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Training on CBFM

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ELABORATION OF IDEAL MODELS FOR THE PROMOTION OF CBFM IN DAK LAK
Elaboration of Ideal Forest Models
for the Promotion of CBFM
in Dak Lak province

Case Study Report

Philipp Roth
Dak Lak, April 2004
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1 Introduction

Decision making in forest management has to be based on an overall management goal or standard, which can be compared against the real situation. In the context of community forestry, this standard aims at satisfying the demand of the forest user in terms of forest products while at the same time ensuring sustainability of the forest resource. In other words, the structure of the forest is mainly defined by the human demand of the forest user based on its production potential. Consequently, the standard does not aim at reflecting a potential natural forest structure as desired in special-use forests like national parks or nature reserves but to develop an adapted forest structure combining production and protection functions at the same time.

Many mixed stands 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 (Philip 1994). The so-called negative exponential model is frequently used as a standard of comparison for natural and mixed stands managed on a polycyclic cutting system and as an aid in designing cutting schedules in such stands (Philip 1994; v. Gadow and Hui 1999), exemplary illustrated in Figure 1.

Due to the ability to represent natural forest stands, negative exponential functions resembling ideal natural forests, similarly providing protection and production functions are prepared for each forest type separately. Respective ideal stand models are compared against stem number-diameter distributions obtained via participatory forest inventories to facilitate the identification of management options for the respective forest stand. This is of special importance regarding the postulation of simplicity for participative methods, as applied in the context of Community Forest Management (CFM) promoted by the RDDL project.

Three input variables, namely basal area, diameter-class width and the number of trees in respective diameter-classes are necessary for the modelling of stem number diameter-distributions. Figure 2 displays the sequence of tasks leading to the determination of ideal models.
As presented in Figure 2, ideal models have to be elaborated for each forest type separately. Thus, the initial task of model establishment has to be the assessment of overall forest types present within the given region. Attention should be paid to the fact that distinct characteristics for each forest type have to be identified. These characteristics have to be suitable regarding local forest users’ ability to distinguish between respective forest types during the stratification of their village forest in so-called forest blocks.

Subsequent tasks, namely adjustment of diameter-classes and the estimation of basal area and stand structure have to be carried out for each forest type separately. The remainder of this report has been structured accordingly, commencing with a description of forest types (chapter 2), the adjustment of diameter-classes (chapter 3) and the elaboration of suitable basal area and stand structure (chapter 4), before presentation of respective ideal models.

2 Description of forest types

As encountered during the forest survey in Cham village (Ea H’Leo District), implemented from the 25th to the 27th of April 2004, two types of forests are prevalent, namely dry-dipterocarp and semi-deciduous forests (the latter also containing the forest type termed semi-evergreen). This is corresponding to results obtained from previous preliminary surveys.
conducted in Krong Pa district of Gia Lai. Dry-dipterocarp forests occupy the major share of the land and main species include *Dipterocarpus intricatus*, *Dipterocarpus tuberculatus*, *Dipterocarpus obtusifolius*, *Dipterocarpus alatus*, *Castanopsis* sp., *Shorea obtusa*, *Canarium album*, *Celia* sp., and *Tarrietia cochinchinensis*. Generally, respective forest stands are rather open spaced and the majority of the trees shed their leaves during the dry-season, lasting for about four months, from December until March.

As far as the semi-deciduous forests are concerned, a considerable difference in species composition as well as stand structure becomes apparent. Some of the prevalent species are *Den nan la* (*Vitex quinata*), *Huynh* (*Tarrietia cochinchinensis*), *Leng ngheng* (*Cratoxylum formosum*), *Gao* (*Anthocephalus indicus*), *Bang Lang* (*Lagestroemia* sp.) and *Sang le* (*Lagestroemia calyculata*). Only very few dipterocarp-trees are encountered, the main species being *Dau trai* (*Dipterocarpus intricatus*). The vertical stand structure is segmented into three main strata, resulting in a densely closed canopy and the presence of abundant regeneration, an indicator for the fact that the respective forest type is generally encountered in areas exhibiting favourable water supply and better soil conditions.

### 3 Adjustment of diameter-classes

#### 3.1 Sequence of tasks

As already mentioned in the introduction, elaboration of suitable diameter-class widths represents a crucial task of the preliminary forest survey. Figure 3 presents a flowchart of various pathways leading to the determination of diameter-classes in dependence of the respective local context. The assignment of diameter-classes is of special importance regarding the facilitation of data collection and analysis by local people, enabling them to gain knowledge about the structure of their forests. Apart from the static picture of the actual forest structure, the stem number-diameter distribution can additionally be used as a dynamic model to predict forest growth and yield. In this case, the time of passage, defined as the time for a tree to grow through a diameter-class (Lu 1999) is a commonly used method in tropical forest management (Alder and Synnot 1992). Thus, by setting the diameter...
classes to a constant time of passage it is assumed that all trees of the forest stand grow into the next higher diameter-class within the respective period. Ideal models are needed during the participatory elaboration of 5-year management plans for respective forest stands. The time of passage should be set in accordance with the planning period (i.e. 5 or 10 years), facilitating the determination of the number of harvestable trees in respective diameter-classes during the process of management plan elaboration.

The task of adjusting diameter-classes is best accomplished if reliable growth and yield data is available (as has been the case for the ideal models elaborated for Dak Lak, refer to chapter 3.2). The second best solution, in case that growth and yield data is not available is represented by the measurement of annual growth rings. Making use of the method called temporary plots is of merely temporarily character and should only be adopted in regions where the formation of growth rings does not correlate with respective years and no growth and yield data is available. Interviews with local forest users are not an option but imperative regarding the demand-base approach of the entire PFRA-methodology.

In the following, the results of the analysis of growth and yield data are presented prior to the presentation of the general outcome of interviews with forest user groups. Necessary data has been obtained during the field survey in Cham village, as well as previous surveys implemented in villages located in Krong Pa district, Gia Lai.

3.2 Evaluation of growth and yield data

An extensive data set was made available by Prof. Dr. Bao Huy (Tay Nguyen University), comprising 320 measurements of 5-year increments of individual trees measured in dry-dipterocarp forests, as well as 1200 increment measurements from semi-deciduous forests. The data has been analysed in order to obtain information about the correlation of the 5-year increment and the respective diameter of individual trees for both forest types. In other words, the question that was pursued with the analysis was whether if larger trees would exhibit faster growth than smaller trees, or if there would be no correlation between the diameter of trees and their increment. The latter has been the outcome of data analysis for the dry-dipterocarp forest, illustrated in Figure 4 (displayed on the next page).

As becomes apparent referring to Figure 4, no correlation exists between the five-increment and the diameter of trees of the dry-dipterocarp species. This is most probably due to the openness of respective forest stands where light is not a limiting growth factor. The five-year increment furthermore settles around 3 centimetres, which has therefore been identified as a suitable diameter-class width for the subsequent management planning.
Similar results have been obtained from the measurement of annual growth rings from freshly cut stumps of the faster growing species *Shorea obtusa* (2 samples) and *Dipterocarpus obtusifolius* (3 samples), encountered in dry-dipterocarp forests of Cham village. The data analysis revealed a mean annual increment of 8 mm (resulting in 4 cm increment for 5 years for the faster growing species) and confirmed the fact that no correlation between age and diameter at breast height exists, as displayed in Figure 5.

**Figure 4** Diameter – increment distribution of trees sampled from dry-dipterocarp forests

**Figure 5** Mean diameter over age from sampled trees of dry-dipterocarp forests
Analysing the increment data from trees encountered in the semi-deciduous forest yielded a coefficient of determination ($R^2$) of 0.7 and thus a strong positive correlation between tree diameter and 5-year increment.

**Figure 6** Diameter – increment distribution of trees sampled from semi-deciduous forests

Despite this positive correlation, diameter-class widths have been set in compliance with those of the dry-dipterocarp forest model. This decision is justified due to the resulting advantage in terms of practicality during the management planning process (as forest users are only confronted with a uniform set of diameter-classes). Furthermore, referring to **Figure 6**, setting the diameter-classes at 3 centimetres is well within the given limits.

In order to obtain information about the largest diameter-class of both ideal models, forest user group interviews had to be carried out, again paying respect to the postulation of usefulness in the context of community forest management.

### 3.3 Interview of local forest user groups

Closely regarding to the postulation of usefulness in the context of CFM, it has to be assured that elaborated ideal models are adequately adopted to accommodate the demand of local forest user groups, meanwhile ensuring the maintenance of the protection function of managed natural stands. In order to obtain insights about the respective demand, local forest users have to be questioned in the course of each preliminary survey. Women and men frequently collect and utilize different forest products, the reason why care should be taken to
include representatives of both gender as well as varying age groups, yielding an unbiased estimate of the demand for timber and non-timber forest products.

The adjustment of diameter-classes is mainly geared to yield equal times of passage. However, the minimum harvestable diameter for the largest timber dimension demanded by local forest users is of special importance, as it determines the largest diameter-class of the model. In order to acquire this information, an assessment of the forest product demand should be carried out. During the field survey in Cham village, several interviews have been carried out with forest users in order to assess their demand for timber.

The vice village head stated *Shorea obtusa*, *Dipterocarpus alatus* and *Celia sp.* would be very suitable for the construction of houses. Especially the centre core exhibits enhanced durability and is therefore preferred. In order to obtain a core of about 20 centimetres diameter, suitable for house construction, the tree has to be of approximately 30 centimetres diameter (measured at breast height – dbh) at time of harvesting (which was consistently stated in all the interviews). The second major timber product demanded by villagers are pepper-poles, with preferable dimensions and species generally being the same as demanded for housing. However, it was stated that dead and bad-formed trees would be utilizable in addition. In the particular case of Cham village, forest users admitted that they would satisfy a major part of their demand for timber by harvesting trees from areas cleared for shifting cultivation.

Surveys conducted last year in Krong Pa district (Gia Lai) yielded similar results, where villagers stated that trees would be harvestable around 25 to 30 centimetres dbh for the purpose of house construction.

To the question about the demand for pole-sized trees, farmers answered that a remarkable proportion would be obtained as a by-product from harvesting of trees suitable for house-construction, utilizing the upper part of the bole as well as strong branches. Regarding the demand for firewood, it was said that predominantly dead trees are harvested, especially favourable due to their low moisture content.
4 Elaboration of basal area and stand structure

4.1 Sequence of tasks

Basal area of a forest is defined as the sum of the cross-sectional areas of all trees, measured in 1,3 meter height above the ground and commonly expressed in m² per hectare (Philip 1994). Whitmore (1984) refers to basal area as a simple and useful silvicultural measure of yield, because height growth slows down and is usually completed before girth growth. That is why in practice foresters commonly use basal area as a measure for the timber stand. Tasks needed to adjust the basal area as well as stand structure are presented in Figure 7.

Figure 7 Sequence of tasks necessary for the determination of suitable basal area and stand structure as input parameters for ideal models
4.2 Establishment of sample plots and data analysis

If consolidation of scientific literature does not yield adequate data regarding the basal area and stand structure of respective forest stands, sample plots have to be established. As already stated in the introduction of this report, the ideal model aims at representing a managed natural forest combining protection and production functions at the same time. Thus, representative data of a forest in the building phase, with high increment and a stand structure roughly resembling a de Liocourt distribution has to be acquired. In highly heterogeneous natural forests, this often necessitates subjective sampling which also helps to avoid excessive variation of measured plot parameters. In subjective sampling designs the sampling units are chosen deliberately by the designer (or by expert opinion, as Lu (1999) puts it) for their ability, in his opinion, to represent without distortion the whole (Philip 1994).

As far as the ideal stand model is concerned, sample plots have to be located in areas where the present forest condition satisfies the postulation stated above. Thus, rivers, roads, clearings for shifting cultivation or special edaphic forest formations not representative of the forest type should not be located within the sample plots (Gimaretcarpentier et al. 1998). As the number and layout of the sample plots is not intended as a kind of forest inventory, no statistical parameters such as sampling error or standard deviation for plots are calculated.

