the Vietnamese forest classification system (Group I - barren/shrub land, Group II - regenerating forest and Group III - poor to rich exploited forests, Group IV - primary forests).
4. Put the transparency over the village FLA map and use clips to temporarily hold it in place. Using a whiteboard marker show how they can draw on the transparency to delineate boundaries.
5. Ask participants to draw lines around forest areas they consider as being of similar kind in terms of: forest status (e.g. IIa or IIIa1) and forest type (e.g. semi-deciduous or pine forest) so that they can be considered one forest status block. Don't rush them, and let them work out where the boundaries are.
6. Once they have finished – look at the map and see if there are any inconsistencies e.g. shapes that are not closed; lines which don't join up. Ask questions about what they have drawn (e.g. who is the owner, what project supported the afforestation, etc.) and write the information next to the forest block on the transparency.
7. When the map looks complete, explain that similar forest areas can be grouped as one forest block for future management.

   Note: the following steps are only required in case natural forest has been allocated under red books to individual households.

8. Facilitate a discussion on the advantages and disadvantages of individual or joint forest management. (Complete the table no. 6 through guiding questions)

Table 6: Advantages and disadvantages of forest management by user groups

Organisation form	Inventory/ Planning	Reporting/ Approval	Protection	Boundary demarcation	Benefit sharing
Individual household					
Group of households					

9. Point out that planning and reporting is better carried out in groups to reduce the workload for the administration (less application forms) and forest user (shared labour during inventory and plan preparation).
10. Under the point "benefit sharing" emphasise that despite being organised in a forest user group, benefits from forest utilisation could still be divided based on the individual ownership as stated in the red book and that this decision has to be made by each forest user group alone.
11. In case individual forest owners have agreed to join in forest user groups the area and respective members per user group have to be defined.
12. Based on the prepared transparency overlaid on the FLA result map, identify adjoining forest owner plots which could be merged into one forest user group. Invite participants to discuss on the personal preferences of joining in a specific group.
13. Forest user plots should have a minimum size of at least 10 ha of continuous forest vegetation to ensure a suitable size for effective planning and reporting.
14. Record the name of each household per forest user group and the respective forest area and get each individual to sign on the document.
15. Demarcate forest user plot boundaries (only the outer boundary of the forest user group forest needs to be defined on the transparency and to be later demarcated in the field).
16. Identify the total area of each forest user plot and write the size and the name of each forest user group on the transparency. Copy the results into table no. 7 as provided below.

Table 7: Total forest land area (ha) managed by user groups

Name of user group members	***Unit***	***Compartment***	***Block***	***Area (ha)***	***Forest status***

17. Wrap-up the exercise by summarizing the main results.

3 Set-up of Village Forest Management Group

In order to best coordinate and communicate between grassroots level up to commune and even district authorities a Village Forest Management Group (VFMG) is to be established by the local people. The role and function of the VFMB is best defined by authority and responsibility for each single activity under forest management.

During this session local people are guided through the development of a matrix on forest management which will form the basis for developing VFMB regulations to be approved by the commune PC.

Objectives

- Develop a common understanding of main management operations
- Knowledge of where authority and responsibility will lie for forestry operations
- Develop VFMB regulations to be submitted for approval

Time needed 3 hours

Material A0 paper, markers, prepared matrix on two attached A0 papers, meta cards, marker pens

Steps

1. Explain benefits of group organisation for effective forest management.

   Benefits of group organisation:

   - Shared labour in protection tasks and joint support during solving of conflicts especially against outsiders
   - One person seeking information for group benefit, rather than all searching for the same information for individual benefit.
   - Specialists working for group benefit
   - Development of community spirit and cohesion

2. Place the prepared matrix of responsibilities on the wall for all participants to see. Start with forest protection as first issue.
3. Carefully explain the logic of the matrix. Go through the field for forest protection (refer back to the VFPDR regulations). Complete the first row for forest protection by explaining duties and authorities for individual members and the VFMG.
4. Explain the difference between duty and authority of the VFMG
5. Go through each management operation and ask what authorities or duties are to be defined. After an agreement has been reached on one point fill in the specific field of the matrix.
6. As main outcome, authorities and duties for individual households and the VFMB have been defined for the entire forest management process. This is the basis for the development of clear regulations on the set-up and operation of the VFMB.

Table 8a: Matrix of Responsibilities in Community based Forest Management

Activity	Individual Household	Village Forest Management Board
Protection **(fire break; patrolling; dissemination; solving conflicts; punishment / compensation)**	**Authorities:** - **Stop forest violators and temporarily confiscate illegally harvested forest products** **Duties:** - **Participate in forest protection activities**	**Authority:** - **Apply punishment to violators and confiscate illegally harvested products** **Duties:** - **Participate in forest protection activities** - **Inform village community about violations** - **Inform FPU about severe violations**
Forest inventory	**Duties:** - **Conduct 5-year periodical forest inventory**	**Authority:** - **Assign individual household to take part in forest inventory** **Duties:** - **Participate in data analysis**
Management Plan **(5 year)**	**Authority:** - **Participate in development of plan** **Duties:** - **Implement and comply with management plan**	**Authority:** - **Call members of VFMB and community for participating in setting up plan** **Duties:** - **Summary results and submit plan to higher authority for approval** - **Monitor implementation of plan**
Harvesting timber and NTFP	**Authority:** - **Harvest and utilize forest products in a sustainable way** **Duties:** - **Submit application for harvesting** - **Comply with permitted harvesting amount and approved harvesting technique** - **Report result of harvesting to VFMB**	**Authority:** - **Check and supervise forest harvestings carried out by individual households** - **Apply punishment / compensation to cases involved in non-compliant harvesting** **Duties:** - **Give fair endorsement on harvesting applications** - **Provide guidance on harvesting techniques**
Marketing and selling	**Authority:** - **Conduct marketing and sale of harvested forest products** - **Select time, location and seller** **Duties:** - **Submit application for selling forest products and limit selling on approved harvesting amount**	**Authority:** - **Decide amount of harvested products to be sold** **Duties:** - **Survey and identify markets for forest products** - **Prepare legal procedures for transporting and selling of forest products** - **Report large volume of harvested products to communal and district authorities prior to selling**
Benefit sharing	**Authority:** - **Enjoy all forest products** - **Decide rate of fee contributed to village/user group fund** **Duties:** - **Compensate community/user group for individual forest product utilization**	**Authority:** - **Collect forest product tax as contribution to Village Forest Development Fund** **Duties:** - **Organize village meetings to discuss on level of forest product tax** - **Organize meeting for individual compensation**
Financial management	**Authority:** - **Decide on use of compensation for forest management activities.** - **Monitor and check disbursement** - **Stop wrong expenditures**	**Authority:** - **Recommend use of compensation for forest management activities** **Duties:** - **Manage compensation in compliance with village/ user group regulation** - **Announce use of compensation to village/ user group**

7. Responsibilities and duties as documented in the matrix will then be transferred into a text document which will form the final regulation to be submitted for approval (see Annex 1).
8. The supporting staff with one or two selected village representatives is responsible for writing of the regulations (it is best to complete this task right after the session).
9. Select one or two members who will participate during the writing of the regulations and define a date and location. Note down all details on a poster as follow-up activity plan of the session.
10. After the draft regulations have been written, hardcopies of the draft version are distributed to the people and some 3-5 days later a village/ user group meeting will be organised to reach an agreement on the final version.
11. Define who will be responsible for the dissemination and when and how the meeting will be organised. Note down all points agreed upon on the poster.
12. Define a date when the VFMG members will be elected. It could be done during the same plenary meeting or during a separate one after the final version of the regulations has been printed and disseminated.
13. Wrap-up the session by explaining that this regulation is only the first draft developed by the meeting group and still has to be accepted by all villagers/ user group members during a plenary meeting before it can come into effect.

4 Forest Block description and Re-assessment of forest status

Following the outcome of the previous step of forest management blocks have been delineated on the FLA map. However, available mapping information regarding forest status and type might be not detailed enough and/or outdated and therefore need to be verified in the field before further planning steps towards a forest management plan can be conducted.

Objectives
- To briefly describe each forest management unit based on existing knowledge
- To discuss the major opportunities and challenges of current forest management
- To conduct an ocular assessment of the forest status

Time needed 1 hour

Material A0 paper, markers and sufficient blank description forms (one for each forest management block)

Steps
1. Present the objectives of the exercise.
2. Facilitate each forest user group to independently complete a forest description form for each of their forest management blocks. In case areas of similar forest status and type have been divided among several user groups only one description form needs to be completed for all.
3. Distribute the forms and go through the forms (all representatives of the user groups/community should get one form). Summarize and explain the information that is needed per section.

   Access: Walking distance from the village to the forest stand

   Management goal: The main production aim of the forest management block

Main criteria include:

i) main desired products (timber, firewood, NTFP),
ii) mixture in the stand (e.g. 70% timber species, 30% firewood species),
iii) names of species that can provide these products,
iv) diameter class required for the specific product,
v) production cycle required for each product (e.g. timber production with a rotation of 30 years, firewood with a rotation of 5 years only).

Forest age: Mainly for afforestation sites or forest after shifting cultivation
Dominant species: List most dominant/abundant plant species that are present and are characteristic for the plot (those species are not necessarily used by the people)
Products: Mention here if local people are currently extracting timber or NTFPs (NTFPs include species such as fuelwood, rattan, bamboo, medicinal plants, forest fruits and vegetables, mushrooms, etc.) from the plot or expect to do so in the near future (within 5 years). List the species or explain why extraction is not carried out (e.g. too far, no valuable species, not enough trees, etc).
Forest hazards: State the degree of forest hazards like weed invasion, fire, grazing. List the major problems faced in the plot such as fire, weed invasion, illegal exploitation, free grazing or other problems. If there are other problems, mention these problems in detail.
Degree of forest closure: To assess thinning options or protection problems

4. Divide participants into survey teams and decide which team will go to which block.
5. Let each team conduct their survey in the field (30 min. excluding time for walking to the block). While in the forest stand also conduct an ocular assessment of the forest status following the following definition:

Group I:
Land without forests, only covered with grass, shrubs or scattered trees and bamboos with a cover of less than 30%. Depending on the status, this group is divided into:
- IA: vegetation dominated by grass and shrubs.
- IB: vegetation dominated by shrubs, and some scattered timber trees or bamboos.
- IC: regenerated timber trees as well as vegetation with regenerated timber trees of >1 m height and <1,000 trees/ha.

Group II:
Recovered forests with pioneer trees of smaller diameter. Based on the status and origin, these forests are classified as:
- IIA: Forests recovered after slash-and-burn practices. Characterized by pioneer trees with high light requirements, quick growth, even-aged with one single storey.
- IIB: Forests recovered after being over-exploited; majority of these forests include young tree/plant communities of species that have a relatively high light requirements, complex species composition, uneven-aged and unclear dominancy of species.

Group III:
Secondary forests and/or exploited forests. Forest that has been exploited to different extend, which affected the structure and composition of a primary forest. Depending on the level of exploitation and the regeneration capacity of the forests, forests of this group are classified into 3 types:
- IIIA***:*** is characterized by forests that have been under tremendous exploitation and little timber remains for harvesting. The primary structure of the forests has been completely affected and is basically changed. Forests of this type are divided into three sub-types:
  - *IIIA1:* For forests which have been exploited until depletion, the forest canopy is fragmented, some high and large trees at the top storey might remain but these are of poor quality and climbers, shrubs and bamboos are prevalent.
  - *IIIA2*: For forests which have been over-exploited but which are already recovered. Characterized by trees belonging to the middle storey and majority having dbh of 20-30 cm. Two tree layers or more, of which the upper storey has an scattered canopy, which is mainly

formed by middle storey trees, while some scattered big and strong trees are growing over this canopy.

- *IIIA3 :* Forests which have been exploited or developed from forests of type IIIA2. Forest canopy closed with 2 or multi story stands. Characterized by (and differs in this aspect from the forest status of type IIIA2), a higher quantity of trees with some trees reaching a diameter of above 35 cm suitable for timber harvesting.

Group IV

Mature primary and secondary forests which have not been exploited. Forests with a stable structure, multi-storey. Forests of this group are classified into two types:

- Type IVA – Recovered secondary forests
- Type IVB – Primary forests

6. After all teams are back, let a representative of each group present their results.
7. Analyse the results together, presenting the conclusions on options for forest utilisation.
8. Cross-check the field results with the planning outcome from the forest zoning exercise and make adjustments if required.
9. Finally, go over the temporary lines drawn on the transparent sheet with a permanent marker. This will create a permanent map on the transparency.
10. Identify the areas where sample plot measurements are needed (in the plots where extraction of timber is to be expected and no recent FLA inventory conducted) based on the village map.
11. If possible user group boundaries should be added into the GIS database.
12. Wrap-up the exercise by summarizing the main results.

Plot description form

Access	**How long do you walk from the village to reach the forest stand?**		
	less than 1 hour	***1-2 hours***	***more than 2 hours***
Management goal			
Forest Type / Age	***Natural forest***		**Forest Age / Status**
	Plantation		***mature*** / ***middle*** / ***young***
What are dominant species?		**Usage**	
		Usage	
		Usage	
		Usage	
Products	**Can you harvest any products in the next 5 years?**	**Yes**	**No**
	If not, why do you think no products are available?		
	What forest products that can be expected from the forest stand		
	Timber	***Fire wood***	***NTFP***
	Others		
Weed Invasion	**What is the situation with weeds in the stand?**		
	More than 50% of ground covered	***Less than 50% of ground covered (but common)***	***No weeds***
Fire hazard	**When did fire last time occur in the forest stand?**		
	Every year	***In the last 5 yrs***	***In the last 5 - 10 yrs*** / ***Never***
Grazing	**What is the grazing pressure in the stand? (check signs like cattle manure; trampled areas; very short grass; browsed shrubs and herbs etc.)**		
	High	***Medium***	***Low*** / ***None***
Degree of closure of the forest stand	**Look how much light is coming down to the natural regeneration**		
	Open – lack of big trees, understorey only scattered, ground infested with bamboo and/or weeds		
	Big gaps – bigger trees spaced more than a crown-extent away, no regeneration or understorey		
	Light – crowns not more than one crown extent away from each other		
	Closed – crowns of the trees are touching each other		

5 Forest user group boundary demarcation

Once forest management blocks have been identified on the transparency laid over the FLA village map these boundaries have to be permanently demarcated in the field. Only if boundaries are clearly visible for in- and outsiders effective management, protection and enforcement of user rights can be guaranteed.