The same data set, as used for the analysis of the increment data of individual trees has been used to acquire suitable basal areas for both forest types. The respective data sets have been obtained via forest inventory, using a systematic random sampling design with sample plots of 400m² and 1000m².

As far as the sample-plot data from the dry-dipterocarp forests is concerned, data was grouped according to the diameter-classes obtained from the analysis of the increment data (refer to chapter 3.2). The resulting distribution is displayed in Figure 8 on the next page. The respective basal area per ha for this distribution is 24,5 m².
The data obtained from sample plot establishment in semi-deciduous forests resulted in a considerably higher basal area per ha, amounting up to 55,8 m² per ha. This is mainly due to the greater abundance of large-sized trees.

Figure 8  Stem number-diameter distribution obtained from dry-dipterocarp forest inventory data

Figure 9  Stem number-diameter distribution obtained from semi-deciduous forest inventory data
Trees below 9 cm dbh have not been included in the sample of the semi-deciduous forests, the reason why the respective distribution is lacking the initial two diameter-classes (refer to Figure 9).

4.3 Interview of local forest users

The importance of elaborating ideal models that are useful in the sense of being suitable to fulfil the demand of local forest user groups has already been stressed in chapter 4.2.3. Regarding the choice of stem numbers in determined diameter-classes implies that the assortment of forest products, preferred by the villagers needs to find adequate consideration during this process (Branney and Wode 2003). The demand 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 ideal model certainly needs to be different from a model representative of a forest where predominantly medium and small sized trees are demanded for a mixture of timber, poles and firewood. Branney and Wode (2003) provide further reference about the silvicultural system and its connection to the ideal stand models.

As has already been mentioned in chapter 3.3, the interviews with local forest user groups in Dak Lak and Gia Lai revealed a general preference for the harvesting of timber needed for construction purposes and manufacture of pepper-poles. Thus, one ideal stand model has been elaborated for each forest type, aiming to predominantly provide timber of dimensions suitable for construction purposes and pepper poles (around 25 – 30 cm dbh, as indicated in chapter 3.3).
## 5 Presentation of Ideal Models

Following the results of chapters 3 and 4, one ideal model has been elaborated for each forest type. The final adjustment of stem numbers in the various diameter-classes was geared towards suitability for the local context (referring to the outcomes of the demand assessments of local forest user groups) as well as the natural framework conditions assessed via the analysis of growth and yield data as well as respective basal areas.

Exponential trendlines have been added to the stem number- diameter distributions obtained from the sample plot data (refer to Figures 8 and 9) in order to obtain the final stem numbers in the various diameter-classes. Respective ideal models are presented in Figures 10 and 11 (refer to the next page for details). The resulting basal area for the dipterocarp-forest model amounts up to 26,6 m² and is slightly higher than the value obtained from the sample plot data (24,5 m²). However, comparing Figures 8 and 10 it should be clear, that the proposed ideal model stays well within the average site potential.

As no trees below 9 centimetres were included in the original data set, the ideal model for semi-deciduous forests is currently lacking the initial diameter-class (refer to Figure 11, next page). However, amendments should be made by the time data from participatory forest inventories becomes available. For now, data analysis has to focus on the diameter-classes displayed in Figure 11 and it has additionally be checked whether the number of trees in the initial diameter-class (0-6 centimetre, currently lacking) lies somewhat above the tree number of the next higher one, as this would be necessary for sufficient recruitment and thus sustainability. The basal area of the proposed ideal model amounts up to 43,6 m² and is rather low in comparison to the 55,8 m² of the sampled forests. However, as revealed by the distribution displayed in Figure 9, the sampled forests exhibit a somewhat over-matured growth stage, with a lack of trees in the size-class ranging from 27 – 29,9 cm dbh and in the smallest diameter-class. The resulting basal area of 55,8 m² is primarily caused by the abundance of trees in the largest diameter-class. This number, however, has been reduced in the ideal model proposed in Figure 11, allowing for more space for the growth of trees in the smaller size classes.
Figure 11  Ideal model for the semi-deciduous forests.
References


Part II:

CASE STUDY REPORT ON THE PARTICIPATORY ELABORATION OF FOREST PROTECTION REGULATIONS
Introduction of a Participatory Approach

On the Establishment of Village Forest Protection and Development Regulations

Case Study Report

Philipp Roth
Dak Lak, April 2004
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Abbreviations

ACO  Agriculture and Cadastral Office
CBFM  Community Based Forest Management
CPC  Commune Peoples Committee
DPC  District Peoples Committee
DPI  Department of Planning and Investment
FLA  Forest Land Allocation
FMB  Forest Management Board
FPD  Forest Protection Department
FPDR  Forest Protection and Development Regulations
Ha  Hectare
PD  Participatory Diagnosis
RDDL  Rural Development Project Dak Lak
SFDP  Sustainable Forestry Development Project
1 Introduction

As stipulated in the concept on the establishment of CBFM pilots, passed by competent agencies from provincial to commune level in December 2003 for the RDDL, the establishment of community-based forest regulations is to be targeted following the clarification of forest land allocation. As stipulated in Circular 56/1999/TT-BNN-KL, so-called village level Forest Protection and Development Regulations (FPDR) have to be put in place, providing the legal environment for communities to enforce their tenure rights.

In order to assure that the regulations adequately address the problems and needs of local communities, a participatory approach developed by SFDP Song Da has been adopted and applied. The methodology aims at building the farmer’s capacity to analyze their forest resources and traditional regulations, eventually identifying and adopting a set of forest regulations that will best respond to farmer’s and government’s forest management needs. It is furthermore targeted to improve the relationship between Forest Protection Officers and local communities via the establishment of a rapport of trust, respect, and exchange of information.

Three-day village meetings are conducted to facilitate discussions among village representatives, finally resulting in the formulation of FPDRs. Firstly, community members share their ideas and opinions on the purpose of the Forest Protection and Development Regulations and agree upon what they would like to achieve with them. Subsequently, a map of the forest land allocated to the village is drawn to establish a common ground for discussion. In order to facilitate this exercise, participants are asked to delineate features important for their orientation (for example rivers and trails) prior to the identification of forest areas. Respective features and areas are marked using local names to enhance their recognition in the field. Following this, main problems related to forest protection and management are identified, ensuring that FPDRs adequately consider the respective local context. Gradually villagers have to identify regulations concerning the harvesting of forest products, upland clearing and burning, fire prevention, as well as hunting and harvesting of wildlife. The next step is to identify the procedures for fining and compensations, as villagers are often not aware of how to deal with violation cases. Concluding the village meeting, participants have to decide how the forest regulations will be disseminated within the community effectively.

One village was selected in each of the two model communes of the project for the exemplarv establishment of FPDRs. Substantial differences in the extent and status of allocated forest land of both model communes, as well as differences in prevailing socio-economic conditions were likely to result in distinct sets of FPDRs for both villages. The following text aims at sharing the experiences drawn from the two courses implemented in Ta Li and Jol village in the period from the 5th to the 10th of April 2004.
2 Description of Progress

2.1 Establishment of Forest Protection Regulations in Ta Li village

The first course on the establishment of FPDRs was held in Ta Li village, Ea Sol commune, Ea H'Leo district from the 05th until the 07th of April 2004. Apart from 12 villagers, the list of participants comprised two Forest Protection staff at commune and one at district level, one Agriculture and Cadastral officer, one commune extension worker, as well as one Ea H'Leo Forest Enterprise staff.

The forest land allocation (FLA) process has been completed by the 29th of June 2003 with 1128 ha being handed over to Ta Li village via issuance of a community owned Red Book Certificate. Only 29,8 ha (or 2,6%) of the total area allocated actually consists of bare land, legally classified as Ia, Ib and Ic, the rest being covered by natural forests (IIa, IIb, IIIa1, IIIa2, IV). The entire forest land is legally classified as production forest. The composition of the village forest area is presented in Annex 1.

2.1.1 Introduction and objective setting

After a brief introduction of the participants and facilitators, the meaning and importance of participation in the process of FPDRs establishment was emphasized, reminding participants to freely voice their concerns and raise questions whenever emerging. The identification of villagers’ perceptions regarding the main purpose of forest protection regulations revealed an extensive list covering various issues. Besides general statements like enhanced forest protection to ensure that the forest can be passed on to future generations, participants pointed out that protection would be needed to ensure constant supply of drinking water, especially referring to the forest area covering Chu Phot mountain. Further issues expressed the concern to protect wild animal and plant species as well as to prevent soil erosion. One of the major requests related to the need for a legal document enhancing the villager’s capacity in handling the problem of illegal logging.
2.1.2 Mapping

The first exercise consisted of the joint consultation of the map displaying the allocated village forest area. The map scale of 1:10,000 resulted in some inconvenience during the process of labeling streams, mountains, and forest areas using local names. However, apart from these challenges, the exercise proved to be a valuable learning experience for the participants.
from this minor technical problem participants had no problem to identify and delineate the various village forest areas\textsuperscript{1}.

### 2.1.3 Determining problems of forest management

As far as the identification of main problems regarding the forest management is concerned, the most frequently made statement addressed the predominant lack of clarity about the procedure of handling the problem of illegal logging. One case was brought forward, in which an illegal logger had been arrested and brought to the village head, but had somehow managed to escape. As an act of revenge it was said, the violator had later devastated the fields of the farmer who had arrested him. Some participants even admitted that they are afraid to take action, as illegal loggers are often armed and willing to use violence\textsuperscript{2}. Thus, another problem identified by the participants consisted of insufficient equipment of the village’s patrolling teams.

### 2.1.4 Determining regulations for forest product harvesting

In the following, regulations for the harvesting of forest products had to be established. After a list containing the most important forest products has been compiled, participants were asked to determine the subset of products for which they would like to establish harvesting regulations. The final list of products comprised timber, firewood, bamboo-poles and –shoots, fruits of the canarium-tree, as well as sand and earth used as building material (some villagers stated that local companies commercially exploit sand from rivers located in their village forest area).

In order to facilitate the determination of harvesting regulations, participants were divided into three groups and each group provided with a pre-printed table form, containing questions about the forest products, such as the locations where harvesting would be allowed and respective time-periods, the quantities permitted, as well as the modalities of harvesting. Additionally, areas where harvesting would not be permitted and respective fines in case of violations, had to be identified.

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\textsuperscript{1} The final village forest map, containing the land use as a result of the course on the establishment FPDRs can be found in \textit{Annex 5}.

\textsuperscript{2} Similar facts have been reported by Wode (2003). Report on a Community-Based Forest Management Concept. Rural Development Dak Lak (RDDL) Vietnam.
Encouragement was needed to initiate group discussions about the identified forest products and ACO as well as commune level Forest Protection staff were helpful in providing guidance for the single groups. With a total duration of about four hours needed to finally reach consensus between the single groups about harvesting regulations, this exercise was the most time consuming of all. Nevertheless, thorough discussions are believed to be of importance for the process of determination of regulations that are socially acceptable. Facilitators are therefore encouraged to be patient, allowing for sufficient time in the training schedule in order to enable participants to reach consensus.

Five forest areas, comprising about 200 ha were identified as suitable and therefore designated for the harvesting of construction timber. Besides suitability of the forest stands to provide the desired timber in terms of quality and dimension, proximity to the settlement area was among the most important criteria for the decision. The subsequent determination of allowable harvesting quantities resulted in some confusion of the participants. As two groups had stated different cubic meter figures allowed to be cut by each household, the question was asked whether they could estimate how many trees of which diameter that would be, closely referring to the postulation of feasibility of established regulations. As none of the participants was able to come up with an estimate of the number of trees representative of the stated volumes, it was suggested to make the harvesting of trees conditional on the results of the already scheduled course on participatory forest resource assessment and management planning. The respective course enables participants to identify sustainable levels of timber harvesting for their forest blocks with the outcome being respective stem numbers in various diameter-classes to ensure that villagers are enabled to adequately put the results into action.

Harvesting of trees would be strictly prohibited in the sacred forests covering and surrounding Chu Phot Mountain, as according to the existing traditional law. The fine in case of illegal logging was set at 200,000 – 300,000 VND per tree surpassing 30 centimeter diameter and 50,000 – 100,000 VND for each tree up to 30 centimeter dbh.

As far as bamboo, bamboo-shoots, firewood, sand and rocks are concerned, participants agreed to allow community members to satisfy their demand. Commercial exploitation, as well as harvesting of respective products by outsiders, however, would be strictly prohibited. Thus, participants agreed upon respective levels of punishments for each of those products in case of violation.

2.1.5 Regulations for upland clearing and burning

In the course of this exercise a consensus had to be reached about the areas designated for slash and burn agriculture, aiming to stop uncontrolled slash and burn activities, leading to progressive degradation of the village forest resource. According to Decision 178, owners of

3 Decision 178/2011/QD-TTg of November 12, 2001 on the benefits and obligations of households and individuals assigned leased or contracted forest and forestry land
forest land subject to production forest planning are entitled to use up to 20% of the forestry land area without forests for agricultural production. On forest land covered by forests, respective households and individuals are entitled to inter-plant agricultural and pharmaceutical plants.

Being already familiar with the procedure from former exercises, participants discussed eagerly on the topic and came to an agreement in relatively short time. Slash and burn agriculture should be confined to narrow strips (not surpassing the width of 100 meters) along the rivers Ea Sol, Eam Sam and Ea RTeng. Furthermore, land clearing and burning within those strips would only be allowed on patches infested by shrubs and Imperata cylindrical, as no clearing of forests would be permitted. Respective areas have been indicated on the village forest map (refer to Annex 2). As far as the modalities for burning are concerned, participants agreed that it would be mandatory to inform the village forest management board 2 to 3 days in advance, to establish a fire-break with the widths of 5 to 10 meters and not to depart from the spot until the fire would have ceased. The punishment was set at 1,000 VND per m² of illegally burned area.

2.1.6 Establishment of a fire prevention plan

The next issue on the agenda was the discussion about fire prevention in the forest areas. As stipulated in the Forest Protection and Development Law⁴ burning of forests is identified as an illegal activity, especially lighting of fire on dry vegetation in the dry season.

There was some confusion in the course of this exercise. First of all, participants were asked to identify the different causes of fire in their forest. It was stated that fire was used to trigger the germination of natural regeneration enhancing the food supply for their cattle. Besides, fire would also be used to chase wild animals as well as to facilitate the collection of resin that dropped on the forest floor.

However, as participants were instructed that the use of fire for such purposes would not be in compliance with the law, furthermore harming the establishment of natural regeneration, needed for maintaining a viable forest in the long run, Mr. Bui Anh Dung, staff of the Ea H'Leo Forest Protection Unit, entered into the discussion. He stated that annual burning of the ground vegetation stimulates the germination of dipterocarp seeds and furthermore prevents the accumulation of the dry leave layer, thereby reducing the fire risk. Such fire prevention schemes were said to have been implemented by the Ea H'Leo State Forest Enterprise since 1992. The annual planning is carried out by the Forest Protection Department (FPD), issuing directives for the District People’s Committee (DPC). From there, necessary information is passed on to the Communes People’s Committee (CPC), being in charge of providing guidance and instructions for the villages. It was also stated that in the last year guidance on preventive burning has been provided to Ta Li village by the People’s

Committee of Ea Sol commune, having issued instructions to burn the ground vegetation of the entire dry-diptercarp forest area. This was furthermore confirmed by the participants, but was an obvious contradiction to statements made at the beginning of this exercise. With district and commune forest protection staff supporting the preventive use of fire as a silvicultural measure, villagers stated that there would be no need for a fire prevention plan or any regulation prohibiting the use of fire in their forest. The question about the fire risk regarding the semi-deciduous forest stands was answered by simply stating that respective forests would retain a higher moisture content which would naturally prevent fires.

Besides the issues mentioned above annual burning in deciduous and semi-deciduous formations has major ecological impacts (Goldammer et al. 1996). Fire strongly promotes fire tolerant trees, which replace the species potentially growing in an undisturbed environment. Goldammer et al. (1996) even state that many of the monsoon forests of continental Southeast Asia would be reconverted to evergreen rain forest biomes if human-made fires were eliminated (as illustrated in Annex 5). The fire climax deciduous forests (i.e. the forests which result from annual burning over many years) are not necessarily in an ecologically stable condition. Long-term impacts of the frequent fires lead to considerable erosion processes because of the removal of the protective litter layer just before the return of the monsoon rains.

Besides the negative ecological impacts, there is furthermore doubt about the fact that instructions are communicated effectively to villagers, ensuring an orderly and safe implementation of planned burning measures (as initial statements by participants indicated). Thus, current burning activities are likely to be carried out in a disorderly manner. Adequate timing of those activities is of great importance, at least to minimize negative impacts for the upcoming natural regeneration.

Thus, in order to obtain information on the development of natural regeneration in undisturbed conditions, it is necessary to choose some smaller forest blocks and to prohibit all fire and grazing activities strictly. Uncontrolled use of ground fire harms emerging natural regeneration. Substantial reduction of natural regeneration is very likely where fire is used to promote the growth of grasses in order to enhance the food supply for cattle, as has been indicated by the villagers. Protected areas would furthermore be very suitable as demonstration plots, where farmers could be shown the differences in forest structures with and without disturbance at the spot.

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2.1.7 Determining areas designated for cattle grazing

Similar to the exercise conducted for the determination of areas designated for upland clearing and burning, areas had to be identified where cattle grazing would be allowed. At first, the participants stated that they would not need to agree upon a regulation on cattle grazing. In order to assure that awareness would be raised throughout the entire community about the location designated for cattle grazing participants finally indicated one area on their forest map. However, it was stated that there would be no need to determine a suitable level for fining or compensation, as outsiders would never graze in their cattle in the Ta Li village forests and that villagers would already respect the informal agreement about the grazing location.

2.1.8 Regulations for hunting and harvesting of wildlife

This exercise was merely confined to the identification of fines for the hunting of wild animals, as with regard to Decree 17\(^6\), the hunting, keeping, selling and utilization of wild animals and their products is strictly prohibited by law. Thus, the most important wild animals that are encountered in the village forest were identified and respective fines were agreed upon. It was furthermore agreed upon to explicitly prohibit the use of fire for any hunting activity.

2.1.9 Clarification of the procedure of fining, compensation and awarding

As stated in the introduction, enhancement of the relation between local forest users and respective Forest Protection staff is one of the main targets of the trainings on the establishment of FPDRs. As participants stated at the beginning of this training that they face a lack of confidence to deal with violation cases partially due to unclarities about the process of reporting violation cases, this exercise was undertaken very thoroughly.

In order to clarify the procedure from discovering of a violation case until the filing of a report for submission to the Community Forest Management Board, various scenarios were created and acted out together with the participants. Simple pictures were used, showing a person carrying out a violation in the forest and questions were asked about what to do in particular case presented. Main steps were recorded on A0-paper sheets for all participants to see. In the same go participants had to determine who would be entitled to issue violation reports and to ask for compensations to be made by the violator. Furthermore, responsibilities of each villager were identified in order to ensure that the problem of illegal logging can be confronted more effectively in the future. The exercise was concluded by the discussion of how benefits made available via reporting of violation cases would be distributed within the community.

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\(^6\) Decree 17/2002/ND-CP Amendment of Decree 77-CP on the sanctions against administrative violations in the field of forest management and protection and forest product management.
During this exercise it was furthermore revealed that villagers lack knowledge about issuing violation reports, needed for submission to the Commune Forestry Management Board. In a meeting with Mr. Huynh Thien Ly, head of Forest Protection Unit Ea Hleo District, a pre-print form for reporting of respective cases was obtained and has been slightly modified to suit the use by the respective target group. All information needed for the completion of a comprehensive violation case report are contained within this form, which can be found in Annex 4.

2.1.10 Dissemination of Forest Protection Regulations

The final step of the three day village meeting on the establishment of FPDRs is to identify effective ways on how to disseminate the regulations within the community and also make them available to neighbouring villages and outsiders.

First of all, participants stated that they would summon a village meeting where the set of regulations would have to be presented and discussed with representatives of all households to ensure that the regulations are socially acceptable. Directly after the approval of the FPDRs a commune meeting would have to be requested in order to inform the remaining villages of Ea Sol commune about the proceedings. Elaboration of a signboard, containing a map of the village forest area as well as the main important regulations, was identified to be important in order to ensure that outsiders are adequately informed. A separate meeting of the village’s women was furthermore said to be useful, ensuring that the regulations are disseminated within the entire community.

2.1.11 Plenary village meeting

The plenary meeting of Ta Li village was held on the 19th of June 2004, after the completion of the course on participatory forest resource assessment and management planning. The list of participants comprised representatives of 55 households, including 25 women. The preliminary forest protection regulations were presented by the village head, Mr. Ksor Phong, and the head of the village forest management board, Mr. Nay Thoi. After every topic presented, the group was given some time to discuss the issues presented and to come up with suggestions. The following amendments of the preliminary regulations were made:

- Harvesting regulations

  The results of the resource assessment and management planning course were incorporated into the protection regulations, exactly stating where harvesting activities are allowed (for details, please refer to the respective case study report7). It was also agreed

that harvesting activities have to comply with the elaborated management plans and minor adjustments of the level of fines for illegal logging were made. The compensation for cutting of firewood without permission was changed to only comprise living trees, as the harvesting of dead tree is allowed in all forest blocks. Compensations regarding bamboo-shoot (mang) and bamboo (Le, Loo) are only applicable to outsiders. Restrictions on the procurement of sand as building material were dropped, due to the abundance of the resource. However, outsiders need permission to collect sand.

The procedure for harvesting of trees was also clarified:
1) The villager has to make an application to the village forest management board (FMB)
2) If the application gets approved by the FMB it is submitted to the CPC.
3) CPC sends a representative of the FMB to meet a representative of the FMB at village level to identify trees suitable for harvesting.

- **Upland clearing and burning**

Following the results of the participatory forest management planning approach, regulations regarding slash and burn activities were defined in more detail. Restricted areas include Hue Set, Ch Phot, Ea Kham, Eam Sam Nho, Nang Let, Chu Pa and Ea Yu. Although having realised the need to stop shifting cultivation in their forests (an outcome of the management planning), but the need for cultivation land currently forces the villagers to clear additional forest areas. One women voiced her concern about the future, asking what would happen if in five years time land for cultivation would be lacking. The village head informed her that the village forest protection regulations can be updated whenever necessary.

- **Cattle grazing**

No objections to the preliminary regulations, but areas where grazing would not be permitted were explicitly stated. Those areas are Chu Phot, Eam Sam Lon, Eam Sam Nho, Ea Boah, Ea Khang, Ea Yu and Chu Pa (as identified during the management planning course).

- **Hunting and harvesting of wildlife**

Only minor changes to the catalogue of fines for hunting of various wild animals were made. It was furthermore clarified that each villager has the right to confiscate weapons and tools in case of spotting an illegal hunter in the field.

- **Dissemination**

Besides the already made suggestions it was stated that immediately after approval, the FPDRs should be made available to every household. This could be best achieved in form of a poster, containing the most important regulations.
2.1.12 Conclusion and recommendations

Concluding the three days course on the establishment of FPDRs in Ta Li village and the plenary village meeting, the following points can be noted:

The particular situation encountered in Ta Li village, where traditional village regulations are still in place and the forest land has been allocated to the community, was seen to be of advantage for the establishment of village forest protection regulations. Due to the strong sense of a community spirit, consensus about areas designated for certain uses (as for example timber harvesting) or protection could be reached with ease.

Due to the vastness of the allocated forest land and the availability of valuable timber, illegal logging was identified as one of the major problems. In the course of the three day village meeting the procedure of tackling the problem of illegal logging was clarified, carefully explaining the facts as well as acting out various scenarios. First positive results could already be seen, with villagers stopping outsiders that illegally harvest timber from their forests (refer to Figure 2).