Objectives
- GPS ground-truthing of user group boundaries
- To permanently mark boundaries in the field

Time needed Depending on the number and size of forest blocks

Material FLA result map, transparency showing forest user group boundaries, GPS hand receiver, red oil paint.

Steps

Preparation
1. In case FLA mapping information is only available in the national VN2000 map datum, either the mapping information needs to be converted into UTM system or a GPS is needed which has been customised to the VN 2000 datum.
2. In case all boundaries are following clearly visible landmarks like rivers or roads no GPS ground-truthing is required and boundaries can be directly demarcated in the field.

Field work
1. Copy a sufficient number of waypoints (~25m distance between points) a) directly from the FLA map or b) from the GIS database into the GPS hand receiver.
2. Invite representatives of the respective forest user group and the neighbouring groups to join in the field trip.
3. One technical staff is operating the GPS receiver and at the defined waypoints a permanent oil paint mark will be placed identifying the exact border including a reference number to be added into the map.
4. Border demarcation is conducted by the respective village/ user group as stipulated in Circular 38/2007/TT-BTT. Only mark the outer boundary of the entire area of the forest management block of the respective village/ user group.
5. In case villagers want to also demarcate their individual plot boundaries, they should find an agreement with the respective neighbours to ensure a conflict-free result.
6. At the end of this step, all forest user group boundaries are demarcated in the field and the exact size of each forest management block (in hectare) calculated as basis for the inventory (if required).

6 Participatory Forest Inventory

Remember this exercise is only required if no recent FLA inventory data is available. For the first year after FLA with existing inventory, all data for the development of management plans can be directly obtained from FLA results.

Reliable data on the current forest resources is essential for the CBFM plan development and future management. Based on the existing resources, management activities such as selective

cutting, stand improvement and enrichment planting can be identified. Furthermore inventory results are useful for the monitoring an evaluation of the impacts of CBFM on the forest stand.

Before field implementation a brief introduction of the technical concept of participatory inventory should be given. However, learning by doing is most effective with most villagers, so don't expect to be able to make everything clear after a theoretical introduction only.

Objectives

- To provide quantitative and qualitative information on forest resources for forest management plan development
- To form measure teams and instruct teams
- To identify the forest inventory design (number of sample plots, location of sample plots)
- To conduct forest inventory

Time needed Depending on forest status and size of the forest block (4-5 sample plots/team/day)

Material Sufficient copies of tally sheets, markers, chalk, adjusted measure tape (see instructions below), tape measure 30m, slope measure tool, set of two ropes (20 m rope with a knot at 10 m) with loops at the ends, forest status map, blank sample plot forms, pencils, compass, hatchet

Steps

Preparation

1. Sufficient measure tapes depending on the number of measure teams have to be prepared in advance by supporting staff following the below described design.

Diameter class	Class width	Min. Girth [cm]	Colour
08-14,9	7cm	25,13	yellow
15-19,9	5cm	47,12	black
20-24,9	5cm	62,83	stripes
25-29,9	5cm	78,54	blue
30-34,9	5cm	94,25	dots
35-44,9	10cm	109,96	saw
>45	open	141,37	red

Girth and diameter class measure tape

In case forest inventory has been conducted during the process of PLUP-FLA the same measure tapes can be used for the CBFM inventory.
DBH is measured in diameter classes represented by colour bands only (see table below).
Diameter tapes are made out of durable plastic tape measures (cm scale) covered with coloured masking tape or directly coloured with permanent markers

2. Present the objectives of forest inventory and stress the importance of carrying out the plot measurements accurately. The obtained data during the sample plot measurements will determine if timber extraction is feasible.
3. Explain that the field work will be done in small teams which will work separately and describe tasks of each member.

Name	Main job	Support to technician
Recorder (Technician)	Find plot location on transect line or by GPS Measure slope Record tree data	Mark transect and plot starting point
Two Measurers (Farmer)	Measure diameter class (colour) Define tree species Decide whether each tree is suitable for timber Chalk tree	Layout transect line (top point) Layout plot line (20m) Remove ropes after completed measurements

4. Explain that the number of sample plots in each plot depends on the size of the plot and the status of the forest (according to Decision 684/1994/QD-BNN).

Table 8: Sample intensity based on forest status

Forest status	Sample area (% of total area)
Regeneration forest (IB, IC)	No sample required (no standing volume)
Recovered and poor forest (IIA, IIB, IIIA1)	1%
Medium and rich forest (IIIA2, IV)	1.5%

5. To calculate the number of sample plots per forest block and the distance between sample plots the following calculations are required (see Excel inventory database):

   - Sample area= $\frac{\text{Forest block in square meter}}{\text{100 x sample intensity}}$
   - Number of sample plots= $\frac{\text{Sample area}}{\text{Plot size}}$
   - Grid net distance= $\frac{\text{Forest block in square meter}}{\text{Number of sample plots}}$

   Use a transparency to draw the grid net with the calculated grid distance (refer to the scale of the map for the correct distance). Lay the transparency over the respective forest block and draw transect lines by connecting grid net points in lines. Draw the transect lines so that they cut the contour lines (running up or down the slope). Explain that depending on the location at the slope (e.g. foot hill, shoulder, rim) the growth and yield of the same forest can differ to a great extend and that therefore the transect lines always have to run up- or downhill to get a representative sample of all different sites.

6. The starting point of the transect line should be easily recognisable in the field. A compass bearing should be used to follow the transect line in a more or less straight direction when implementing the inventory.

7. Use the A0 paper to draw a plot layout. Sample plots are designed in a rectangular shape of 500m² (20x25m) and temporarily marked by nylon ropes as shown in the following figure.

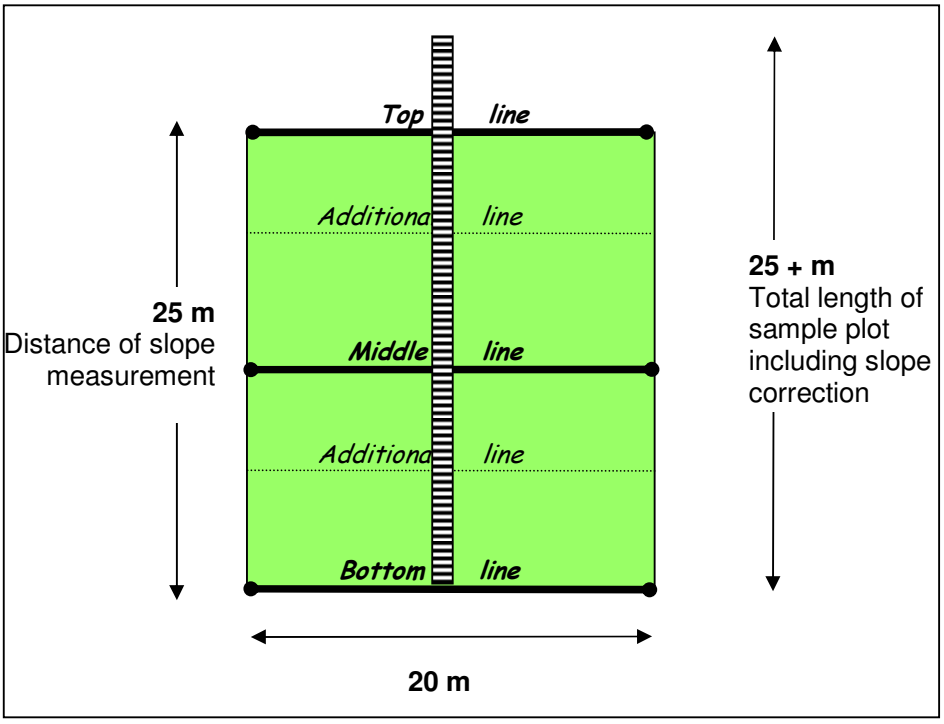

Figure 4: Lay-out of forest inventory sample plots

Field work

8. With all participants, go to the starting point on the edge of the selected forest block. Use the village forest map to locate the spot (as agreed on the map before) exactly.
9. One person is lying out a straight transect line using the 30 m measure rope. The technician is directing him until reaching the starting point of the first sample plot.
10. In mountainous areas a slope correction is required for accurate measurements. In this case, a slope measurement is conducted from the starting point of the plot and is targeting one persons face at the uphill side of the plot in 25 m distance. The additional length (slope correction table on the slope measure tool) is added to the total plot length following the transect line. In case of varying slope within one sample plot area an average of two readings taken from the plot centre (uphill and downhill) is to be used instead.
11. Bottom and top sample plot boundaries are located by use of 20 m nylon ropes laid out rectangular (90° right angle) to the transect line. Depending on the visibility of the forest two or more additional lines have to be laid out inside the sample plot area to identify whether border trees have to be measured or have to be excluded.
12. The recorder can now start to write information on the tally sheet (format provided at the end of this session plan). Make sure the date, name of village, block and plot number are recorded first.
13. Inside the sample plot all trees ≥ 8 cm diameter at breast height are recorded with tree name (local or scientific name), colour diameter class and timber potential. Border trees are counted as ½ a tree.
14. The timber potential is based on whether the stem of the tree is healthy/straight and a good timber species or whether the tree is poorly formed or diseased and not suitable for construction timber.
15. After measuring and recording a tree, it is marked with chalk to avoid double counting.
16. Further count how many bamboo poles are available in the plot and record according to size class at the bottom of the inventory sheet.
17. After one sample plot has been completed follow the transect line to the next sample plot location according to the calculated distance between sample plots.

Tally sheet: trees DBH ≥8cm (20*25 m)

Province		District		Commune	
Village		Date		Recorder	
Compartment		Forest block		Forest owner	
Slope		Plot number		Notes	

Local tree name	☺ **DBH (cm) of trees with timber potential**							☹ **DBH of trees without timber potential**						
(mark timber species with asterisk)	Yellow	black	stripes	blue	dots	saw	red	Yellow	black	stripes	blue	dots	saw	red
Number of Bamboo poles	**Big size**					**Medium size**				**Small size**				

7 Data analysis

Data compilation is a difficult step and has to be carried out slowly without rushing the participants. A good recorder will be needed (preferably the technician or another person who can write and calculate well).

It is not expected that participants will be able to do the actual calculations by themselves – probably they will always need support from a technician.

Remember, the process you are going through with participants is equally important as the output. Participation will ensure that local people are aware that it is really their own data which is being used in the calculations.

Objectives

- To compile and summarize sample plot data for each forest management unit
- To present the data in an understandable way for user-groups using histograms
- To discuss the implications of the data for forest management and forest product utilization

Time needed around 3 hours (depending on the number of measured sample plots)

Material Sample plot summary forms (at least 1 per user group), completed tally sheets, calculators, A0 paper, markers, rulers with scale

Steps

Data compilation

1. Divide the group according to the forest management blocks for which an independent inventory has been conducted and ensure that each group has the filled in set of tally sheets for one forest block and one summary form. (Or in case FLA inventory data is used the respective data sheets).
2. Each group needs one recorder who starts with fillings in the data at the top of the summary form showing: village, area (ha), user group, number of plots, etc. Give each participant one tally sheet at a time.
3. Ask each participant to read out the names of all recorded tree species. Participants should agree for each tree species whether it is suitable for timber or not. If a tree species is considered a good timber species an asterisk will be placed after its name on the sample plot forms. The facilitator can write the names of the timber species on a flipchart as reference for all participants. Make sure everybody agrees with the list.
4. Explain the summary form and let each user-group compile the data recorded from the completed sample plot forms.
5. Start with yellow diameter class (8-15cm) and only for trees that are suitable for timber ☺. After this continue with those that are not ☹.To do this add all numbers of trees with an asterisk in this diameter class. The recorder writes this number on a piece of paper and asks the next participant to give the same information (number of trees in the first diameter class) and so on until all participants have finished. Add all these numbers together to get the total number of trees (timber species) in the first diameter class in all plots and write it in the column for “yellow” trees in the Block Summary Form.
6. Continue with the next higher diameter class until the highest (red) has been completed.
7. To get the totals per hectare (all bold framed boxes) multiply by factor a (see block summary form).
8. Add the numbers ☺+☹ for each colour-row to get totals for “All trees”.

Data analysis

9. Divide into 2 groups for each forest management block. Explain that each group will try to draw a picture showing the information from the block. One group will draw a histogram showing the distribution of timber trees only. The other group will draw a histogram showing the distribution of all trees (all species).
10. Both histograms have to have the same scale so that they can be compared easily.
11. Write the dbh classes as well as diameter class colour under each bar of the histogram. Ask each group to write titles and labels in local language to show what the histogram represents.
12. After participants finished drawing the histograms, allow some minutes for break and use this time to prepare a transparency showing the sustainable forest model for the respective area. The transparency has to exactly fit to the scale of the histograms as prepared by the participants.
13. Invite participants to present their poster. Each histogram should be presented by someone from the group who drew it. Let them explain how they prepared the histogram; what it shows and any particular issues or potentials which it indicates.
14. After this, place the transparency showing the "DBH class distribution model over the histogram prepared by the groups, and introduce the concept of a sustainable forest model (SFM). After this, invite participants to explain what the histograms tell us about the forest resources in the plot e.g. what is the available resource and what can be harvested? Some examples of questions are shown below.
15. Introduce the idea of a SFM by using the example of a water bottle (see end of this session).
16. Explain that depending on the water level two main forest management options can be identified:
    - Bottle not yet full = insufficient stem number per diameter class indicating strict protection is required
    - Water spills over = sufficient stem number per diameter class indicating options for harvesting
17. By thoroughly comparing the "real" forest structure against the given SFM, participants should be able to identify management options for their respective forest block. For example, if a lack of medium-sized trees is revealed, the management could be to protect the trees in this size-class and to ensure that enough smaller-sized trees are available to grow into medium-size in the future.
18. Note down any important points on a separate piece of paper because these will be needed later during the writing of the management plan.
19. Wrap-up summarising the main outcomes from the forest inventory data analysis.