As far as the improvement of the relationship of Forest Protection Officers and the local community is concerned it can be noted that despite initial scepticism about the new methodology, participating Forest Protection staff of commune and district gave positive feedback. It was especially acknowledged that the work has been carried out thoroughly, allowing enough time for conveying of crucial matters.

Especially the encountered lack of knowledge about administrative procedures currently results in inadequacy to respond to the problem of illegal logging. This makes the newly introduced approach a valuable tool. By conducting a final village meeting it is furthermore
assured that the regulations reflect the opinion of the entire community and that determined punishments are socially acceptable.

As stated earlier, it is desirable from the silvicultural point of view to set aside some smaller forest areas where burning and grazing should be strictly prohibited. In the short run, such a trail is expected to yield valuable insights about the reaction of natural regeneration to external disturbances, as well as providing a great opportunity to show farmers the results in the field. In the long run (several decades), a considerable shift of forest structure, namely from dry and open forest ecosystems to more closed and semi-deciduous forest formations can be expected in the set aside areas.

2.2 Establishment of Forest Protection Regulations in Jol village

The second course on the establishment of Forest Protection and Development Regulations was held at Jol village, Dak Nue commune, Lak district in the time period from the 8th until the 10th of April 2004. A total of 15 villagers participated in the three day training course, including 1 woman. The training was furthermore attended by the chairman of Dak Nue commune, one member of the Legislation Section of Lak District, one Cadastral Officer of Dak Nue commune, 1 staff of the Agriculture and Cadastral Office, a member of Nam Ka Nature Reserve Management Board and two Forest Protection Officers of Lak district.

The land allocation had been carried out by Lak State Forest Enterprise and ended in 2002 with a total of 213 ha having been allocated to the village. One quarter of that land is covered by bamboo-forest, with only very few trees scattered over the area. The remaining land is legally classified as bare land (refer to Annex 1 for further information about the quantities of allocated forest types). Of the total of 30 households of Jol village only 16 households actually received forest land via individually owned Red Book Certificates, a strong indicator that the land allocation has not been carried out in a participatory way.

2.2.1 Introduction and objective setting

After informing participants about the agenda, the importance of their active commitment in order to come up with regulations relevant to the specific local context was stressed. Although the importance of women had been stressed in the planning phase of this village meeting, no woman was actually participating during the first day. Participants stated that all women would be currently busy with fieldwork and could therefore not join the meeting. However, after repeatedly stressing the importance of women, frequently harvesting and utilizing other forest products than men, participants agreed to at least include one woman during the second and third day. One participant agreed to record the minutes of each exercise, to be attached to the document submitted for approval.

Prior to the determination of regulations, the main objectives participants pursue with the establishment of forest protection regulations had to be assessed. Participants were told to
focus on potential goals to be achieved with the forest protection regulations and three
discussion groups were formed in order to enable shy people to voice their concerns.
Participants drew a very clear picture of what they would like to achieve with the
establishment of forest protection regulations. The most commonly made statements
addressed the desire to stop outsiders from illegally harvesting products from their forests via
the determination of suitable fines. One participant stated that the forest would have no
chance to survive without regulations being put into place. Even to the possibility of passing
on violations to higher agencies, in case villagers would not be allowed to fine the violator
was mentioned. It was also said that the restriction of cattle grazing would be another desired
outcome of the establishment of forest protection regulations.

2.2.2 Mapping
Participants were provided with a present land-use map at the scale of 1:5000, overlaid with
a transparency to facilitate the drawing with whiteboard markers. As turned out in the course
of the exercise, the scale was very suitable. Referring to the contour lines, participants to had
no problems to identify the hills and small mountains surrounding their village. After the
identification and delineation of the village territory, rivers and hills were labeled using local
names. Subsequently, the village settlement area, agricultural fields and finally the various
forest areas (including forest land with no forest cover) were delineated on the map. The
exercise took about one hour and participants were discussing eagerly about the various
features.

2.2.3 Determining problems of forest management
This exercise is carried out in order to assure that the protection regulations address the
main issues, currently compromising the sustainable use of the forest resource. Therefore,
each participant is asked to identify one main problem presently faced with forest
management. The answers are written on cards, collected and put up on the board for
everyone to see. Statements are grouped
to avoid duplications prior to facilitating the
group discussion.

One of the main
problems that was
frequently brought up
addressed illegal
logging. Participants
differentiated between
illegal logging by people
from neighboring
villages, as well as for
professional purposes
(although this is not very likely given the present status of the forest resource) and also mentioned the problem of timber harvesting for own consumption by inhabitants of Jol village without the permission of the respective forest owner. Some participants stated that this would be mainly due to the lacking awareness of land-ownership, while others mentioned that the present land-use conflicts would be primarily due to the unsatisfactory forest land allocation, merely providing 16 households with forest land (and thus land for cultivation). In the following, participants were told to concentrate on the establishment of regulations, suitable to achieve a rational management of the forest resource, closely keeping in mind the unfavorable situation of land allocation.

2.2.4 Determining regulations for forest product harvesting

In order to be able to come up with regulations for the harvesting of various forest products, a list of the various products for which villagers feel the need for regulation, has to be compiled initially. After the decision about the set of products for which regulations are to be established is made, participants have to discuss about location, time, and quantities, suitable for the harvesting of each product. Furthermore, compensations and fines in case of violations have to be agreed upon.

The list of products to be regulated included construction timber from natural forests and afforestation (being of future relevance), bamboo (Lo o for poles and Le, a smaller type used for fencing) as well as bamboo-shoots, firewood, bark of Litsea, as well as Rattan. Additionally, participants wanted to make regulations for the extraction of soil and rocks, used as building material.

Two groups were formed, each provided with a table form containing the main questions to be considered for each product. After 45 minutes of group discussion the results were presented and discussed in front of the whole group until consensus about the regulation for each of the products was reached. It was generally agreed to allow villagers to harvest forest products to satisfy their demand, but permission would have to be obtained from the respective forest land owner prior to any harvesting activity. Thus, with the decision about harvesting being reserved for the individual forest owner, levels of compensations and fines were determined for all of the products.

2.2.5 Regulations for upland clearing and burning

During this exercise, areas, as well as modalities and compensations and fines for slash and burn agriculture have to be identified. This exercise is facilitated by a group discussion, with the main issues agreed upon being written on a pre-printed table form.

Two previously cleared areas were selected for slash and burn agriculture, namely Bon Jiri and Plum (refer to the map displayed in Annex 3). Similar to the harvesting of forest products it was decided that permission by the respective forest land owner is needed prior
to clearing and burning plots in those areas. In the remaining areas of the village forests, slash and burn agriculture would be strictly prohibited. The size of the actual plot to be cleared would depend on the demand of the household and the permission of the owner of the forest land. Burning should only be allowed during April, in the afternoon. As far as technical issues for the burning can be concerned, participants stated that fire-breaks of 7 to 10 meter width are mandatory, that fires are not to be left unattended and that burning has to be carried out starting from the foothill. In case of violation a fine of 200,000VND per sao (equivalent to 1000m²) becomes due. If permission to clear a piece of land from the forest land owner has been granted, the village has to be informed two days in advance.

2.2.6 Establishment of a fire prevention plan

The establishment of a fire prevention plan is guided by following a set of questions, which are written, on an A0-paper sheet for everybody to see. Participants are encouraged to discuss about the various issues addressed by the questions and the main points are written down and copied by the secretary.

This exercise was carried out in the beginning of the second day of the village meeting and one woman was amongst the participants. Firstly, the forest land areas where grouped according to their potential fire risk. Bon Jiri, Plum, Yuk Nul and Muoi Pang were identified to be very prone to fires, while the remaining forest land areas exhibit a lesser risk to catch fire (refer to Annex 3 for information about the location of forest land areas). It was agreed upon that the person detecting the fire is obliged to report to the village immediately and that the village head, the vice-village head and the policeman are mainly responsible for mobilizing the whole village to fight the fire. Three fire protection groups were appointed, each one consisting of six members, responsible for a different part of the village forest area. The question if the fire prevention groups should be remunerated for their efforts was answered referring to the current lack of funding. The next issue that had to be discussed was to which extent other villagers, not included in the forest protection groups, should be obliged to help in case a fire would break out. Once more, a general discussion about the unjust land allocation flared up. The village head argued that if he would permit any villager who did not receive forest land to cultivate some of his land, then of course this person should be obliged to assist in case of a fire. Yet another forest owner, who had apparently received a better plot of forest land commented that he does not share his land with anybody and therefore does not see the necessity to oblige other people in fire prevention. The discussion whether to include all the villagers in case of a fire or merely restrict this obligation to forest land receivers, despite the agreement about joint utilization of the benefits (refer to chapter 2.2.4) on the previous day, went on for a long time until a final agreement was reached. Households which did not receive any forest land should only be allowed to benefit from other household’s forest land, if they make a commitment for fire prevention. The forest-receiving households should be liable to a payment of 30,000VND if refusing to take part in fire preventive measures. The only exemption is households consisting of elderly people. It was furthermore clarified that any villager would have the right to stop people from nearby villages carrying inflammable substances into their forest and that the penalty would be 300,000VND per sao (equivalent to 1000m²) of burned land.
2.2.7 Clarification of the procedure of fining, compensation and awarding

This exercise is normally carried out after the elaboration of the complete set of regulations. However, various questions and statements by the participants revealed an urgent need to clarify the procedures for reporting violation cases, the reason why this exercise was advanced.

Firstly, participants were asked about the immediate steps in case of detecting a violation. In order to clarify the case, a picture was drawn illustrating a person illegally cutting some big trees in the village forest. Gradually, villagers identified the sequence of steps to be followed in the respective case. When it came to the decision about whom should be responsible of issuing a claim for compensation, it was decided that at least three of the following people would be necessary to make a decision: head of the village; vice-head of the village; village policeman; old man of the village; representative of the women's union; the representative of the youth union. The first four persons mentioned would furthermore be responsible for the compilation of a violation case report, which one of them would have to sign, besides the violator. The direct claim for compensation is limited to 200,000VND per violation case. If the violation results in a damage of less than 200,000VND (as determined in the village protection regulations), the case is regarded as a minor violation and the violator is allowed to leave if he has paid the outstanding amount. If, however, the violation results in damage above 200,000VND, a violation report is issued and submitted to the Commune Forest Management Board. The illegally harvested forest products are kept in both cases and villagers have the right to temporarily confiscate the violation means and hand them over to respective Forest Protection staff if necessary.

As far as awarding can be concerned, participants agreed that the person detecting and reporting the case should receive 20% of the reward, the persons dealing with the violation case share 30%, the rest goes into the budget of the village.

2.2.8 Determining areas designated for cattle grazing

In the course of this exercise, consensus is reached about locations where grazing of livestock is permitted. The village forest map is consulted and participants are encouraged to discuss and address their concerns and needs. Despite the fact that grazing of livestock in forest areas subject to production forest planning is permitted by law, forest owners should be informed about the negative impacts the grazing of livestock in forests has on the natural regeneration. This is a well-known silvicultural fact, but awareness is frequently lacking and thus careful explanation, guided by simple drawings should be provided whenever needed. The outcome should be a decision enabling the villagers to identify suitable land for grazing meanwhile ensuring that the major part of their forest resource is being protected.

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8 As stipulated in Article 7, Decision No. 178/2011/QD-TTg of November 12, 2001 on the benefits and obligations of households and individuals assigned, leased or contracted forest and forestry land
At first, participants mentioned the problem to restrict cattle grazing by other villagers on their individually received forest lands. It was also stated that it would hardly be possible to restrict cattle grazing to a few forest land areas. However, after having discussed for some time it was decided that the strips along the streams running through Buon tri, Phok pap, Puong crieng, Muoi pang, Bri vai and Plum, which have already been cleared of weeds and grasses for reforestation would have to be strictly protected from livestock. However, the problem was mentioned that there might be a lack of suitable land for grazing in case that reforestation would be implemented according to the plan. Finally, suitable fines had to be determined and participants decided that for the first two times livestock is encountered in restricted areas, the owner should be warned. If despite warning the livestock would continuously be permitted to graze in restricted areas, fines are due and participants defined various rates according to damages done to planted saplings, upland rice-fields, and hybrid maize.

2.2.9 Regulations for hunting and harvesting of wildlife

The main task of this exercise is to inform the participating farmers about recent government policies, prohibiting the hunting, utilization, trading, and keeping of all wild animals and their products. Thus, applicable fines have to be agreed upon and responsibilities of the individual have to be clarified.

After compiling a list of wild animals that have been encountered in the past and present, the reasons for the decline in abundance and diversity of wild animals were determined. Participants stated that the reduction of forest area was the primary reason and that additionally illegal hunting by outsiders professionally motivated or for own-consumption had been observed frequently. When it came to the clarification about the procedure, the participating Forest Protection Officer informed the farmers that in case the Community Forest Management Board receives a violation case report about illegal hunting, resulting in a charge imposed by the government, the informant would get a share of 30% of the respective charge. Once more, pictures were used to display violation cases and participants were asked to identify suitable ways to deal with the specific problem. Finally, consensus about respective levels of fines was reached, generally stating that for each small deer and wild pig, the village would demand a compensation of 200,000 VND, for smaller animals like weasel, rabbit and hedgehog 50,000 VND, as well as 5,000 VND for various bird species. The hunted animals or their products are confiscated in any case and a violation report issued and submitted to the Commune Forest Management Board.

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9 As stipulated in Decree 17/2002/ND-CP on the amendment and modification of Decree 77-CP on the sanctions against administrative violations in the field of forest management and protection and forest product management.
2.2.10 Dissemination of Forest Protection Regulations

The final step of the three-day village meeting aims at identifying how the regulations can effectively be made available to all households of the village, as well as to neighboring villages and outsiders.

Participants were split into two groups and asked to identify how to ensure that the regulations would be socially acceptable prior to submission for approval. Furthermore, the question about suitable ways of making the regulations known to villagers as well as outsiders was asked. After the groups had finished discussing, the main issues were written on the board. Firstly, participants agreed to organize a plenary meeting to give every villager the chance to discuss about the regulations. Once the regulations are approved, signboards would have to be put in place to inform outsiders. Additionally, meetings of the women’s union and the youth union should be organized. In order to reach the youngest generation of the village, it was suggested that the school should provide some classes about forest protection.

2.2.11 Plenary village meeting

The plenary village meeting for the amendment of the preliminary FPDRs was held on the 17th of June 2004. A total of 28 villagers participated, including eight women. Regulations were presented in front of the group and time for group discussions and suggestions was given after every topic. The most important changes of preliminary regulations are listed in the following:

- **Harvesting regulations**
  
  Besides minor changes of the catalogue of fines for the various forest products, one woman stated that imperata grass should be taken into the regulations, as poor households rely on it as roofing material. Others also mentioned the need to regulate fodder grass, which will be introduced to the village later this year (refer to the respective case study report\textsuperscript{10}). A suitable level of compensation payments was agreed upon for both products.

- **Upland clearing and burning**
  
  After the presentation of preliminary regulations (foreseeing slash and burn activities in two local areas; refer to Chapter 2.2.7), the issue of land allocation flared up. One forest owner who did not taken part in the elaboration of preliminary FPDRs stated that he would clear some land in his plot (outside the foreseen areas), as the foothills of the mountains would

be predominantly covered by bamboo (Le). Thus, the regulation was changed to include all foothills that are not covered by forest of reasonable condition. The question whether a permit from the land owner has to be obtained prior to the clearance of plots for cultivation was denied. Villagers stated that they are afraid to be impolite, in case they would have to deny future requests by landless households. This, however, indicates that the current land allocation does not reflect the villagers need for land.

- **Cattle grazing**

Many villagers argued that prior to land allocation, land was regarded as community property and that it was very easy to confine grazing to certain areas. At present, forest land receivers are afraid that cattle from other villagers is damaging their crops. At first, three areas where grazing should be permitted were agreed upon, but again some villagers opposed until the final agreement to permit grazing anywhere except on cultivated land (including plantations and agroforestry). For the better looking forest areas no such regulation would be needed as weeds would be generally absent.

Remaining regulations (hunting, fire prevention, procedure for fining and compensation and dissemination) were all agreed upon without major changes (refer to respective chapters for details).

![Figure 4: The location of forest land was clarified, initiating the plenary village meeting.](image)
2.2.12 Conclusion and recommendations

The introduction of the participatory approach for the elaboration village level Forest Protection and Development Regulations (FPDRs) has generally been successful. Participants had a clear notion about the objectives of protection regulations and discussed eagerly on the various topics presented. However, the main concern voiced by the farmers addressed the unequal forest land allocation. The issuance of Red Book Certificates to individual households might be favorable for the implementation of reforestation efforts, but it should be ensured that the forest land is equally distributed amongst all households of the village.

Another issue brought up during the village meeting is the lack of suitable areas for cattle grazing in case that reforestation takes place according to schedule (refer to chapter 2.2.8). It is therefore suggested that the project attempts to introduce new fodder species to enhance the food supply for their livestock, starting with Participatory Diagnosis (PD) to enable the farmer to identify current problems and to come up with possible solutions. Existing fodder trials made by the project indicate first success.

Participating Forest Protection staff was again seen to be in favor of the newly introduced approach. Respective personnel were very capable of guiding group discussions, especially promoting group discussions on various crucial issues. Similar feedback was obtained from the Chairman of Dak Nue Commune who joined the entire three-day meeting. He acknowledged the suitability of the presented approach, mainly referring to the importance of participation in order to ensure that villagers get the chance to voice their concerns and to come up with regulations suitable for their specific context.

Regarding the participation of women, it has to be admitted that it was difficult to fulfill the postulation to involve women in the establishment of protection regulations in the course of the village meetings. Only one woman joined the last two days of the training course and did not feel confident to join the group discussion even though the attempt was made by the facilitators to get her involved as much as possible. However, the representative of the women’s union revealed that most decisions (for example regarding forest product harvesting and slash and burn activities) within the household are discussed between wife and husband, but that women are not used to discuss such issues freely in public. Because women’s participation is crucial in the decision making process about forest protection regulations, it is suggested to let the members of the women’s union form a separate group for discussion of the preliminary regulations during the plenary village meeting. This should enable them to incorporate their knowledge and ideas into the set of regulations prior to submission for approval.
3 Monitoring and periodical review

This chapter provides a brief overview of responsibilities at different administrative levels in implementing, monitoring, as well as periodically reviewing forest protection regulations.

**Implementation and monitoring**

At district level, the forest protection station is the core assisting body to the districts people’s committee in monitoring the enforcement of the regulations. The commune should organize a village meeting to inform villagers about amendments of regulations by the district and commune in the approving process. It furthermore assigns a person to check and monitor the collection of fines at the village level and handle commune level violations. It is therefore necessary that the commune receives a copy of all village regulations. The village forest management board assigns one of its members to be responsible for enforcing, monitoring and evaluation of the regulation. Forest protection groups are nominated, responsible for regularly patrolling the village forest. Following the approval of regulations, a village meeting for starting the enforcement should be held. In this meeting, every villager’s responsibility should be clarified, as well as a seasonal forest patrolling plan and fire prevention measures be set up. Signboards and posters should be made and distributed as regular reminders. An annual village conference is necessary to review and evaluate the enforcement of the regulations. Forest protection officers should participate in these village meetings to support villagers in handling constraints and difficulties.

**Regular evaluation**

Review and adjustment of FPDRs should take place every 3 to 5 years or even earlier in case policy changes occur. After 3 to 5 years implementation, the village may gain experience in forest protection and the application of FPDRs. Therefore, villagers should review their FPDRs and decide how to readjust them to the new situation. Following the same procedure as during the establishment of FPDRs, a village meeting will be held to discuss and if necessary adjust, rewrite and submit the new FPDRs for approval. The role of the forest protection officer is to support this process, facilitate the finalization of the document, follow the approval procedures and disseminate the new FPDRs.

4 Evaluation and follow-up activities

Both courses on the participatory elaboration of village forest protection and development regulations indicated the potential of the approach to be replicable on a larger scale. Participating farmers were aware of the importance to establish forest protection regulations, as revealed during the objective setting. The specific set of regulations, an outcome of group discussions which addresses the concerns of participants while ensuring that the regulations agreed upon are within the legal framework, is believed to be more sustainable than a superimposed set of standardized regulations.
Participating staff of Forest Protection and the Agricultural and Cadastral Office were capable of providing guidance, as well as to promote group discussions about the various topics presented. They acknowledged the need to inform farmers about procedures of handling violation cases, including guidance on the elaboration of violation case reports. This is believed to result in an improved relationship between villagers and Forest Protection staff, as confidence is gained in dealing and reporting violations cases. During the course of both trainings, the importance of participatory forest land allocation, prior to the establishment of village forest protection regulations became apparent. Participation during the process of land allocation is of outmost importance in order to minimize land use conflicts, in return promoting the establishment of effective village forest protection regulations. In this context, the situation encountered in Ta Li village, where traditional community structures are still largely intact, was experienced to be favorable for the elaboration of protection regulations.

As far as the participation of women during the establishment of forest protection regulations is concerned, difficulties have been faced to include a representative number in the village meetings. In order to assure that sufficient women participate during the training courses, their importance has to be emphasized in the run-up of such events. In case that women do not feel confident at all to voice their concerns in a public meeting with men, the women’s union might be suitable to organize a meeting and give women a chance to incorporate their knowledge and make amendments of the village forest protection regulations.

The proceedings of the trainings on forest protection regulation were presented in a provincial meeting, held in Boun Ma Thout on the 18th of June 2004 and representatives of all administrative levels participated (refer to Annex 6 for a list of participants). As far as the evaluation of the method was addressed, improved awareness of villagers about their regulations was said to be of advantage. Further advice addressed the need to revise and supplement some technical issues of the training material, which should be done in collaboration with forest protection staff. Regarding necessary follow up activities, formation and strengthening of village forest protection groups and silvicultural capacity building were mentioned. As far as the project pilot area is concerned, implementation of further training courses is needed in villages where participatory land allocation has already been completed. In this regard it is also desirable to provide training for trainers for forest protection staff, enabling them to adopt and apply the methodology independently in the future.

Regarding impact monitoring of the enforcement of approved regulations, it was said that the number and specific cases of illegal logging, as well as the extent of areas cleared for cultivation are good indicators. However, difficulties were mentioned in cases where villagers are aware of protecting their own forest but still manage other forest areas. Regarding the practical implementation, it was stated that villagers will have to closely monitor activities and impacts, besides ACO nominating a person conducting regular field assessments.
ANNEX 1: Reference data on forest land use of respective villages in the project pilot areas

Table 1: Area of forest land (ha) subdivided into forest types, Ta Li village.

<table>
<thead>
<tr>
<th>Forest Type</th>
<th>Ia, Ib, Ic</th>
<th>IIa, IIb</th>
<th>IIIa₁</th>
<th>IIIa₂, IV</th>
<th>Σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Natural Forest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Dipterocarp Forest</td>
<td>8,2 ha</td>
<td>602,1 ha</td>
<td>160 ha</td>
<td>770,3 ha</td>
<td></td>
</tr>
<tr>
<td>b) Semi-Deciduous Forest</td>
<td>159,7 ha</td>
<td></td>
<td>7,7 ha¹</td>
<td>167,4 ha</td>
<td></td>
</tr>
<tr>
<td>c) Evergreen Forest</td>
<td>66,2 ha</td>
<td>46,9 ha¹</td>
<td>46,9 ha</td>
<td>160 ha</td>
<td></td>
</tr>
<tr>
<td>2) Bare Land</td>
<td>29,8 ha</td>
<td></td>
<td></td>
<td>29,8 ha</td>
<td></td>
</tr>
<tr>
<td>Total forest land allocated</td>
<td>29,8 ha</td>
<td>74,4 ha</td>
<td>808,7 ha</td>
<td>214,6 ha</td>
<td>1,127,5 ha</td>
</tr>
</tbody>
</table>

¹ = Figures had to be added in order to account for the totals; original figures obtained from the village Red Book Certificate.