Forest inventory summary form (per forest management block)

1) District		2) Commune		3) Village	

4) Forest block ID		5) Block area [ha]		6) Total number of plots [z]		7) Factor a = 1 /(z x 0.05)	

	Timber potential	Yellow (8 – 14,9 cm)		Black (15 – 19,9 cm)		Stripes (20 – 24,9 cm)		Blue (25 – 29,9 cm)		Dots (30 – 34,9 cm)		Saw (35 – 44,9 cm)		Red (>45cm)	
		Total in all plots	Per ha (x a)	Total in all plots	Per ha (x a)	Total in all plots	Per ha (x a)	Total in all plots	Per ha (x a)	Total in all plots	Per ha (x a)	Total in all plots	Per ha (x a)	Total in all plots	Per ha (x a)
Tree number	Yes														
	No														
All Trees															
Bamboo poles		**Big size**				**Medium size**				**Small size**					

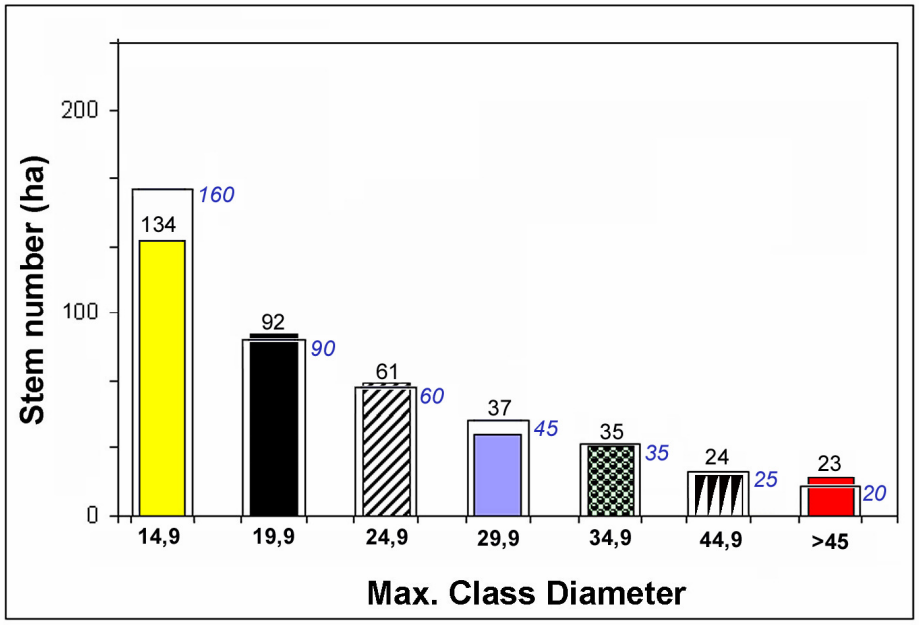

Figure 5: Example of the analysis of sustainable harvest amount based on a SFM

Explanation:

The **sustainable forest model** is represented by blue italic numbers (transparent histogram)

The **actual inventory results** are represented by black regular numbers (coloured histograms).

When comparing the individual diameter classes the following harvest amount can be identified:

2 trees per hectare from black diameter class (15-19,9 cm dbh), = 92-90

1 tree per hectare from stripe diameter class (20-24,9 cn dbh), =61-60

3 trees per hectare from red diameter class (>45 cm), =23-20

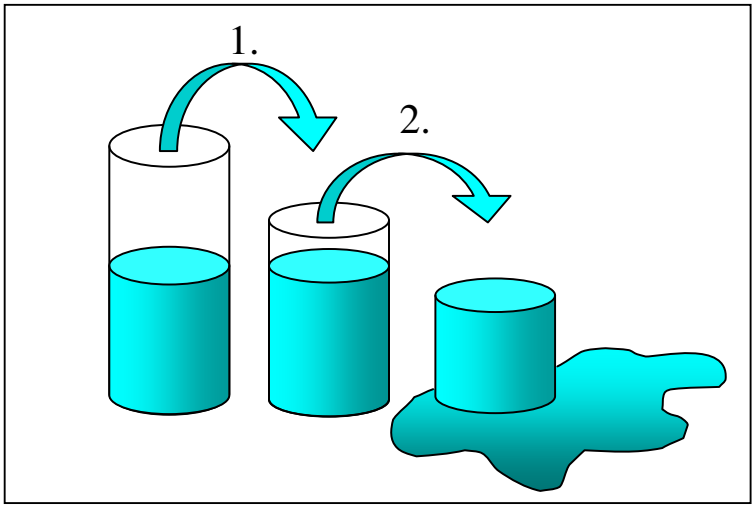

Figure 6: Tip for facilitating the discussion on the histograms

If participants find it difficult to interpret the histograms it might be useful to show the “water bottle” example. Prepare 4-5 plastic water bottles and cut them open at different heights representing the different diameter classes of the model histogram. Fill up the tallest bottle around ½ full. Explain that this represents the smallest diameter class with many trees. When the trees grow bigger they will grow into the next diameter class – poor the water into the next smaller bottle. The bottle is already ¾ full. Again poor all the water into the next smaller bottle and let the surplus poor on the floor. Explain that the bigger the trees the more space they need. Consequently in the last bottle not all trees find enough space – the water spills over. The water that spills over, is the amount of trees that can be harvested, as they would anyway die due to competition.

Guiding questions for discussion on the forest inventory histogram

Young trees & regeneration
▪ What is the regeneration status of the forest? ▪ How does it compare with the ideal situation in terms of numbers? ▪ If the number is low, what is the possible cause? ▪ What could be done to improve the regeneration status? ▪ What will happen to the numbers of middle-aged trees in the future if the number of young trees is low?
Middle-aged trees
▪ What does the diameter distribution of middle-aged trees look like? ▪ Are there any diameter classes where there are fewer trees in one class than there should be? ▪ If so, what are the possible causes? ▪ What could be done to improve this? ▪ Are there any diameter classes where there is a surplus number of trees? ▪ What will happen to adult (timber-sized trees) if the numbers of middle-aged trees is too low? ▪ What can be done to avoid this?
Adult trees (timber trees)
▪ What is the status of adult (timber-sized) trees in the forest? ▪ Are there enough timber trees to be able to cut some over the next 5 years, or 10 years? ▪ If not, then why not? ▪ If there are enough timber trees for harvesting, then how many could be harvested per year? ▪ If not, then what can be done to increase the number of timber trees? ▪ What is the number of timber species in all size classes compared with the total number of trees? If timber species are low in numbers, then what is the cause? ▪ What can be done to improve the numbers of timber trees? ▪ What other operations can be done to improve timber quality?

8 Elaboration of 5-year CBFM plan

The final and most important part of the CBFM planning process is the writing of a forest management plan to be submitted for legal approval to district authorities.

Objectives

- To describe in detail the activities for each forest management unit that will be carried out during the 5-year management planning period
- To develop the village CBFM plan for approval

Time needed 90 minutes

Material A0 paper, markers, histograms, copies of the format of the 5-year forest management plan (appendix 4)

Steps

1. Divide the group into the user-groups (or sub-groups) and let each group think about the main activities that can be carried out in one forest management block. These main activities can be categorized into 3 groups of activities:

- **Utilisation -** timber harvesting, or the removal of mature, timber-sized trees by feeling and extracting their stems
- **Improvement -** removing a selected number of trees or competing vegetation (climber, shrubs) in densely stocked forests to create sufficient space for potential crop trees to grow into large diameter. Further add that afforestation or enrichment planting are also means to increase the forest coverage.
- **Protection -** all activities to protect the forest from natural (fire, diseases, grazing) and man made hazards (illegal logging, land conversion).
- **Others/NTFP -** other forestry related activities e.g. road construction, or the production and utilisation of Non Timber Forest Products.

2. Ensure that the respective forest block summary form is available and provide each group with a copy of the management plan format.
3. Start filling in the header of the table. Ask participants to complete the column “management goal” referring back to the results of the block description exercise.
4. Continue by presenting again the completed histograms with the overlaid SFM. Invite one participant to explain again how to identify options for harvesting or areas for protection.
5. For each activity under utilisation and improvement try to get participants to break them down into diameter classes and add more details under “description” (how?, what?, when?, how much?). How much should be harvested to ensure that the condition of the forest does not degrade (look at the smaller diameter classes and try to see how long it will take for them to grow to timber size)? etc.
6. For every activity, ask participants to describe:
   - How it will be done? (description)
   - How much of the activity? (quantity e.g. How much to be harvested in number of trees per diameter class.)
   - Who will do it? (responsibility)
7. Work through the objectives of utilisation and improvement by diameter class and discuss each of the activities in detail.

8. If required ask whether some finance is needed to implement a specific activity, how much would be required and where this money could come from. Note down the results in the table under “required budget & source”.
9. For protection, it will usually be enough to refer to the approved Forest Protection and Development Regulations, but ask further questions to see whether the group feels these regulations are sufficient to protect their forest management block and whether additional protection activities need to be carried out by the group members (community).
10. Explain that for “NTFP” no detailed figures on the total harvest amount will be described as this is very difficult of estimate and to monitor. Instead, correct harvesting techniques are described to ensure the sustainability of the extraction of the specific NTFP. For reference the FPDRs should be available to refer to some forbidden products/harvesting techniques, e.g.: amount to be harvested, season to harvest, variety of trees to be harvested, size for harvesting, etc...
11. Ask a representative of each group to present their results and encourage the other participants to ask questions.
12. End the exercise and explain that this is the major part of the CBFM plan. All representatives of the group should discuss the plans with all members of their group and reach agreement on the plan (in case of forest land allocation to the entire village the CBFM plan should be discussed in a village meeting). The sum of all individual CBFM plans (each one respective forest block inside the village area) form the village forest management plan to be submitted to the commune and district authorities for reference. The individual forest management block plans have to be approved at district level before any implementation in the field can start.

9 Evaluation and closing

CBFM is relatively new to Vietnam and entirely new to Quang Binh province. It would therefore be appreciated to get feedback from participants and stakeholders to improve the methodology for CBFM and this manual. Furthermore an evaluation is useful to know if the implementation met the expectations of the participants and which follow-up steps are needed to apply CBFM in the field.

Objectives

- To see whether participants expectations have been met
- To identify improvements which could be made for the next implementation

Time needed 30 minutes

Material A0 paper, markers, expectations listed in the introduction

Steps

1. Tell participants that this is the last part of the CBFM planning process. Ask them to give their comments and tell them that these will be used to improve future CBFM plan development.
2. Refer to the list of expectations from the introduction session. Go through the list and ask participants if these were met.
3. Ask participants which follow-up activities are needed and if further support is needed in implementing their plans.
4. Try to ask specific questions e.g.: From which session did you learn most? Which parts of the implementation did you not understand?
5. Make notes of points raised.
6. Finally, thank participants for their contribution to the results.

Further reading

Community Forestry Training Package, 2004. Social Forestry Development Project Song Da, GTZ/GFA, Hanoi Vietnam

Community Forest Management Planning – Implementation guideline, 2006. Project on Rural development Dak Lak (RDDL), GTZ/GFA, Dak Lak, Vietnam.

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Appendix 1: Village Forest Management Group regulations

Guiding Questions for Development of Village Forest Management Group Regulations

CHAPTER I

GENERAL PROVISION

Article 1: Major field of activities of VFMG of .....village

Scale and area for which VFMG will be responsible?
Responsibility for plan development?
Responsibility for financial management?
Responsibilities for reporting to higher authorities?

Article 2: Operating Principles of VFMG

What principles have the VFMG to obey to effectively serve the community?
What silvicultural principles have to be followed for the long-term benefit of the community?

CHAPTER II

AUTHORITY AND RESPONSIBILITIES OF COMMUNITY MEMBERS

Article 3: Authority of community members

Who has the authority to elect VFMG members?
Who will develop regulations for the operation of the VFMG and FPDR?
Who is responsible to reject unqualified VFMG members?
What authorities do villagers need to ensure good performance of VFMG? How to avoid illegal action of the VFMG against the community?
How will decisions being made? What about financial management?
How to ensure that decisions being made are enforced and implemented?
Who will decide on ways of how to share benefits among the community?

Article 4: Duties of community members

What are the responsibilities of all community members to ensure effective protection, management of their village forest?
How often to meet and to discuss on village forest management issues?
Who will be responsible to develop an annual work plan?
What obligations has a member to fulfil when harvesting major forest products?
Who supports the VFMG in detecting and dealing with violation cases?
Who will define the financial compensation for people working for the community?

Article 5: Regulation on participation in CBFM and voting rights

How to ensure full participation of members during decision-making?
How are decisions being made during meetings? (voting/majority/%)
Who has a right to vote during meetings?

Article 6: Rejection of VFMG members

How can members of the VFMG be timely expelled if they not comply with regulations (corruption) or are not effectively working (not available)?
Who can support the community to deal with unqualified VFMG members?

CHAPTER III

VILLAGE FOREST MANAGEMENT GROUP

Article 7: Positions / Election period

What positions are needed to ensure effective work of the VFMG?

How long can members work in the same position?
When will the next election being conducted?
How to elect a new VFMG member?
Who has the qualification to become a member of the VFMG?
Who cannot qualify?
What are main criteria for selection of members? (education, attitude, behaviour)

Article 8: Authority of VFMG

What authorities does the VFMG needs for effective CBFM?
a) fund management?
b) organisation of meetings?
c) solving violation cases/dealing with compensation?
How to ensure that authority will not be misused against members?

Article 9: Duties of VFMG

What does the VFMG has to do for the community?
a) request help from higher authorities?
b) supervising harvesting procedures?
How can VFMG ensure that members are well informed about all activities?

Article 10: Daily allowance for VFMG members

How can members being compensated for their contribution to the community?
Do VFMG members require a compensation for their labour?
If yes, where can financing come from?
Can existing structures and staff being used instead? (Women Union-Fund management)

CHAPTER IV

FOREST MANAGEMENT

Article 11: Forest Protection

Refer back to Forest Protection Regulations
How will compensation and punishment being carried out by the VFMG?
How can higher authorities can be informed and called in for support?

Article 12: Forest Inventory

What is the role of the VFMG in conducting and analysing the five-year forest inventory?
Who is keeping the data/equipment?

Article 13: Forest Management Plan (5-year)

What is the role of the VFMG in developing, implementing and monitoring the CBFM plan?
Who is submitting the plan to higher authorities for information/approval?

Article 14: Forest Utilisation (thinning, harvesting)

What is the role of the VFMG in harvesting of forest products?
Who is checking correct implementation of harvesting?

Article 15: Marketing and selling

How to get updated information on market demand and prices for forest products?
Who will be responsible for developing contracts and solving conflicts?
How should they be compensated?
Will there be punishments for wrong doing?

Article 16: Benefit sharing

What is the role of the VFMG in ensuring a fair share of benefits among members?

CHAPTER V

FINANCIAL MANAGEMENT

Article 17: Financial management

Who will manage financial compensation?
Who decide what to use finance for?
Where will savings be located? (Saving account)
How and how often can money be withdrawn?
What activities can be supported?
How can members get information on the financial status?

CHAPTER VI

PENALTIES AND FINES

Article 18: Dealing with violations of VFMG members

What can be done if the VFMG is working against the members?
What are the procedures to expel VFMG members?
After what period of time a VFMG member can be expelled after being convicted?
Who will be informed about such a case?

CHAPTER VII

IMPLEMENTATION PROVISION

Article 19: Implementation and Adjustment

When will this regulation become effective?
For how long this regulation will be effective?
When and how can this regulation be adjusted/updated?
Where will the regulation being kept/made public to everybody?

Appendix 2: Decisions for the establishment of Commune Forest Management Boards

Decision for the formation of the Commune Forest Management Board

Peoples' Committee of
……..

No:……/QD-UB

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Date:

DECISION OF THE PEOPLES' COMMITTEE OF ……

On the "Formation of the Commune Forest Management Board"

- *Pursuant to Law on Organisation of People's Council and People's Committee issued on 26th November, 2003;*
- *Pursuant to Decision No. 245/QD-TTg dated 21st December 1998 and Direction No. 12/2003/CT-TTg dated 16/5/2003 of the Prime Minister on strengthening urgent measures to protect and develop forest.*
- *Based on the real status of forest protection and development in the commune……*
- *Based on the Minutes of the meeting of the CPC dated / / 200… on implementation of community-based forest management plan in the commune……*

DECIDES

Article 1*:* To establish the Commune Forest Management Board comprising of the following members:

1.	Head:	Mr. / Mrs…….,	Vice-chairman
2.	Vice-head:	Mr. / Mrs…….,	Local Forest Ranger
3.	Member:	Mr. / Mrs…….,	Communal Forestry staff
4.	Member:	Mr. / Mrs…….,	……..

Article 2*:* The tasks of the Commune Forest Management Board include:

- To monitor and evaluate the implementation of CBFM in the villages
- To assess, review and submit 5-year CBFM plans to the district authorities
- To assess, review and appraise the submitted harvest proposals for selective cutting
- To submit harvest proposals to district authorities for approval
- To ensure that CBFM activities are carried out according to Vietnamese law (including the payment of taxes in case of commercial timber extraction)
- ……..

Article 3: The CPC of……..….commune and the members mentioned above are responsible for the implementation of this decision.

CC:
- Members of Commune Forest Management Board
- CPC of ……..….commune
- Forest Protection Unit
- Office of Natural resources and Environment

On behalf of the CPC
Chairman

(signature & stamp)

Appendix 3: Decision for the formation of the Village Forest Management Group

Peoples' Committee of
……..

No:……/QD-UB

Socialist Republic of Vietnam
Independence- Freedom-Happiness
----------o0o----------

Date:

Decision of the Peoples' Committee of ……

On the "Formation of the Village Forest Management Group"

- *Pursuant to Law on Organisation of People's Council and People's Committee issued on 26th November, 2003;*
- *Pursuant to Decision No. 245/QD-TTg dated 21st December 1998 and Direction No. 12/2003/CT-TTg dated 16/5/2003 of the Prime Minister on strengthening urgent measures to protect and develop forest.*
- *Based on the real status of forest protection and development in the commune……*
- *Based on the Minutes of the village meeting dated / /200… on implementation of community-based forest management plan in the commune…… and proposal of village ..... on the establishment of the Village Forest Management Group*

DECIDES

Article 1*:* To establish the Village Forest Management Group in village……..……with the following board members as mentioned below:

1. Head: Mr. / Mrs……., Village leader
2. Vice-head: Mr. / Mrs……., Women Union representative
3. Member: Mr. / Mrs……., ……..
4. Member: Mr. / Mrs……., ……..

Article 2*:* The tasks of the Village Forest Management Group include:

- To monitor and evaluate the implementation of CBFM in their village in cooperation with the Commune Forest Management Board
- To submit 5-year CBFM plans to the Commune Forest Management Board
- To collect and aggregate harvest proposals for selective cutting and submit to the Commune Forest Management Board
- To keep a logbook of the implemented CBFM activities (including plantation establishment, number of trees and volume of timber cut for commercial purposes)
- To assist user-groups in the preparation of CBFM plans and harvesting proposals
- ……..

Article 3: The CPC of…….commune and the people mentioned above are responsible for the implementation of this decision.

CC:
- Members of Village Forest Management Group
- CPC of ……commune
- Forest Protection Unit

On behalf of the CPC
Chairman

(signature & stamp)

Appendix 4: Elaboration of Sustainable Forest Model

I. Justification for a stem number based forest management system

Timber harvest is the most important silvicultural intervention to be applied in forest management and has to be based on clear and practicable benchmarks which can easily be assessed, monitored and enforced by local forest users and local administration.

Conventionally, stocking tables are used as main tool for defining harvest levels which are derived from long-term growth and yield research plots after decades of repeated measurements. Thus effectively applied for monocultures, they are not applicable for mixed uneven-aged natural forests. At present no reliable data on natural forest growth is available in Vietnam and scientific research would require decades to yield reliable results. Available survey data from national institutions (i.e. Forest Inventory and Planning Institute) can also not be utilized to developed forest growth models as the applied forest inventory design merely serves statistical purposes at national level and does not yield reliable data for forest management at stand level.

Moreover, scientific approaches for yield prediction are likely to produce results which are too difficult to be interpreted by local forest users and supporting staff alike. Therefore, simple but reliable indicators for sustainable utilisation levels are needed to bridge the gap until more detailed forest growth and yield data will be made available in the future.

In the context of CBFM stem-number diameter distributions derived from static (non-recurring) forest inventories are utilised instead and are defined as representing the structure of a well developed, productive forest under sustainable management, the so-called Sustainable Forest Model (SFM).

Main variables of a stem-number diameter distribution include the number and width of diameter classes and the stem number per diameter class.

The SFM is used as a benchmark against which the current forest structure in a respective site is compared during village forest management plan development. Imbalances between the SFM and the current forest status are defining sustainable harvest options or protection requirements for each diameter class.

In view of simplicity and practicability of participatory approaches in CBFM no volume figures are calculated, instead the number of trees per diameter class is used as only unit for all planning procedures, implementation and controlling.

In the context of community forestry, forest management aims at satisfying the diverse demand of the local forest users for timber throughout all diameter classes, as well as providing a constant flow of forest products. Therefore, conventional forest management systems (e.g. minimum harvestable diameter, long cutting cycles at high single harvest intensity) are in contrast to existing use patterns and needs of forest-depended smallholders and are therefore not representing socially and economically acceptable solutions.

Stem number per diameter class is a very transparent and accountable unit which can be easily measured by local people and field staff and allows a very precise description of planned silvicultural interventions which cannot be achieved by use of general volume figures only. Any timber extraction is therefore aiming at improving the actual forest structure towards the desired SFM structure.

A SFM furthermore provides an effective monitoring tool within the capacities of both local field staff and forest users which helps to improve transparency, accountability and improving villagers confidence in dealing with government agencies e.g. for timber harvesting application. Without clear benchmarks an approval for harvesting operations will be very difficult to achieve for local communities and will leave them vulnerable for indirect taxes.

A guideline on “the establishment of the optimum forest model for community natural timber forests” has been issued by the community forestry pilot program under MARD. A description of

main procedures is detailed in official letter 815/CV-LNCD, dated 12th June 2007 for an application within the 40 project communes. However, as the regulation has been developed prior to the issuance of Circular 38, it is not taking advantage of the data pool made available under FLA procedures. The guideline is furthermore not clearly stipulating a respective number of diameter classes or diameter class width to be applied for the model structure.

So far a total of 42 SFM have been developed by the project covering all agro-ecological regions in Vietnam, which can be referred to when developing SFM based on detailed FLA forest inventory databases.

II. Technical description of the Sustainable Forest Model concept

Mixed natural forest stands can be best described by the distribution of the stem numbers within defined diameter classes. Many natural forests with a continuous series of age classes and continuous recruitment by natural regeneration illustrate a diameter distribution in which each diameter-class has fewer stems than the adjoining, smaller diameter-class. This can be visualized in form of a falling curve with a negative exponential model.

The trend can be best described by a negative exponential function which is commonly used as a standard to define cutting schedules for mixed natural forest stands under a polycyclic cutting system (Gadow and Hui 1999) This distribution is frequently referred to as De Liocourt distribution (1898) or Meyer function (1933) and its equation model is $Y = A*e -B(dbh)$ where A and B are constants. The constant A reflects the stocking of very small seedlings while the constant B governs the relative frequency of successive diameter classes.

A higher number in the smaller diameter classes ensures that once a tree has been extracted it can be replaced by many smaller trees to guarantee the sustainability of the forest stand and thus defines the utmost important criteria for a sustainable forest structure.

Main variables of any stem-number diameter distribution include the number and width of diameter classes and the stem number per diameter class and if representing the structure of a well-developed, productive forest under sustainable management, is called a Sustainable Forest Model (SFM).

The SFM approach has to be understood as a static model comparing the currently existing forest status against the model status. No prediction of increment and yield is intended nor required as only the current available surplus is to be harvested in a period of five-years. After a five-year period the new forest status has to be assessed and will again be compared against the SFM to derive at new harvest amounts.

In case reliable data about growth and yield could be made available the widths of a respective diameter class can be adjusted to present the time for a tree to growth into a next higher diameter class in a period of five years, the so-called time of passage of a tree (Alder and Synnot 1992). In this sense, the model could also predict the growth of a forest stand in the coming five or ten years. However, as mentioned before growth and yield data are no compulsory input variables for the static SFM model concept.

In European forest management systems such stem number distributions are referred to as “Stammzahlleitkurven” after Kurth (1978) and are applied for directing thinning and harvesting operations in uneven-aged natural forest stands.

The form of a stem number distribution varies depending on a) site quality and most important b) the applied management (thinning regime). Sustainability for a specific forest type can be ensured within a wide range of varying shapes of stem number distributions. This “area of sustainable forest structures is referred to as “Mitscherlich Heart“ and is illustrated as yellow polygon (see Figure 1).

Consequently, sustainability for a single forest type can be achieved under a range of different SFMs depending on the desired management goal and applied management. This implies that there is no fixed single standard but the structure can be adjusted by the developer based on forest management and political/legal requirements .

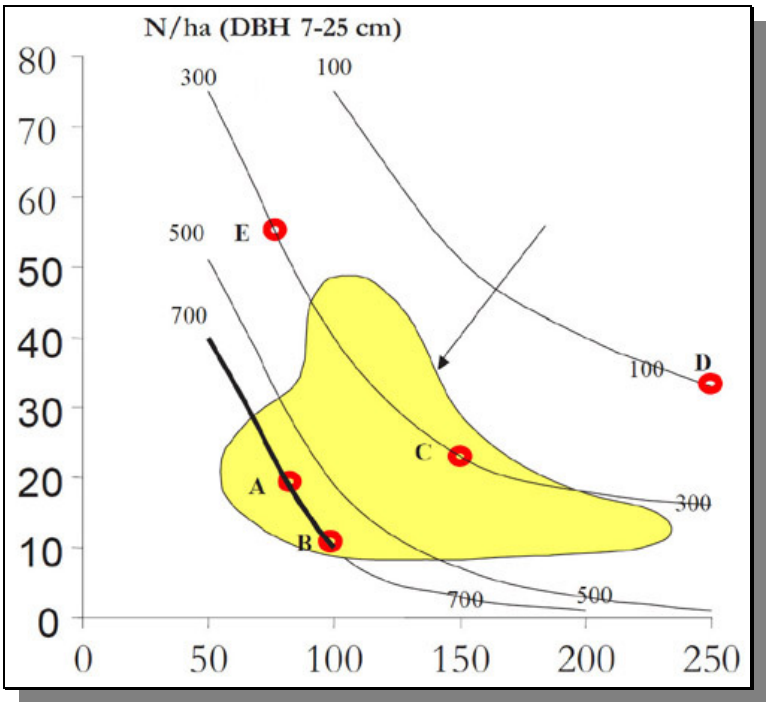


Figure 1: Area of sustainable permanent forest structures (yellow area) so-called "Mitscherlich Heart"

III. Data requirements for SFM elaboration

Elaboration of SFMs has to be based on comprehensive data derived from scientific forest inventories, describing main forest characteristics such as stem number, diameter, tree height and standing timber volume.

SFMs have to be developed separately for the dominant forest types in each ecological region to precisely reflect their specific production potentials.

Required raw data has to be obtained through technical sound forest inventories by measurement of temporary sample plots and through consultation of local forest users regarding their demand for specific forest products.

As CBFM can only be initiated after completed forest land use planning and forest allocation (available land use certificate plus forest management profile), SFMs only need to be developed after a comprehensive forest inventory has been conducted for the respective forest area as stipulated under Circular 38/2007/TT-BNN[4] and forest management profiles have been issued.

FLA inventory data is providing free of charge a technical sound basis for the development of SFMs which has already been approved as "legal" database through the issuance of forest management profiles.

By applying inventory data from actual forest stands of the respective site it can be ensured that developed SFMs will be within the actual growth potential of the respective forest.

In general, forest inventory data can be presented in form of a) a total volume estimate, or b) a stem number diameter distribution. Both results are based on the same database and therefore present an identical forest stand (see Figure 2).