Table 2: Area of forest land (ha) subdivided into forest types, Jol village.

<table>
<thead>
<tr>
<th>Forest Type</th>
<th>Ia</th>
<th>Ib</th>
<th>Ic</th>
<th>Σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Bamboo Forest</td>
<td></td>
<td></td>
<td>55,4 ha</td>
<td>55,4 ha</td>
</tr>
<tr>
<td>2) Bare Land</td>
<td>95 ha</td>
<td></td>
<td>62,5 ha</td>
<td>157,5 ha</td>
</tr>
<tr>
<td>Total forest land allocated</td>
<td>95 ha</td>
<td>117,9 ha</td>
<td>212,9 ha</td>
<td></td>
</tr>
</tbody>
</table>
ANNEX 2: Ta Li Village Forest Map - displaying various types of land use as identified during the establishment of Forest Protection and Development Regulations
ANNEX 3: Jol Village Forest Map - displaying various types of land use as identified during the establishment of Forest Protection and Development Regulations
### ANNEX 4: Form for reporting violations of forest protection regulations

People’ Committee of …..  

Village:.......................  

No:........../200............  

**SOCIALIST REPUBLIC OF VIETNAM**  

**Independence - Freedom - Happiness**  

---

#### MINUTES OF VIOLATING FOREST PROTECTION AND MANAGEMENT REGULATIONS

Today at ......... date  
in (location where the violation takes place) .............................................  

Representatives of Forest management and protection group including:  

Mr.:..................................................  

Mr.:..................................................  

Mr.:..................................................  

and  

The detector (or the witness):.................................  

make this minutes of violation of forest protection and management regulation to the following persons:

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Occupation</th>
<th>Current residence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

for.................................................................  

Violation exhibits are:  

.................................................................  

Means of action are:  

.................................................................  

This is to proclaim that all the violation exhibits and means of action are taken to the village for settlement as per village forest protection and management regulation.  

Three copies are made of these minutes, read in plenum, and are jointly signed.  

Violator       Detector (witness)     For the FPMG  

People’ Committee of .....  

Village:.......................  

No:........../200............  

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---
ANNEX 5: Example of the evolution of seasonal and perhumid forest biomes in continental and insular Southeast Asia as influenced by fire and fire protection

Source: Goldammer et al. 1996
ANNEX 6: List of participants at the debriefing presentation of the training progress on CBFM; held in Boun Ma Thout on the 18.06.2004

### Province level

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Position/Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ho Vinh Chu</td>
<td>Deputy director of DPI</td>
</tr>
<tr>
<td>2</td>
<td>Vo Xuan Nhun</td>
<td>Expert from DPI</td>
</tr>
<tr>
<td>3</td>
<td>Bao Huy</td>
<td>Professor Tay Nguyen University</td>
</tr>
<tr>
<td>4</td>
<td>Dang Dinh Duong</td>
<td>Department of Natural Resources &amp; Environment</td>
</tr>
</tbody>
</table>

### District level

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Position/Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Y Manh Drong</td>
<td>EaH'Leo District</td>
</tr>
<tr>
<td>6</td>
<td>Huyen Thien Ly</td>
<td>Head of Ea H'Leo Forest Protection Unit</td>
</tr>
<tr>
<td>7</td>
<td>Nguyen Viet Quang</td>
<td>ACO, Lak District</td>
</tr>
<tr>
<td>8</td>
<td>Sao Hao Phi</td>
<td>Forest Protection Unit, Dak Nue commune</td>
</tr>
</tbody>
</table>

### Commune level

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Position/Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Ho Duy Tan</td>
<td>Chairman Ea Sol CPC</td>
</tr>
<tr>
<td>10</td>
<td>Truong Dinh Chinh</td>
<td>Ea Sol commune</td>
</tr>
<tr>
<td>11</td>
<td>Ksor Phong</td>
<td>Head of Ta Li village, Ea Sol commune</td>
</tr>
<tr>
<td>12</td>
<td>Nay Thoi</td>
<td>Head of Ta Li village FMB</td>
</tr>
<tr>
<td>13</td>
<td>Ma Thuc</td>
<td>Training course participant Ta Li village</td>
</tr>
<tr>
<td>14</td>
<td>Phan Quang Vu</td>
<td>Head of Youth Union Ta Li village</td>
</tr>
<tr>
<td>15</td>
<td>Y Dut Tor</td>
<td>Chairman Dak Nue CPC</td>
</tr>
<tr>
<td>16</td>
<td>Dao Dinh Phuong</td>
<td>Head of extension station</td>
</tr>
<tr>
<td>17</td>
<td>Y Be Ong</td>
<td>Extensionist</td>
</tr>
<tr>
<td>18</td>
<td>Y Krang Ong</td>
<td>Head of Jol village, Dak Nue commune</td>
</tr>
<tr>
<td>19</td>
<td>Y Thuot Phok</td>
<td>Training course participant Jol village</td>
</tr>
</tbody>
</table>
Part III:

CASE STUDY REPORT ON
PARTICIPATORY FOREST RESOURCE ASSESSMENT AND
MANAGEMENT PLANNING
Participatory Forest Resource Assessment

And Management

Planning

Case Study Report

Philipp Roth
Dak Lak, April 2004
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Abbreviations

ACO  Agriculture and Cadastral Office
CBFM  Community Based Forest Management
CPC  Commune Peoples Committee
DPC  District Peoples Committee
DPI  Department of Planning and Investment
FLA  Forest Land Allocation
FMB  Forest Management Board
FPDR  Forest Protection and Development Regulations
Ha  Hectare
LUPFLA  Land Use Planning and Forest Land Allocation
RDDL  Rural Development Project Dak Lak
PFRA  Participatory Forest Resource Assessment
1 Introduction

The concept on the establishment of CBFM pilots, passed by competent agencies from provincial to commune level in December 2003 for the RDDL project, provides for a clear sequence of steps to be implemented in order to achieve sustainable forest management, ultimately making an important contribution to poverty reduction. Following Land Use Planning and Participatory Forest Land Allocation (LUPFLA) and the establishment of Forest Protection and Development Regulations (FPDR) at the village level, the management of handed over forestland has to be addressed. In the context of community forestry development in Vietnam, suitable approaches of forest resource assessment and management planning have to be simple enough to ensure their applicability in the rural context. Local forest user groups have to be properly involved in the entire process of management planning, to create a sense of ownership over the results. This sense of ownership results in enhanced willingness and ability to implement the various measures contained within the elaborated management plans. Besides ensuring full participation of local forest users, resource assessment should be undertaken as a joint activity, involving the commune forest management board as technical resource person and extension worker as facilitator. Thus, stakeholders are supported to gain confidence in the techniques, enabling them to independently carry out resource assessment and management planning in the future, reducing the workload of involved agencies like Forest Protection Units.

The implementation of the Participatory Forest Resource Assessment and Management Planning Methodology (PFRA) requires the existence of so-called ideal forest models, which are used as benchmarks. Comparing the actual forest structure (assessed via forest inventory) with the one stipulated by the respective ideal model facilitates the identification of management options at the stand level. Respective ideal models have been elaborated for Dak Lak and Gia Lai provinces and documentation can be obtained from the RDDL project.1

The methodology consists of four major steps: blocking, forest inventory, data analysis and management planning. The demand for forest products is assessed and compared with the supply from respective forest stands, leading to the formulation of management plans at the stand level. Forest blocks are only earmarked for inventory and management planning if being legally classified as production forest and in case that local forest user groups intend to harvest timber within the next planning period (five years). This is in accordance with Decision 04/2004/QD-BNN, stipulating the elaboration of forest management plans in a five-year cycle.

Ta Li village of Ea Sol commune, located in Ea H'Leo District was selected for the exemplary introduction of participatory forest resource assessment (PFRA) and management planning. The forest land allocation (FLA) process has been completed by the 29th of June 2003 with a total of 1128 ha being handed over to Ta Li village via issuance of a community owned Red Book Certificate. The entire forest resource is legally classified as production forest, its composition at time of land allocation is presented in Annex 1. The establishment of Forest Protection and Development Regulations (FPDRs) has been guided by the RDDL project in

April this year. The first part of this report aims at sharing the experiences drawn from the training course implemented in the period from June 25 until July 12.

In case that the allocated forest resource is severely degraded and rehabilitation and reforestation are of primary concern, respective management options have to be elaborated with the local stakeholders. This situation was encountered in Jol village of Lak District, where participatory management planning without forest inventory has been implemented. Proceedings and experiences drawn from this training course are presented in the second part of this report (starting at page 24).
Part I Management planning approach in Ta Li village

2 Description of Progress

2.1 Introduction and Blocking

The list of participants comprised nine inhabitants of Ta Li village, however, no women participated. Ea H'Leo Forest Protection Unit was represented by 4 staff members who alternated in the course of the training. Mr. Nguyen Ngoc Hoa took part on behalf of the Agriculture and Cadastral Office. Three staff members of Ea H'Leo Forest Enterprise joined the first half of the training and were primarily involved in the fieldwork. The commune was represented by a total of four people, two of which being members of the Commune Forest Management Board. The list of participants at district and commune level is presented in Annex 2.

Prior to the first exercise participants were informed about the training schedule and the importance of participation in the entire process of forest management planning was stressed. Due to the fact that community forestry represents a long-term investment and commitment, where immediate benefits of sustainable management are seldom at hand, participants were told to think about their future generations potentially benefiting from sensible management. Time was taken to emphasize the need for forest inventory as a base for reliable management planning, using local examples to demonstrate important issues.

The first exercise consisted of the joint consultation of a map, displaying the allocated village forest area. A topographical map was used, prepared by FPI in 1999, classifying the forest according to volume of the standing stock. The map had been enlarged to a scale of 1:5000, as its original scale of 1:10000 would have resulted in inconveniences. Participants delineated various forest blocks as indicated on the map and came up with local names wherever possible. The area of each forest block was determined overlaying the map with a transparent grid and simply enumerating the number of squares per block (each square being equivalent to 1 ha; refer to Figure 1 on the previous page).

Figure 1: Participants estimating the area of their forest blocks, using a transparent grid
Unfortunately, the map was lacking important features such as small streams, walking trails and the boundary of Chu Phot Mountain, located in the centre of their village forest territory. The latter was of special importance, as participants revealed that the area would be taboo for logging or hunting activities. A comprehensive description of the traditional laws of the Jarai in Ea Sol Commune is given by Junker (1999)\(^2\). Furthermore, as turned out in the initial two days of fieldwork, the displayed volume classification was outdated. This resulted in a map, merely representing a broad overview over the village forest, rather than providing the exact locations of the single forest blocks, prerequisite for forest inventory and management planning.

To overcome these shortcomings, three additional days for field-verification and adjustment of the map became necessary in order to assure that the area of the forest blocks could be determined accurately and to clarify the location of the forest blocks. A GPS receiver was used to mark forest blocks, which were distinguished by local area names. Bearing in mind the opportunity costs of involved farmers, efforts primarily focused on the delineation of those forest blocks where harvesting was said to be carried out in the next planning period (i.e. 5 years). A new map was drawn and presented to the group, before each forest block was described in detail (refer to Annex 3 for details).

2.2 Block description

Following the participatory determination and delineation of forest blocks in the field, pre-printed table-forms, containing a specific set of questions important in the context of forest management planning, were used to make further descriptions. In order to facilitate the participation of reticent and shy people, participants were divided into three groups. As almost the entire village forest area had been visited during the three days of participatory mapping, no difficulties were encountered in the course of this exercise.