[4] Circular 38/2007/TT-BNN, dated 25/04/2007 on guidelines for procedures for forest allocation, forest rental and withdrawal to organisations, households, individuals and communities

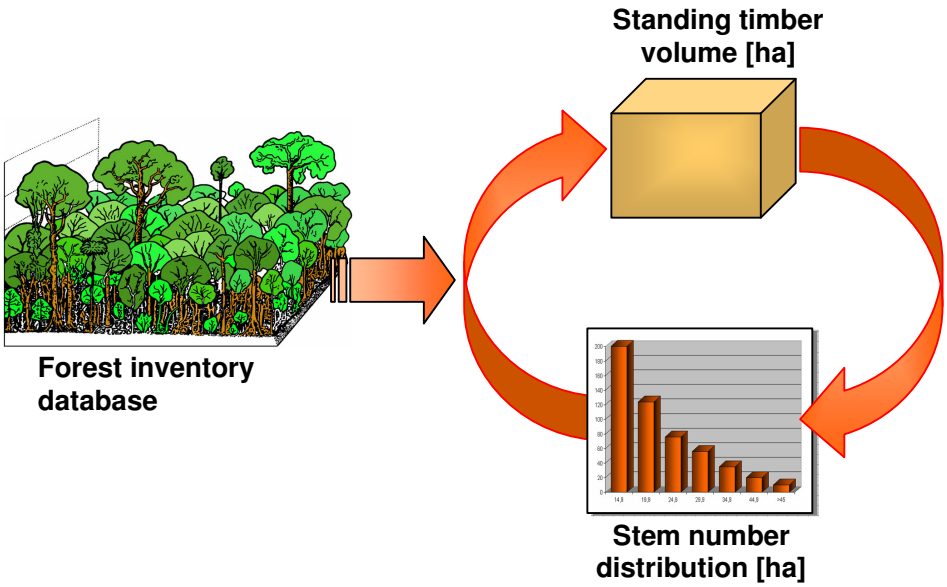


Figure 2: Optional ways of presenting identical forest inventory results

Consequently, any figures for standing volume can be transferred into a stem number histogram and vice versa provided the forest inventory raw data is available. In this way, political concepts as defined in Decision 40 can be directly applied (e.g. 130m³/ha) and illustrated in form of a stem number diagram by using raw data as derived from the respective forest allocation inventory database.

Note: The elaboration of Sustainable Forest Models is at the same time incorporating silvicultural and administrative/political requirements into one single model! The exact shape is to some extend depending on the subjective judgment of the developer and is not totally based on scientific research only. The SFM is not intended to depict an undisturbed natural forest but a forest under sustainable management, shaped according to the demand of the forest user.

IV. Implementation steps for SFM elaboration

Step 1: Interviews with local forest users

The SFM is designed to best reflect the demand of the local population in terms of demand for forest products. The forest product preferences by local forest users furthermore determine the management goal for the respective stands. If predominantly large sized trees are needed for construction timber, the management goal and therefore the SFM certainly needs to be different from a model representing a forest where predominantly medium and small sized trees are demanded for a mixture of timber, poles and firewood.

Consequently, interviews with local forest users are not an option but a necessity regarding the demand-based approach of the SFM concept.

A SFM should therefore be calibrated by using the desired harvest diameter as orientation for the stem number distribution and ultimate design of the SFM.

It is important to realise that despite the fact that the SFM defines an upper diameter-class limit, forest users are at no point urged to cut trees if reaching the respective harvestable diameter. Instead, freedom over the decision to harvest trees at the desired point in time is maintained, as long as the limits postulated by the SFM are obeyed.

Step 2: Identification of dominant forest types

Prior to the field implementation a stratification of main dominant forest types regarding different forest production potential and accompanied forest structure has to be conducted.

The aim is to define forest types which significantly differ in terms of the above mentioned criteria and consequently have to be described in a separate SFM (e.g. semi-evergreen broadleaf, evergreen lowland forest etc.). Sufficient information should be obtained by exploring available secondary data such as provincial forest statistics, forest type re-classification or Forest Allocation inventory data sets.

Based on the secondary data analysis the required number of SFMs are defined for the respective implementation area (district, province, agro-ecological region).

In view of a future application of the SFM concept by district agencies the number of SFMs should be limited to the greatest extend possible.

It is emphasised that SFMs are designed to present a production forest structure under sustainable management and not a natural undisturbed forest structure as observed in e.g. National Parks. Management in form of improvement thinning is the outmost important factor to shape a forest into a desired forest structure. Consequently, various forest types can, through applied management, be shaped into one identical forest structure. Therefore, a wide range of forest types can actually be accommodated within a single SFM.

Furthermore, numerous SFMs for each forest type, soil type, growth condition etc. would result in an extreme costly and unmanageable concept without offering additional benefits for the overall goal of sustainable forest development and protection.

Step 3: Design of SFM structure

The design of the SFM structure is set by identifying the number and width of each diameter class.

Based on field experiences from various projects in Vietnam a total of 7 diameter classes is proposed as most suitable to a) provide technical sound guidance for local forest users during timber utilisation and management (minimum required number of diameter classes) and, b) to be within the capacity of local people to participate during data collection, analysis and tree selection for harvesting (maximum feasible number of diameter classes).

The minimum SFM diameter class starts at 8 cm dbh in compliance with technical procedures as stipulated in Circular 38/2007/TT-BNN.

The diameter class width is set to an average of 5 cm as applied in most conventional forest management systems by professional forest companies. The second highest diameter class is set to a 10 cm width due to the expected rather low actual stem number to be realised in young or depleted forest stands as normally allocated to local people. A diameter class design for the elaboration of adjusted measure tapes is provided in Table 1 below.

Table 1: Tree measure tape - Diameter class design

Diameter class in dbh [cm]	8-15	15-20	20-25	25-30	30-35	35-45	> 45
Diameter class width [cm]	7	5	5	5	5	10	>
Diameter class index colour band	Yellow	Black	Stripes	Blue	Dots	Saw	Red

Trees of above 45 cm dbh are combined into one diameter class as mostly young or rather depleted forests are expected to be handed over to local people with dominant numbers of trees found in the smaller diameter classes and only solitaire tree individuals might exceeding the highest diameter class average. 45 cm furthermore defines a very suitable harvest diameter for manual/animal skidding and short distance transport as commonly applied under CBFM schemes.

Step 4: Collection of available data on main forest characteristics

Precise and reliable forest inventory raw data is required for the elaboration of SFM and should be obtained from inventory databases as developed during FLA forest resource assessment. The database has to be made available in Excel format following the Excel database as stipulated in the provincial PLUP-FLA guideline, dated 16th December 2008.

In case volume estimates have not yet been developed, a non-linear regression analysis has to be conducted and a two-factor diameter-height equation for the respective forest type developed as stipulated in Circular 38/2007/TT-BNN (for detailed guidance on the process see provincial PLUP-FLA guideline).

All available research data from reliable sources should further be added to complete the current database.

Step 5: Data analysis and Definition of SFM benchmarks

The ultimate structure of the SFM can be defined by either standing timber volume [m^3] or basal area [m^2].

More conventionally, standing timber volume is applied as defined in Decision 40/2005/QD-BNN dated 07.07.2005 regulating extraction of timber and forest product issued by MARD. Such harvest limits (e.g. ≥130m^3) are mostly derived from scientific research but finally adjusted following political decisions and therefore cannot be explained by forest science alone.

Similar to this, the SFM benchmark to be defined has to be within the natural production potential of a respective forest type (review of inventory data) but is ultimately a management and political decision.

Therefore a compromise between the above mentioned objectives has to be reached when defining SFM benchmarks.

In order to ensure at least minor tangible benefits (harvesting options from allocated forests) for smallholders in the near future it is recommended to set a benchmark at modest level (e.g. slightly below the one defined in Decision 40/2005/QD-BNN dated 07.07.2005 regulating extraction of timber and forest product issued by MARD). In the long-run SFM structures can further be adjusted if forest resources have considerably improved and on large scale are reaching the benchmark in all diameter classes.

Step 6: Identification of stem numbers per diameter class

Once a benchmark has been set, the database is screened for forest inventory data that best represents the benchmark (similar volume figures). These sample will resemble the desired forest structure and are used as preliminary SFM structure.

Finally, an exponential trendline following the Meyer function can be applied over the preliminary structure to smoothen and standardise the curve.

Stem number per diameter class should be further rounded to define a clear and simple structure to be used and understood by local people as well as commune and district administration.

Calculation of basal area[5] can be further conducted to get an impression of the density of the forest stand and to cross-check the feasibility of the proposed stem number distribution by comparing it with available scientific publications from in- and outside the region.

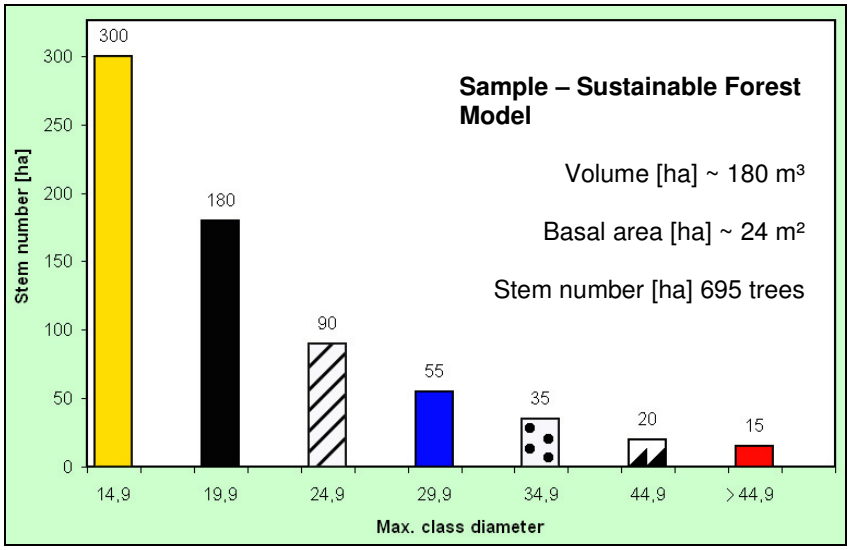
The diameter distribution is developed for all trees regardless tree species or ecological or economical value.

[5] The cross-sectional area of all trees in a forest unit, usually measured as diameter at breast height (dbh) and expressed in m^2 per hectare. Commonly used as a measure of tree density in a forest stand.

Step 7: Description and approval of SFM by provincial DARD

Finally, SFMs require approval by the Department of Agriculture and Rural Development before they can be applied in the context of CBFM management.

Therefore a brief report stating main data source, decision-making process during data analysis and description of final SFM should be attached to the actual SFM before submitted to DARD for approval.



	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Diameter class	8	14,9	15	19, 9	20	24,9	25	29,9	30	34,9	35	44,9	45	>
Stem number [ha]	300		180		90		55		35		20		15	
Class width	7		5		5		5		5		10		Open	

Figure 3: Sample of a Sustainable Forest Model defined for 180m³ standing timber volume

Proposed standards for nation-wide application

Proposed standards for the elaboration of a national concept for development of SFMs for seven agro-ecological zones in Vietnam are listed below:

1) Development of SFMs for entire Vietnam should be limited to one professional team of silvicultural experts only, to ensure a consistent standard and approach followed.
2) SFMs are to be developed separately for each of the seven agro-ecological zones.
3) The diameter widths should be standardised to ensure that only one standard diameter tape will be applied in entire Vietnam and is proposed as shown below:

Table 2: Diameter class design for Sustainable Forest Model

Diameter class [cm]	**8-15**	**15-20**	**20-25**	**25-30**	**30-35**	**35-45**	**> 45**
Class width [cm]	**7**	**5**	**5**	**5**	**5**	**10**	**>**
Diameter class index colour band	**Yellow**	**Black**	**Stripes**	**Blue**	**Dots**	**Saw**	**Red**
Number of classes	**1**	**2**	**3**	**4**	**5**	**6**	**7**

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Appendix 5: Village CBFM plan format

SOCIALIST REPUBLIC OF VIET NAM
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COMMUNITY BASED FOREST MANAGEMENT PLAN

Village…….

Commune……..

District……

Province…….

Planning period from……to……..

Day…….Month…….Year…….

……DPC

……CPC

SOCIALIST REPUBLIC OF VIET NAM

Independence - Freedom - Happiness

No. : **/TT-UB** *Place…….. date……*

SUBMISSION ON

«Approval for Community Based Forest Management Plan of …….village»

To : **-** ……**DPC**
- ……**District Economic Division**

This Community-based Forest Management Plan (CBFMP) is the outcome of a participatory planning exercise jointly completed by the village/ user group under guidance of the respective local administration in line with existing legal regulations on forest management as stated by the government of Vietnam in the Law on Forest Protection and Development.

This CBFM plan aims at the sustainable development and utilization of the forest resources managed within ……. village.

The CBFM plan as presented here, is elaborated for a planning period of five years to provide the medium-term stability that is needed to guide consistent implementation of sustainable forest management activities as prescribed in the plan.

All silvicultural interventions including the annual harvesting regime are derived from a technical sound forest inventory conducted together with the village/ user group.

Long-term land use right certificates have been issued by the DPC for the entire forest area concerned in this plan and land use certificates have been handed over to the present forest manager in the year…….. Relevant mapping information about the forest resources of the village are available as updated village forest land allocation map at the CPC.

The CBFM plan is described for each forest management block of the village forest area based on an independent forest inventory..

In order to realize the CBFM plans in the field and thus enhancing effective forest management, forest development and forest protection, …… CPC, would like to suggest the DPC and the Economic Division of ……..District to review and to approve the attached CBFM plans (please see the attached files for details).