\(^2\) Junker, B. 1999. Traditional Natural Resource Management of the Jarai in Ea Sol Commune, Ea H’Leo District, Dak Lak Province. On Behalf of the MeKong River Commission (MRC) and Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)
Referring to the summary table presented in Annex 4, it becomes apparent that forest areas located in proximity to the settlement area, namely Nang Let, Ea Sam Nho (Small Eam Sam), Ea Kham and Chu Pa, are covered by immature forests. In the latter case, participants admitted that a lot of harvesting has been carried out over the last years and that the area formerly belonged to Ea H'Leo state forest enterprise, which also conducted intensive harvesting operations. The lack of trees of suitable diameter for construction was given as the main reason for the decision not to harvest any trees within those areas in the next five years. Regarding Ea Kham, farmers stated that the semi-deciduous forest is generally lacking suitable species for construction timber and that besides the steepness of the terrain, weeds would only be abundant in proximity of the river, where some smaller plots had been cleared for cultivation. Thus, grazing was said to occur only to a marginal extent. However, weeds were identified to be most abundant in the forest blocks Nang Let and Ea Sam Nho, located closest to the village, coinciding with the highest grazing pressure of all forest blocks.

As far as the forest blocks within the areas of Ea Khang and Ea Yu are concerned, both located a bit further away from the settlement areas, the forest type was identified as dry-dipterocarp forest (refer to the preliminary survey for details about the forest types\(^3\)) and stand age was said to be medium, comprising some trees suitable for construction purposes. However, during the delineation of Ea Yu forest block, interviews with participating farmers revealed that the major demand for construction timber (including pepper-poles) is currently satisfied via management of adjacent forests, belonging to Ea H'Leo State Forest Enterprise. This area was said to be under managed by Ta Li villagers traditionally since many generations. The southern and eastern side of Ea Yu borders on the rivers Ea Yu and Ea Sia respectively, while the northern border does not coincide with any distinct natural feature or terrain shape. Participants revealed that they do not know the exact location of the northern village forest boundary. Therefore, guidance was provided with the help of a GPS receiver and the topographical map, walking along the northern boundary of Ea Yu forest.

Grazing was affirmed to be absent in Ea Yu and only occurring to a very low extent in Ea Khang. However, cattle were roaming through the latter at the time of inventory. While the main product harvested in Ea Yu was said to be construction timber, the forest of Ea Khang is additionally managed for the obtainment of firewood and bamboo. Timber harvesting had occurred recently in both forest blocks.

The forest block named Ea Boah directly adjoins Ea Khang at its northern boundary, in total comprising some 107 hectares (refer to Annex 4). The forest was identified to be of matured age, with many trees being suitable for construction purposes in terms of species as well as dimension. Firewood and resin are also amongst the main products obtainable from this forest block. Despite the presence of some weeds, grazing was said to be absent, mainly due to the remoteness. Although having solely cleared some parts of the block for shifting cultivation but not having harvested any trees, participants stated that they intend to harvest trees in this area within the next five years (which was the reason to include it in the subsequent inventory). Illegal logging was furthermore said to have frequently occurred, especially in the northern part of Ea Boah forest block.

---

The forest areas located north and north-east of Chu Phot Mountain are called Hue Set and Ea Sam Lon (big Ea Sam), the latter representing the catchment area along Eam Sam Lon River. Both areas contain dry-dipterocarp forests of mature age, with many suitable trees for harvesting. However, due to the remoteness of these forests, with more than 2 hours of access time needed from the village centre, no harvesting operations by Ta Li villagers were said to have occurred until present. For the same reason, grazing was said to be absent in these forests. The area of Hue Set was visited with the intention to assess the forest condition, as participants had mentioned earlier that they would rely on the management of State Forest Enterprise forests for the satisfaction of their timber demand. A local tractor path was followed, separating Ea Boah from Hue Set in the south, than heading northwards until meeting Ea Sol river (refer to Annex 3). The area enclosed by the trail and Ea Sol River comprised some 99 hectares and for the sake of convenience, mainly referring to the easy identification of this forest block, was called Hue Set. The area eastwards of this trail is called Ea Sam Lon, as its eastern boundary is represented by the homonymous river. However, no area could be calculated, as the southern boundary of this plot has not been demarcated yet.

As became apparent walking along the path between the two blocks, the biggest trees had been frequently logged. Villagers stated, that they did not harvest timber in this area before, mainly holding outsiders responsible, illegally accessing their forests. The remoteness of the area and the accessibility by local trucks currently facilitates illegal logging to a large extent. The magnitude of such activities was observed to be far reaching. Proof was found the northern part of the trail, which has not been expanded allow passing of local tractors, where logs had been processed onsite to be transported manually (refer to Figure 3, right side).

Clearance of plots for shifting cultivation was observed eastwards of the trail, where areas stocked with matured forest had been clear-felled and burned (displayed in Figure 3, left side). Participating villagers stated that they observed these plots for the first time, and that the people responsible for the clearings are not belonging to Ta Li village, but are of the
same ethnic minority (Gia Rai), lacking suitable land for cultivation. Ta Li villagers expressed strong sympathy, allowing those outsiders of same ethnic background to clear plots in their forests.

The current pressure on the forest resource to be partially converted into agricultural land by villagers and outsiders seems to be high, representing a considerable threat for the elaboration and long-term establishment of sustainable forest management in the northern part of Ta Li village forests (especially the areas of Hue Set, Ea Sam Lon and the northern part of Ea Boah). However, the Land Allocation Program (Decision 132/2001/QD-TTg by the Prime Minister), stipulating the provision of some 5000 hectares by local authorities in the Central Highlands to ethnic minority households facing a shortage of farm land, is said to provide Ta Li villagers with additional farm land areas in the near future. Taking the pressure of the existing forestry resource via enabling farmers of Ta Li and surrounding villages to carry out sedentary agriculture, providing suitable land and infrastructure (i.e. irrigation, suitable crop varieties etc.), is therefore seen to be of major significance for the promotion of sustainable CBFM.

The last forest block described was the area covering Chu Phot Mountain. As stated earlier, this area is hold sacred by the villagers, strictly prohibiting any harvesting or grazing activities. Field demarcation was relatively simple, as the border between Chu Phot and adjacent forest blocks is demarcated by large rocks. The northern boundary between Chu Phot and Ea Sam Lon was not established due to the temporal constraint and because villagers indicated that they currently do not harvest products from the Ea Sam Lon forest block. However, to demarcate the boundary was crucial for the calculation of the forest blocks Ea Boah and Ea Khang, as areas had to be calculated due to the upcoming inventory and management planning in both blocks.

2.3 Establishment of sample plots
Following the clarification of forest block locations and areas (refer to Annex 3 and Annex 4 for results), the next step on the agenda was forest inventory. As stated in chapter 2.2, participants revealed that they currently manage adjacent State Forest Enterprise land in order to fulfil their demand for timber. This is why participants were questioned about the suitability of their forest blocks for harvesting – in terms of suitable species, stand structure and age, as well as accessibility. Villagers stated that the forest blocks Ea Yu, Ea Khang and Ea Boah might retain enough suitable trees, although the latter is located far from the village. Another forest block that had been mentioned to contain matured forest was the area called Hue Set. However, the remoteness of the forest block currently results in inadequate protection and thus illegal logging activities as well as clearing for shifting cultivation by outsiders are common problems, as observed during the participatory mapping exercise (refer to Chapter 2.2 for details). That was the reason to focus the current inventory and management planning process on the forest blocks Ea Yu, Ea Khang and Ea Boah (refer to the block description summary table, presented in Annex 4). A comparison between the villagers’ demand for timber with the supply from the sampled forest blocks facilitates the decision making process regarding the question about which forest blocks to include in the current management, in order to ensure that the local demand can actually be satisfied via management of the village forest.
2.3.1 Forest inventory in Ea Khang

The initial block visited for the purpose of inventory was Ea Khang. Three inventory teams were established, each one being comprised of one extension worker responsible for the filling out of the provided sample-plot forms, as well as three farmers. Firstly, teams were instructed how to make a straight transect line with the help of three bamboo sticks and the twenty-meter rope. Then, using the two ten-meter ropes, a first sample-plot was set up along the transect line. Using the coloured diameter-tape (refer to Table 1), trees within the block were measured by the participants, following the technical guidelines (refer to footnote 3 on page 5). Initially, there was some confusion about the fact, that trees with a diameter larger than 8.9 centimetre are additionally assessed regarding their species affiliation and stem-form.

Table 1: Relationship between diameter-classes and colours, as displayed on the coloured diameter-tapes for dry-dipterocarp forests

<table>
<thead>
<tr>
<th>Diameter-class (cm)</th>
<th>0 – 5.9</th>
<th>6 – 8.9</th>
<th>9 – 11.9</th>
<th>12 – 14.9</th>
<th>15 – 17.9</th>
<th>18 – 20.9</th>
<th>21 – 23.9</th>
<th>24 – 26.9</th>
<th>&gt; 26.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>White</td>
<td>Yellow</td>
<td>Black</td>
<td>Stripes</td>
<td>Blue</td>
<td>Dots</td>
<td>Red</td>
<td>Orange</td>
<td>Waves</td>
</tr>
</tbody>
</table>

A distinction is made between trees that are of suitable species and stemform, yielding construction timber and those that are of unsuitable species, unsuitable stemform, or both. The judgment is made by participating villagers (whose demand is to be satisfied by forest management), not by the person recording the data. This resulted in initial confusion as some of the persons recording the data tried to superimpose their ideas upon the participants. However, the situation was clarified and teams enabled to carry out the task independently. Facilitators were only needed to occasionally check the quality of the work and give advice wherever needed.

During the first day, six sample plots were established and teams quadrupled that number.

Figure 4: Sample plot establishment; using two ten-meter lines (yellow) perpendicular to the transect line (green).

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in day two, establishing additional 24 plots. Facilitators guided the group to more or less evenly space the transect lines, distributing the sample plots over the entire block area.

2.3.2 Forest inventory in Ea Yu

As villagers had stated that the forest block Ea Yu contains some trees, which could be harvested within the next five-year period, sample plots had to be established. Being located in the north-eastern corner of the village forest, villagers said that they did not harvest here recently. However, as became apparent in the course of the fieldwork, stumps of recently harvested trees were located in most of the sample plots. The extent of exploitation was seen to be far-reaching, as even on the top of a hill trees had been felled. This might be due to the dense network of small tractor trails covering the entire block, which essentially facilitates the skidding of logs. Participants stated that outsiders are responsible for the illegal harvesting of timber from the block. The question whether they would be able to protect this block from illegal logging in the future due to the recent establishment of forest protection regulations was affirmed. Three groups established 27 sample plots in one day with transect lines covering the entire block area. A strip along Ea Sia River, the eastern boundary of the forest block, had recently been cleared for shifting cultivation. The area was measured with the help of a GPS-receiver and the resulting figure of 1.1 ha was subtracted from the block area, arriving at the final block area of 43 ha.

2.3.3 Forest inventory in Ea Boah

The last and largest block selected for inventory and management planning covers the area locally known as Ea Boah. Comprising 107 ha, a minimum of 35 sample plots has to be established. However, due to the rapid progress of the three inventory groups 77 sample plots were established in two days, equally distributing them over the entire block area. A fraction of the northern part of the block, along the border with the area known as Hue Set, had been cleared for shifting cultivation, including a larger strip along Ea Sol River. Trees were said to have been cut illegally by outsiders, leaving stumps in the entire block. However, the forest still exhibited reasonably good growing condition, with a relatively high density of mature trees.

2.4 Forest product demand assessment

Ideally, this exercise should have been concluded prior to the implementation of fieldwork. However, shortcomings in the organisation, mainly due to the coincidence of the course and the commencing planting season, this exercise had to be postponed. The objective is to acquire the village’s demand for timber and non-timber forest products within the next five-year period. In order to ensure that illiterate people are able to participate, diameters are displayed by colours (refer to Table 1 on page 8) and additional use is made of cut out diameter-circles displaying the various size-classes. The exercise is initiated, asking the participants about the various products they built of timber. Subsequently, the number of trees in the various diameter-classes for each unit of those products is approximated. Together with the number of units needed within the next five-years, the final number of trees can then be calculated.
Due to initial statements made by participating villagers regarding their inability to estimate the number of trees needed for the building of an average house, the whiteboard was used to gradually arrive at the estimated figures. The first question asked concerned the number of compartments, an average house comprises. After a short discussion, participants agreed on four compartments. Thus, a long-house with four compartments was sketched on the board. Subsequently, the amount of timber needed for the various parts was estimated. The tree-diameter needed to produce a stilt was said to be bigger 27 cm (displayed as wave). Timber needed for the other parts of the house is displayed in the demand table (refer to Annex 5). Villagers stated furthermore that about one to two new houses would be built every year and that about one house would have to be rebuild annually, arriving at the final estimate of 12 houses for the next five years.