To
- As above
- For filing

On behalf of the CPC
Chairman

(signature & stamp)

Table 1: Forest management blocks currently managed by forest user groups (In attachment with Submission No. TT/UB date month year)

- **Forest user groups per village (only required if user group management is based on individual land use certificates)**
- **For forest village/ user groups under one land use certificate see respective land use certificates and forest management profiles for details**

#	Group (head of group)	Location			Area (ha)
		Unit	***Compartment***	***Block***	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
…					
Total number of user groups				**Total forest area [ha]**	

Table 2: 5-year Natural Forest Management Plan (per forest management block; including one or more user groups)

(In attachment with Submission No. TT/UB date month year)

Area [ha]		**Unit**		**Compartment**		**Block**	
User group							
Forest type							
Management Goal							
Objective	**Quantity**		**Unit**	**Description**	**Responsibility**	**Required budget**	**Source**
Utilisation [diameter ≥ 20 cm] Red = ≥ 45 cm Saw = 35 - 44,9 cm Dots = 30 - 34,9 cm Blue = 25 - 29,9 cm Stripes = 20 - 24,9 cm	Red		tree				
	Saw		tree				
	Dots		tree				
	Blue		tree				
	Stripes		tree				
Improvement Black = 15 – 19,9 cm Yellow = 08 - 14,9 cm	Black		tree				
	Yellow		tree				
Enrichment planting			ha	*Species:*			
Protection *further details see FPDRs*							
Others / NTFP							

Table 3: 5-year Village Forest Plantation Management Plan (Village level)

(In attachment with Submission No. TT/UB date month year)

	Activity	Total Area [ha]	Age	Unit	Compartment	Block	Required budget	Source
Harvest	*Acacia mangium*							
	Eucalyptus sp.							
	…							
	NTFP							
	Total harvest [ha]							

	Activity	Total Area [ha]	Unit	Compartment	Block	Required budget	Source
Afforestation	*Acacia mangium (1600/ha)*						
	Eucalyptus sp. (1600/ha)						
	…						
	NTFP						
	Total afforestation [ha]						

Appendix 6: Application form for selective timber harvest from natural forest **(hand written by local forest users)**

Village _____ Commune _____

User-group _____

Unit _____ Compartment _____ Block _____

The following trees are marked for harvesting in the respective forest block

Tree number as marked on stem	Diameter class and girth		Tree species
	Colour	(cm)	

Proposed time frame for timber harvest:.....

Date:..... Harvest design approved at harvest site by Forest Protection Unit

Date:..... Harvested amount approved at log yard by Forest Protection Unit

Appendix 7: Village/Commune record book - timber extraction natural forest

Table 6: Village/Commune record book - timber extraction natural forest

Village		**Commune**		**5-year planning period**	**From……to……..……..**

	DBH classes [cm]							**Location of harvest sites**				
	08-14,9	15-19,9	20-24,9	25-29,9	30-34,9	35-44,9	≥ 45	Block	Compartment	Plot	Signature	Signature
	Allowable timber extraction 5-year							**All permitted blocks**			***Head of user group***	***Commune People Committee***
	Actual timber extraction							**Actual harvested blocks**				
Total												
Balance[1]												

[1] *(allowable extraction – actual extraction)*

Appendix 8: Silvicultural guidelines for natural forest management

1. Introduction

This guideline is intended to be applied by local forest users such as group of households or entire village communities who have been handed over natural forest resources for sustainable long-term management and protection (red book certificate plus forest management profile).

1.1 Silviculture in the context of CBFM

Since expertise in forest management and planning cannot be presumed from all local forest users from the beginning, this guideline is intended to provide guidance on the main concepts and selected silvicultural techniques adjusted to the available capacities at grassroots level. Consequently, conventional silvicultural and planning procedures as applied for forest enterprises/companies had to be simplified to ensure that sustainable forest utilization that can be independently conducted by local forest users.

Conventional silviculture compared against CBFM

Criteria	Conventional forestry (State Forest Enterprise)	Community-based Forest Management
Assortment of harvested forest products	Selective exploitation of commercial timber species based on minimum harvest diameter concept. No stand improvement through thinning of competitors in smaller diameters ("*exploit and wait*")	Selected harvesting in all diameter classes based on SFM concept. Continuous stand improvement through removal of undesired trees, climbers and shrubs for firewood consumption.
Planning units	Cubic meter of solid timber	Number of trees per diameter class
Harvesting cycle	One felling cycle >30 years (see Decision 40/2005 QD-BNN)	Continuous extraction of small quantities based on local demand (permanent forest structure)
Harvest volume per cutting cycle	Large harvest volume (entire 20 years timber increment extracted in one harvest) driven by economic criteria e.g. transport costs, sales volume, wages and other costs	Small to medium (mainly for self-consumption and surplus for commercial sale)
Harvesting operation	High mechanised harvesting operations; dependency on sophisticated road network; high investment	Low impact logging with motor-manual harvesting, on site-processing, use of existing road network only, low investment
Post-harvest impact on remaining stand	High damage through intensive and mechanised logging and skidding operations. High risk of soil erosion, weed and climber infestation of logging sites due to canopy opening	All timber extraction oriented towards an improved forest structure following the SFM. Low risk of soil erosion and weed invasion due to low intensity timber extraction

1.2 Principles for Community-based Forest Management

Principles	Description
Participation of local people in all activities	Local forest users are involved in all planning, implementation and monitoring steps and main results are "owned" by them which leads to a commitment to implement it. All activities are within the capacity of local people for independent long-term continuation
Multi-functional forest resources	CBFM has to meet the diversified needs of local people in terms of timber, firewood and NTFPs. At the same time CBFM has to ensure ecological functions of the forests following the thoughts of "Forest protection through sustainable utilisation"
Relevant planning procedures	Only information really needed for forest management purposes is collected and compiled (minimised planning and reporting)
Cost- and time effectiveness	Procedures are cost and time effective to ensure that communities can comply with proposed planning, implementation and reporting
Incorporate indigenous knowledge	Local knowledge and experiences on the use of forest products (medicinal plants, materials, food…) are integrated into planning procedures to maximise the tangible benefits for forest users and to satisfy their diversified demand for forest products
Technically sound forest management	Forest management planning and utilisation are following technical sound procedures and are in line with international standards for sustainable forest management
Sustainable utilisation	Forest utilisation is only allowed within the actual growth potential of the forest resources ensuring a continuous flow of products and a permanent forest cover on the entire area at any time

Objectives of harvesting regulations

- Form a basis for planning, implementation and monitoring of the approved five-year CBFM plan and the Annual Work Plan
- Ensure the safety of people working in the vicinity of felling operations
- Minimize damage to residual trees and seedlings, especially those that are expected to make up the population of future crop trees
- Minimise damage to soil and streams
- Ensure the protection of the ecological functions of the forest ecosystem
- Maximise the volume of timber that can be profitably utilized from each felled tree
- Maximise the value of the logs prepared for extraction

1.3. Selective cutting

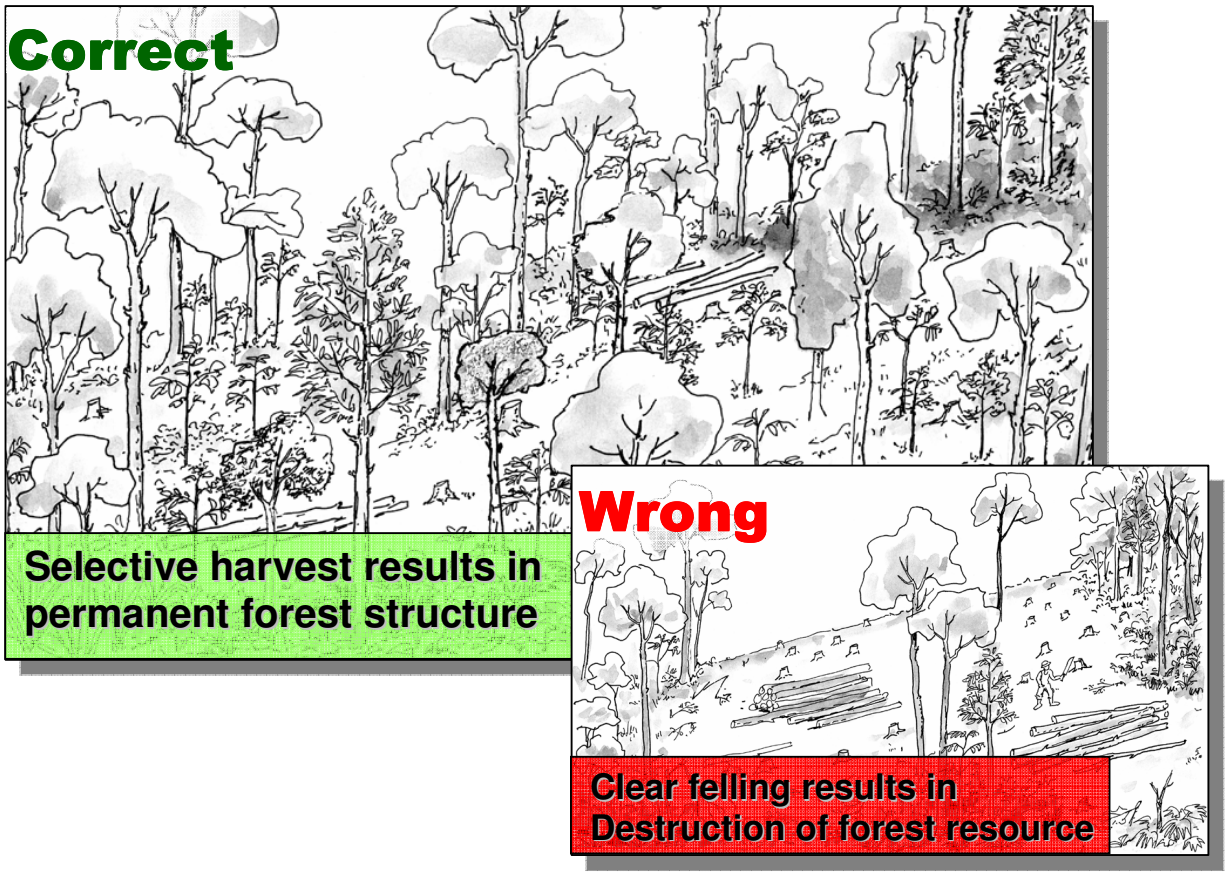
Selective cutting refers to the selection and utilisation of individual trees within a forest stand. In this system trees are removed on a felling cycle that occurs more frequently than the rotation and in which an uneven-aged forest structure is maintained. The harvesting is implemented based on the approved 5-year CBFM plan and annual work plan.

Selection of trees to be harvested and those to be retained is based on a set of criteria (e.g. species, quality, density, competition…) as detailed in the silvicultural guideline.

The aim is to harvest trees that are ready for the market and trees with low-value that are competing with future crop trees while maintaining a permanent forest structure.

Under this system, the forest can provide timber on a continuous basis, with natural regeneration constantly replacing harvested trees. Timber extraction is carried out in all diameter classes based on the Sustainable Forest Model to fulfil the diversified demand of the local forest users for housing, stables for livestock, fencing, firewood and commercial timber sale.

Under this system the actual forest structure is continuously adjusted towards the structure of the SFM in line with the long-term forest management goal for the respective forest stand.



1.4 Legal policy frame for selective cutting

In conventional forest management, selective cutting is applied in un-even aged rich forests comprising trees of mature diameter classes for large-sized timber harvesting (as per Decision 40/2005/QDD-BNN dated 07/07/2005 on Regulations of timber and forest products harvesting of MARD). Furthermore, selective cutting is carried out in poor/degraded forests and forests in order to improve the structure of the dominant and lower tree layers.

In CBFM, all silvicultural interventions are aiming at an improved forest structure and therefore can be applied in all natural forests such as young forests, poor/degraded forests, average and rich forests as long as the two following conditions are met:

• Participatory Forest Resource Assessment has revealed a surplus in a specific diameter class compared against the SFM

• Local forest users or entire communities are interested in utilising the timber surplus for self-consumption or commercial sale

2 Pre-Harvest planning

2.1 Species selection criteria

Before tree marking for harvesting, it is necessary to identify species that are not allowed to be harvested such as:

- Valuable and rare species as detailed in the Red List[6] and the Decree 32/2006/ND-CP on the list of wild, valuable and rare animals, plants and trees in Vietnam.
- Valuable and rare species that have a cultural significance for traditional communities (e.g. graveyard trees, worshipping trees,…)
- Trees and species that need to be protected as source for propagation (seed trees) or as important source for NTFPS (bark, leafs, fruits, resin etc.)

Local forest users have to be consulted and a common agreement reached before any decision can be made. The species list as developed during the forest inventory analysis should be used as reference and species of cultural significance indicated separately.

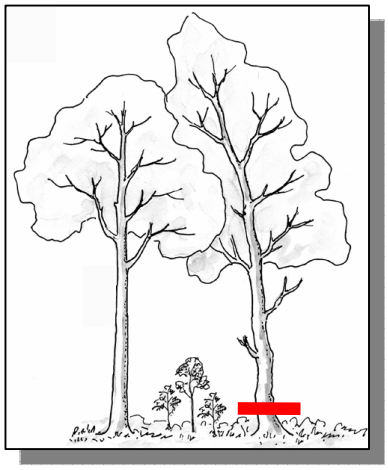
2.2 Tree selection criteria

The selection of trees for harvesting has to be based on comprehensive criteria since harvesting is the most important silvicultural intervention which is defining the future production potential and environmental functions of the forest.

Timber tree - selection criteria

Selection based on canopy competition (main criteria)
Potential Crop Trees (PCT) have to be provided sufficient space for optimal growth. This can only be achieved by providing sufficient space and limiting competition from undesired trees through felling of competitors.
Only trees with crowns higher or at the same height as the PCT can cause competition. Smaller trees have no effect on the growth of the PCT and should only be extracted if desired for their direct products.
Trees to be protected until they reach final harvesting diameter have to have the following characteristics:

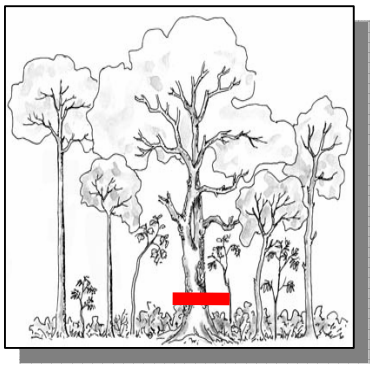
- Vital, not diseased and no major bark injuries
- Straight with round solid stem
- Wide and dense crown
- Species with production potential (timber or NTFP)
- Dominant or co-dominant position in the upper canopy layer



[6] IUCN Red List of threatened species created in 1963

Trees to be extracted from smaller diameter classes should be limited to trees that are:

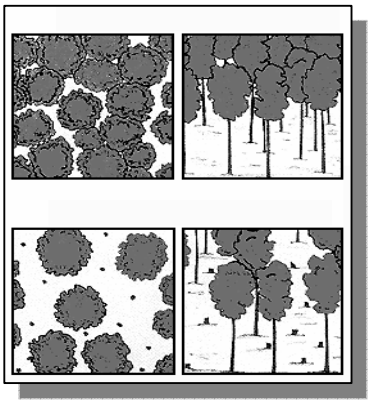
- Diseased or dead with a potential risk of spreading diseases to remaining trees in the forest
- Trees of undesired species or stem form (bended or forked) competing with a good timber species
- Undesired trees shading out natural regeneration



Timber extraction should never leave big openings in the canopy layer which can increase the risk for weed invasion and soil erosion.

After harvest at least 50% of the ground should be covered by a dense canopy (canopy closure at least 50%).

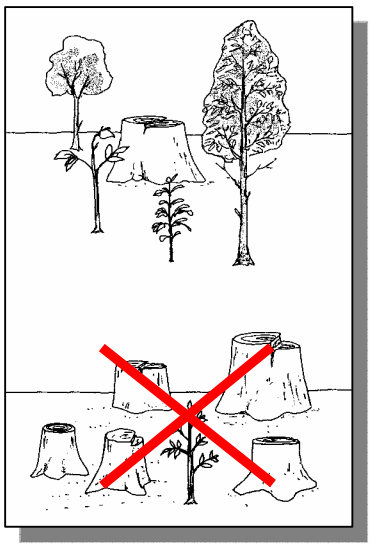
Single canopy gaps should not extend the space of a mature tree crown.



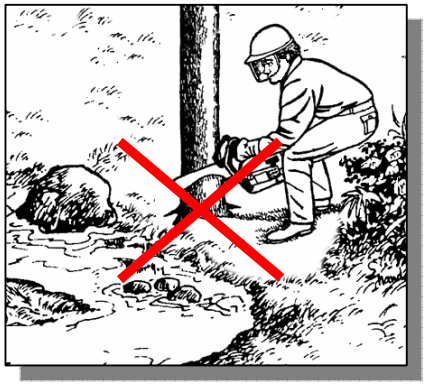
For every tree cut, enough smaller trees of various species have to be available as replacement, otherwise labour and cost intensive enrichment planting might be necessary in the future.

In areas with insufficient natural regeneration, mother trees have to be retained as future seed source.

A minimum distance of ~ 20 m between two mature trees to be extracted should be ensured.



No trees to be harvested within the bufferzone of streams or rivers. Tree shade is effectively protecting sources of drinking water and fish population.



River width (m)	Bufferzone width (m)
1-20	30 m
21-40	80 m
> 40	200 m

Do not cut timber-sized trees on extreme slope or in areas with loose rock outcrops to avoid risk of soil erosion and damage to the remaining stand.

2.3 Tree marking - preparation of tree list

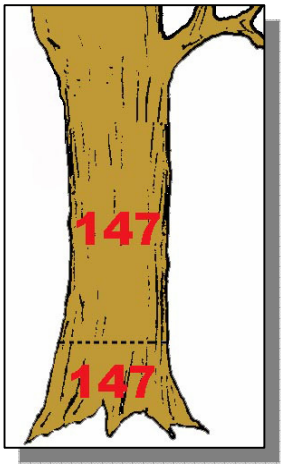
Trees that are selected for harvesting will be marked with oil paint in two positions:

1) at breast height and,

2) near the stump below the felling scarf.

The mark below the felling scarf will serve as identification mark for the post-harvest monitoring.

Marked trees are defined in terms of species, diameter class and recorded in a timber list. This will serve as baseline data to compare the number of trees marked with the annual harvesting plan of the forest block.



2.4. Harvesting season

Timber harvesting, preparing a skidding track for transportation, tree logging, timber felling, transportation and post-harvest site cleaning need to be done in the dry season. Avoid to harvest in growing season of timber trees.

Harvesting season depends on the weather as well as the availability of labour. Therefore, a harvesting plan should be made together with communities to ensure a suitable timing for all harvesting related activities.

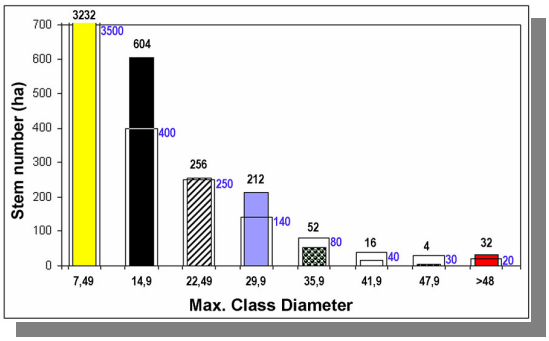
A harvesting plan should detail activity, time, location and responsibilities

2.5. Permitted harvesting amount

Any timber extraction has to be based on the approved five-year forest management plan for the respective forest block.

The planned harvesting/thinning operations therefore have to be within the permitted harvest quota for a five-year period.

All harvesting is based on a forest inventory

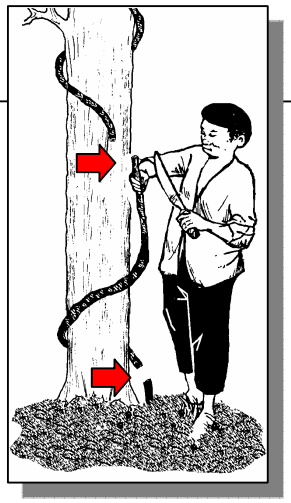


3. Timber Harvesting

3.1 Site preparation

Cut climbers with diameters larger than 2 cm some time before harvesting. As climbers can bind tree crowns together damage can increase to other trees and create potential risks for the logging crew.

Climbers can furthermore strangulate the host tree and can cause deformation of the stem and loss of timber value.



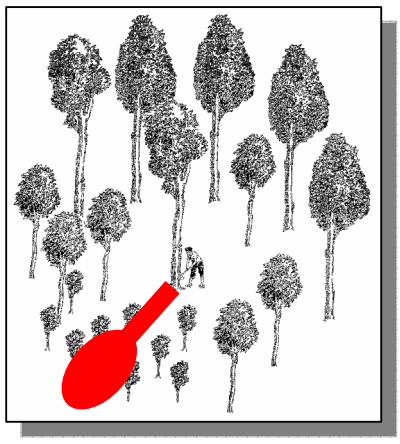
3.2 Directive felling

Select felling direction to reduce damage to remaining stand.

Try to fell trees into open areas or areas with only young trees or regeneration which can easily recover after the crown material has been removed from the felling site.

Do not fell trees during stormy weather as the wind might change the direction of the falling tree and create potential safety risks for the logging crew.

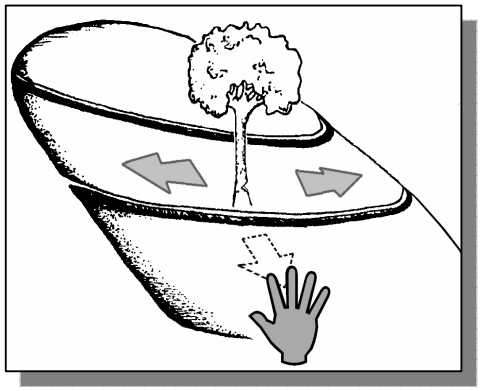
Before starting to cut, remove shrubs and other vegetation around the tree base that could impede your work.



Do not fell trees down the slope unless their downhill direction is too dominant for directed falling. Try to fell trees along the contour lines.

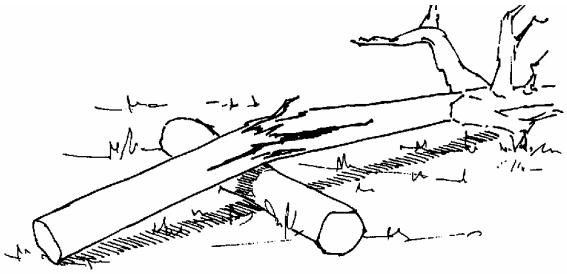
This will help to minimise breakage of felled trees and damage to the remaining stand.

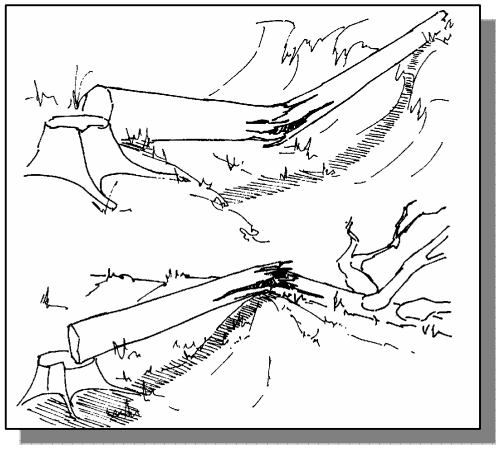
By looking at the lean of the tree, the location of the heaviest branches and the general crown weight, you'll be able to select the felling direction.



Avoid felling a tree over a ditch, hillock or other logs as the stem might crack and loose its value.

Try to direct your felling to place tree crowns of several harvested trees into the same area to reduce disturbance in the remaining stand.





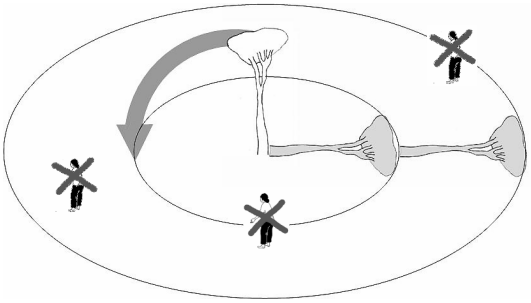
4 Safety regulations

Personal requirements when handling a chain saw

- physically fit and reasonably active;
- trained or experienced in the use and maintenance of chainsaws, felling and crosscutting;
- not under the influence of drugs or alcohol or are tired or fatigued;
- fully equipped to carry out the job;
- having a person with them who is able to assist or obtain help in an emergency; Remember: Never work alone while felling trees or using a chainsaw!

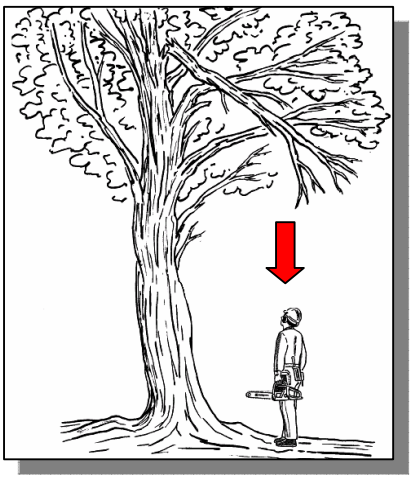
Before felling a tree, Check that there are no other persons, children or animals in the danger zone.

The danger zone is the distance twice the length of a tree to be harvested (twice the length of the falling tree, as it might hit another tree which can also fall). This distance should be increased if felling is directed downhill.



Check for any dead or broken branches that may stuck in the crown and fall into the work area as the tree falls. This is particularly common in old trees and causes serious accidents. View the tree from different angles so you don't miss anything.

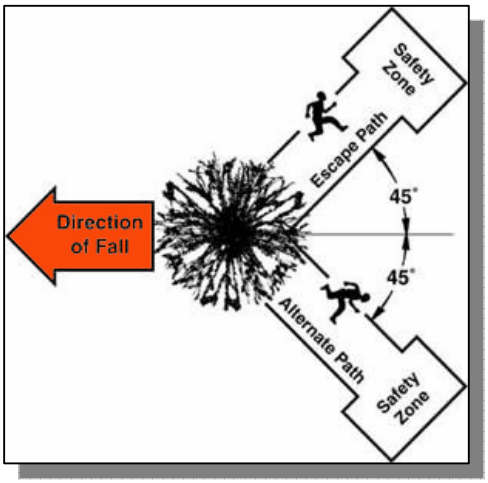
Check for branches interlocking with branches of other trees. These can break off as the tree falls and drop into the work area, pull the tree away from the desired direction of fall, or cause other trees to uproot and fall.



Having assessed the work area and tree to be felled, prepare the site for felling.

If there are any low branches that may get in the way during the felling, cut them off.

Clear an adequate work area around the base of the tree and provide an escape route diagonal to the rear.



Look forward in the tree fell direction and identify any hazards such as stumps, logs, or ground undulations that may cause the fallen tree to kick backwards or sideways on contact.

Back off from the falling tree as soon as the tree shows any sign to give in, make sure to get away from it.

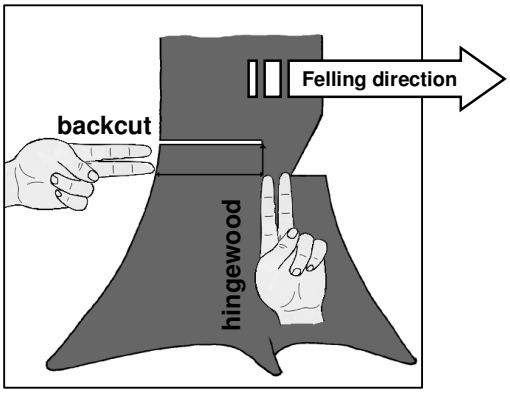
4.3 Harvesting techniques

Cut the scarf in felling direction. The top cut is made first at a 45° angle between one-quarter and one-third of the tree's diameter. The cut must accurately face the desired direction of fall and finish level. The bottom cut must be made level to meet the top cut and form a clean, uniform "V" right across the diameter of the tree when the cut section is removed.

If your tree has a diameter of around 30 cm place the backcut from the other side "two fingers" above the base of the scarf. For a bigger tree increase to 3-4 fingers.

The backcut is the last cut and will finally fell the tree. The backcut is made level and always above the 'V' of the scarf (around one-tenth of the tree diameter). The backcut does not cut all the way through but stops until there is an even amount of hingewood about "two fingers" (or one-tenth of the diameter) parallel before the scarf to remain the hingewood.

The hingewood controls the felling direction and prevents the tree from twisting or breaking sideways when falling.



Once the backcut has been done and the tree begins to fall:

- Remove saw from cut and switch off
- Move into the planned escape route
- Watch for falling material
- Watch for the tree kicking back or bouncing as it hits the ground

Common Felling hazards

Felling uphill: Be aware that the tree may slide back or kick up into the work area once it hits the ground. Move quickly along the escape route away from the stump. Always watch the path and progress of the tree you have felled.

Felling trees along the contourlines: Make sure you are not in the path of a rolling tree. Move back along your escape route away from the falling tree.

Trees without crown (crown breakage after storm or heavy rain): Make the scarf slightly deeper (max. to half of the diameter). Place a wedge in the backcut as soon as possible to ensure correct felling direction as there is no crown to force the tree in the felling direction.

“Hung-up” Trees: Where a tree is hung up in another tree it must be brought to the ground before continue any other work. Do not leave such trees unless you have marked the area while you seek assistance, or someone else is present to warn other people of the hazard.

5. Post-harvest Activities

5.1. On-site processing

Trimming (cutting off branches)

Before starting examine the felled tree for any hazards (tensions, breakages etc.)

Check trees adjacent to the felled tree for any damage or hazard.

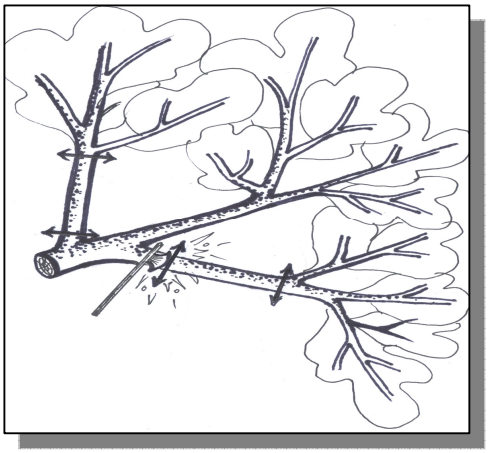
Make sure the tree is stable and will not roll or move when you start to work on it. Place chocks if you think movement is possible — especially on slopes.

Only trim trees that are firmly lying on the ground; do not work with a chainsaw above shoulder level (1,5 m).

Beware of a tree suspended by its branches as one large branch may hold the tree up.

When a tree is held up off the ground, trim the large branches from out- to inside by making a couple of cuts to test the stability.

Always work on the uphill side of a tree on a slope. pull the tree away from the desired direction of fall, or cause other trees to uproot and fall.



Watch out for limbs that are under tension. These can spring back and inflict severe injury. Stand on the side away from the tension and release the tension with two cuts — first on your side and then on the other side.

Crosscutting

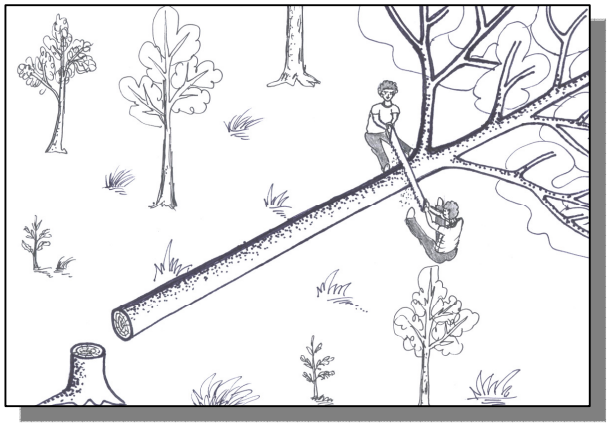
After trimming the stem it can be cut into the desired lengths for house construction, fencing, farm material or firewood.

Check that the stem is lying stable and cannot roll, drop or swing. Look for any defects such as rot or large branches that may affect your crosscutting.

Don’t crosscut logs that are suspended more than 1.5 m above the ground. Crosscutting above this height means the saw is being used above shoulder level.

Clear a sufficient area to operate in.

Make sure the carry-through of the saw does not bring the chain into contact with the ground or objects that may damage it.

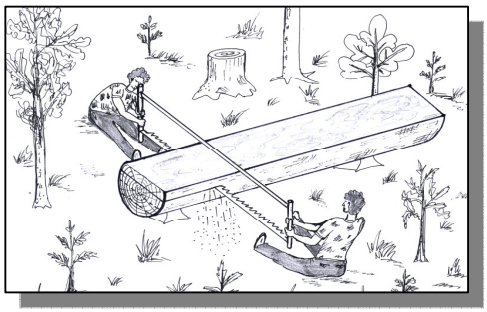


Always finish a cut from the uphill side to avoid the stem rolling against you. Make sure others are not endangered if the cut log rolls down the slope.

On-site processing

Heavy logs should be sawn into smaller planks directly at the logging site to reduce cost and to reduce the damage to the soil and the remaining stand by transport with heavy machines.

Sawn planks can easily be transported manually or by animal skidding without need for a road network.



Cleaning of harvesting site

After the logs have been removed from the harvesting site, bigger crown material and branches should be used for firewood.

Remove and leave limbs and bark directly at the felling site. Small branches should then be cut into smaller ones and spread evenly in the forest.

A large proportion of tree nutrients reside in the bark and foliage. Leaving limbs and bark at the felling site will thus contribute to improved growth of future trees.

6. Thinning - Silvicultural option for forest improvement

Since most forests at the time of being allocated to local people are rather young or degraded forests, a main management objective will be to improve the forest condition with the aim of making it more productive in the future. There are various options for doing this depending on forest type, condition and on the forest product demand of the local people. Some of these options will also have utilisation benefits, but their main purpose is forest improvement.

Thinning is normally carried out in young forests (often called pole-stage) when the tree size is too small for use as sawn timber. Thinning is particularly important where there is a dense stocking of trees of similar age and size.

Conventional forest management by forest companies in Vietnam does not detail thinning activities as the cost of carrying out thinning remains is often greater than the value of the poles produced. In community forestry this is not the case, because poles are required for fencing, animal stalls etc. and cost of thinning done by local people is low.

Definition: Thinning means removing some of the trees in densely stocked forest or patches of forest before they have reached timber size.

Objectives of thinning

- To improve the growth rate and diameter of the remaining trees in the forest (by reducing competition)
- To improve the final timber crop by removing deformed tree stems which will not be needed for timber
- To open the canopy to allow more light to penetrate to the natural regeneration
- To produce poles and fuelwood to meet the needs of local forest users

- To ensure forest remains in a healthy and stable conditions (resistant to storm)

Regulations for thinning

- The first thinning should take place when trees start to compete with each other for light and space. Tree competition can only be assessed by crown competition (tree crown are at least toughing).
- The management objective is to support selected crop trees by removing competitors who are competing for space in the dominant tree layer. Competitors are trees in the dominant/highest canopy layer, of lower quality than the crop tree, growing next to a crop tree and shading out the crown of the crop tree from above or the side.
- Thinning has to be limited to the dominant tree layer in form of a selective crown thinning from above. Only by removing trees in the dominant canopy layer, the development of the crop trees can be improved. Thinning in the lower layer and under storey has to be limited to dead material or diseased trees.
- In the undergrowth climbers are extracted and natural regeneration is strictly protected from any negative impacts like grazing or fire. Shrubs and undesired trees in the under storey are spared from thinning for improvement of the forest structure and for ecological reasons but can be selectively harvested if desired for firewood consumption. Only collect dry firewood and leave small branches and leaf material on the site to protect the soil.
- The frequency of the thinning depends on the time until crown competition will start again. In forests with fast-growing pioneer species a more frequent thinning is required. In general a five-year thinning period should be sufficient to ensure good stand development.
- Rare tree species, especially seed trees that are important for future stand development should be excluded from thinning.

Thinning impact on remaining stand structure

The effect of improvement thinning is illustrated in the following graphic. Trees marked orange in the upper picture are to be removed during stand improvement thinning. The result of the thinning with no crown competition and favourable growth conditions for crop trees is shown in the lower graphic.

7. Fuelwood Harvesting

Fuelwood is an important forest product. Even degraded forests can produce some fuelwood, and most silvicultural options for utilisation or improvement of the forest will yield some fuelwood.

Firewood - selection criteria

Harvested trees unsuitable for timber (e.g. crooked or damaged stems)

Dead and diseased trees unsuitable for timber

Trees that are competing with valuable trees

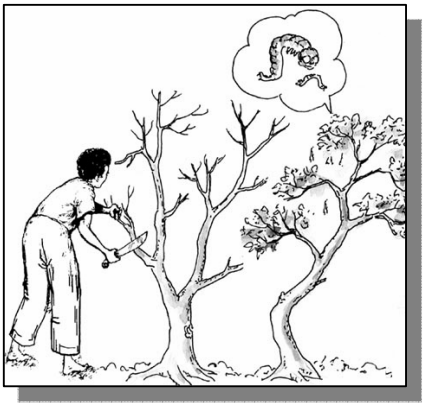
Branches and other tree parts remaining after harvested trees have been converted into timber

Unwanted poles and other stems from thinning operations

Woody shrubs produced during cleaning and weeding operations

Branches and stems from pruning and singling operations

Dead branches and trees which have already fallen and be collected without any harvesting



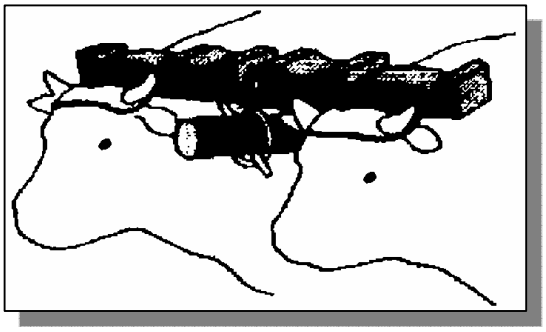
Note: Potential timber species should be strictly protected to grow into higher diameter classes

8. Skidding

Safety regulations

The principles to reduce damage to the remaining trees when transporting timber is as follows:

- Check and select suitable trails for transport (use a map with contour lines)
- Use as much indigenous knowledge and local resources as possible (use animals, transport timber on streams or rivers)
- Devices such as skidding pans or sledges can greatly improve productivity in animal skidding because they reduce skidding resistance and thus allow larger loads to be pulled.



Improper extraction operations of big logs can lead to:

- loss of log volume or value during skidding process
- excessive damage to soil and streams
- excessive damage to residual trees and seedlings

Animal skidding must allow for short extraction distances (typically 200 m or less) and relatively gentle slopes only.
Proper harnesses are essential in order to prevent injury to the animals and to avoid cumulative discomfort over long working periods.

9. Promotion of Natural Regeneration

9.1 General Principles

- Promoting existing natural regeneration through strict protection from grazing, firewood collection, forest fire and during all silvicultural operations.
- Strict protection of any vegetation growing in open gaps especially along rivers and streams, in areas with steep slope and areas with thin soil layers or with rock outcrops. Regardless of the utilisation potential of the species a vegetation cover has to be maintained for crucial soil protection.
- Shrubs and non-target trees in the under storey are spared from thinning for improvement of the forest structure and for ecological reasons but can be selectively harvested if desired for firewood consumption.

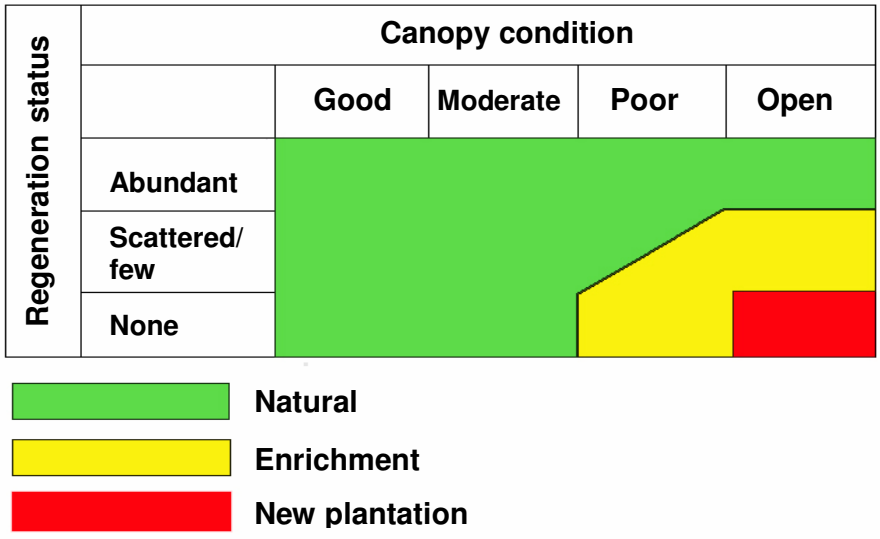
Promotion of natural regeneration follows the idea of utilizing the potential of forests to naturally regenerate and to avoid labour and cost intensive measures for replanting or enrichment planting.

For forest management to be sustainable, regeneration is needed to replace harvested trees, or to improve forest which is already degraded. Getting regeneration of the desired species and making sure that it survives and grows is an essential part of forest improvement.

Existing natural regeneration should be protected and promoted during all silvicultural operations (including plantation sites) in view of achieving mixed natural forest stands of indigenous tree species.

Forests which have been subject to frequent fires and grazing in the past usually do not have enough regeneration and might require enrichment planting to ensure a sufficient number of crop trees in the future.

Since plantation establishment is a costly and labour intensive silvicultural option, it should be avoided unless there is no alternative method for regenerating the forest. The diagram below gives an indication of the regeneration status and forest canopy conditions for selecting plantation establishment as an option. This shows that only where the site is completely open (no forest canopy) and where there is no existing natural regeneration should plantations be established. Otherwise natural regeneration is a more suitable option. Enrichment planting is an intermediate option where planting is only done (at lower density) to supplement any natural regeneration already taking place.



9.2 Main interventions

- Strict protection of young trees with potential for timber and NTFP production.
- No grazing or fodder collection.
- No burning (including controlled burning) allowed at any time.
- Harvesting of firewood has to be limited to undesired non-valuable trees.
- Climbers are to be removed from desired trees to ensure a good stem development.
- Strict protection of mother or seed trees in areas with insufficient natural regeneration.
- Selection of desired tree species and mother or seed trees has to be based on the demand of the local forest users.
- In areas with the vegetation cover dominated by bamboo, the silvicultural option of natural regeneration with or without enrichment planting can only be applied if bamboo is considered a desired species of the long-term management goal. The active elimination of competition of bamboo to support tree regeneration is a very difficult and labour intensive process due to the strong vegetative regeneration capacity of bamboo.
- Existing coppices should be singled, leaving only one or two main branches to develop into bigger diameters.

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