As far as the demand for timber for the construction of animal stalls is considered, participants referred to the fact that they merely use residues from old houses, which was verified during a short walk through the village. Another product brought up by the villagers was pole-sized timber needed for fencing. They stated that about 3 local truck loads are needed to fence off a home garden of half a hectare. Each local truck carries about 60 to 70 trees, their dimension ranging between 9 and 15 centimetres (diameter-classes black and stripes). As poles needed for fencing have to be replaced every three to five years and each household owns a home garden, the final figure of 22,800 trees was estimated. The resulting enormous demand for pole-sized trees was somewhat unexpected (but reasonable) as other demand assessments carried out with people of same ethnic background, predominantly focussed on the need for construction timber5.

Participants were reluctant to come up with estimates about the quantities of timber needed for pepper-poles, mainly referring to district policy, currently prohibiting the cutting of trees for this purpose. It was furthermore stated that only very few households are wealthy enough to afford required capital inputs (e.g. fertilizer), resulting in a marginal number of trees to be utilised as pepper-poles.

One local truck of firewood was estimated to satisfy the demand of one household for two months. Given the total village-size, comprising 114 households, about 3420 local trucks would be needed in the next five years. However, villagers stated that they would mainly harvest dead trees, as well as making use of residues from illegal logging and clearing of forest areas for slash and burn cultivation. Thus, exact tree numbers have not been approximated, but this might become necessary in the near future, in case that the severe problem of illegal logging and shifting cultivation can be overcome.

Coffins and small grave houses were further products mentioned in the course of the exercise. In general, coffins are made up of one entire tree, with the biggest trees (> 27 cm diameter) of the forest being usually used. Furthermore, four trees of diameter 9 to 11,9 cm are needed for manufacture of the barrow. An additional tree larger than 27 cm diameter, as well as four trees of diameter ranging from 15 to 17,9 cm (used as the corner-poles), are needed for the construction of a traditional grave-house. The final number of trees is displayed in the demand table (refer to Annex 5).

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To the surprise of the facilitators, villagers revealed their intention to build a small forest protection house at the south-eastern corner of their village forest, where the forest area called Nang Let shares border with the provincial route 7. The increased awareness and willingness to act against the problem of illegal logging in the village forest is a result of the establishment of village forest protection regulations (so called FPDRs), implemented by the RDDL project in Ta Li village earlier this year. Participants intent to nominate some persons to ensure permanent control over anybody passing the road through Ta Li village. Respective tree numbers can be found in the demand table (Annex 5).

As far as bamboo is concerned, villagers referred to the main uses, such as backpacks, rice-containers and fencing (Le). They furthermore stated that their village forests contain enough bamboo to satisfy their demand. On the contrary, rattan was said to be insufficient, with only a very small amount to be found in Hue Set. Mushrooms are collected wherever found for own consumption while resin from Chai cuc is sold to local vendors.

2.5 Data analysis and management planning - Ea Boah

The initial step of data analysis comprises the compilation of a list of tree-species, where a distinction is made between species that can potentially be used for construction timber and such which are not suitable for that purpose. Subsequently, the data from the sample-plot forms has to be aggregated in order to calculate the total number of trees in the various diameter-classes for the entire forest block. Histograms are drawn displaying the forest structure and after the introduction of the respective ideal forest model\(^6\) management options are being developed. Then, the village demand is compared to the product availability of the respective forest block, before a management plan at the stand level is finally developed. Participation by the local forest user group throughout the entire process is of outmost importance not only to ensure that information is effectively communicated, but furthermore to create a strong sense of ownership over the results. The latter has been identified to play a key-role regarding the independent continuation of proposed matters, prerequisite for long-term sustainability of forest management in remote areas of Vietnam.

2.5.1 Species list compilation

Prior to the aggregation of sample-plot data, a list of all species contained within the respective forest block has to be compiled. Data recording sheets are therefore distributed evenly amongst participating farmers and each one asked to read out the name of the first previously unmentioned species. The group has to determine for every species whether it is suitable for construction timber. With a total of close to 70 species, of which about 30 had been identified as suitable, this exercise took a bit longer than one hour. However, this list was used during data aggregation of all three blocks.

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2.5.2 Data aggregation

This step is similar for all three forest blocks and is therefore only mentioned once. First of all, participants were told to highlight each row on their sample-plot sheets, containing species which are of timber potential. Subsequently, participants were asked to count the total numbers of trees contained within each sample-plot sheet, first the marked species then the unmarked ones (colour by colour). The exercise took some time, but was completed with great ease after participants got used to the procedure. Using the pre-printed block summary form, involved ACO and Forest Protection staff were then shown how to calculate the total tree numbers of the forest blocks.

Figure 6: Participant highlighting species of timber potential on the sample-plot form

2.5.3 Data analysis

Ea Boah, the largest and most densely stocked forest block included in the inventory, was chosen firstly for data analysis and management planning. This was done to assure that interventions are rather focussing on better forest areas, relieving pressure of the more degraded stands.

The completed block summary form was shown to the participants, who were informed that it contains the number of trees in the various diameter-classes for the respective forest block. Following this, the basic contents of a histogram were carefully explained, before the group was split into two, each guided to draw a histogram – one displaying all the trees of the forest stand, while the other only displays the timber-potential trees. In order to be able to directly compare the height of respective bars of both histograms, care was taken to draw both histograms.

Figure 7: Comparing the tree numbers of Ea Khang forest block with the number postulated by the ideal forest model.
in the same scale (histograms have been redrawn and are presented in Annex 6). Although initially reluctant, participants were soon drawing eagerly. Bars of both histograms were coloured (refer to Table 1 for details), enabling participation by illiterate people. In order to familiarize participants in dealing with histograms, respective bars of both histograms were compared first (e.g. the first bar displaying the total number of all “black trees” with the bar displaying all timber-potential trees in the same diameter-class). It took some time to get farmers confident in comparing the height of respective bars, but at the end of the exercise differences were given in fractional amounts.

As became apparent, the relative amount of timber-potential trees increased with increasing diameter-class. The outstanding height of the bar displaying the largest trees of this forest block was another issue mentioned. Concluding the exercise, participants were informed that the high proportion of utilizable trees in the larger diameter-classes is especially favourable regarding the management of this forest stand for construction timber (refer to Annex 6).

The next step comprised the introduction of a respective ideal forest model, needed as a benchmark against the real situation. A local example was chosen to illustrate the facts before the stem numbers postulated by the respective ideal forest model were drawn on a transparency. The transparency was then overlaid over the histogram showing all trees of Ea Boah forest block and participants were once more asked to compare respective bars of both histograms. Having already become familiar with that exercise during the last step, participants had no difficulties to identify in which diameter-classes tree numbers are lacking in comparison to the number postulated by the ideal model and where the actual number of trees is more abundant. In the first case participants were asked whether the situation would be regarded as good or bad and responded, that wherever the actual number of trees lies below the number postulated by the ideal forest model, harvesting would not be permitted, whereas in the latter case the surplus of trees could be harvested. As displayed in Annex 6, only trees of diameter larger 26.9 cm would be frequent enough to be ready for harvesting while all smaller diameter-classes would have to be protected.

Cut water bottles were used to illustrate the dynamic component of tree growth, demonstrating the forest stand development over the next five to ten years under the assumption that suitable management is implemented. As the real forest structure closely leaned against the respective ideal model (refer to Annex 6), with a more pronounced lack of trees only in the diameter-classes ranging from 21 to 26.9 cm, it was demonstrated that in only ten years time the forest could reach a structure similar to the ideal model, with trees over the entire range of diameter-classes becoming available for harvesting.

**2.5.4 Comparing demand and supply**

The last step prior to the elaboration of a management plan for Ea Boah forest block is the comparison of the availability of main products from the respective forest block (refer to the block description summary table presented in Annex 4) with the village’s demand for such products. The respective table named “table of goals, problems, and opportunities” is presented in Annex 7.
As a management goal for this block, participants stated that they would generally have to protect their forest but could cut some trees yielding timber for construction purposes. Construction timber and firewood had been identified as main products for this forest block during the block description exercise (refer to Chapter 2.2). As far as the first is considered, main species were said to be *Ca Chit* and *Rang*. The demand for timber for the various products was simply copied from the demand table (Annex 5), prior to the calculation of harvestable trees, again referring to the histogram overlaid with the ideal forest model. Due to the unavailability of trees smaller than 27 cm diameter, participants stated that they could substitute the trees of diameter ranging between 24 to 26,9 cm (displayed by orange) by cutting trees larger than 27 cm diameter, instead. The same was stated regarding the trees between 21 to 23,9 cm diameter and participants estimated that 40 trees bigger 27 cm diameter would be needed instead of the originally stated 60 to satisfy their demand. The resulting demand and supply balance for trees above 27 cm diameter resulted in a surplus of about 2700 trees, needed to compensate for the lack of trees in the diameter-classes ranging from 21 to 26,9 cm. As far as problems and opportunities are concerned, participants identified that they could cut enough trees to built coffins and grave-huts, as well as the bigger-sized timber needed for house-building. However, the lack of trees below 27 cm diameter needed for house-building and fencing was identified as a problem, but keeping in mind that this forest block is only the first out of three.

As already stated in Chapter 2.4, the demand for firewood is satisfied via cutting of dead trees, and utilisation of harvesting debris. Merely regarding the forest block Ea Boah, participants stated that not enough dead trees and debris could be located to satisfy the villagers’ demand. However, it was stated that the entire forest would contain sufficient dead trees to currently satisfy the need for firewood, especially from shifting cultivation areas and illegal logging.
2.5.5 Elaboration of the 5-year management plan

The elaboration of 5-year management plans at the stand level represents the final step and product of the methodology presented. Activities are grouped into three broad categories, namely utilization, improvement and protection. Furthermore, respective quantities, times and responsibilities regarding the single activities are identified and written down.

As already identified in the last exercise (refer to Chapter 2.5.4), cutting of big-sized trees for construction purposes (building of houses and coffins), with a total of 823 trees bigger than 27 cm diameter, is the activity listed under utilization. It was furthermore agreed, that harvesting of such trees would have to be in accordance with harvesting regulations in order to assure that sustainable management can be realised effectively. Participants stated that they prefer to evenly distribute the amount of trees to be harvested over the entire five-year period. The village head and the village forest management board was granted responsibility over harvesting activities, especially regarding the suitable selection of trees in the field and monitoring of the maximum number of trees to be harvested. As far as the second category, namely improvement, is considered, participants came up with practical suggestions. Climber cutting was amongst the initial issues addressed. One participant referred to the existing traditional law of Ta Li village, generally prohibiting the cutting of trees if entangled by stranglers. However, it was admitted that in case a particular tree would be of superior quality for house building villagers would make an exception. In this case, the strangler would have to be cut and waited until it has died completely before harvesting the tree. Another option of stand improvement was determined to be pruning of strong branches within the initial two meters of the biggest trees, which besides yielding firewood would also improve the wood quality of potential crop trees. Removal of dead trees, as well as clearing of underbrush was said to be undertaken wherever necessary in order to improve the upcoming of natural regeneration. Depending on the actual situation encountered in the forest, all of these options are implemented within the entire forest block, scheduled to be carried out in the same go as the harvesting operations. This has been done in order to minimize opportunity costs of concerned villagers, being primarily concerned with agriculture rather than having time to carry out laborious forest improvement operations. Besides the responsibilities identified under utilization the youth union was earmarked as an important body, as well as conveying information about the necessary activities to each household. The complete five year management plan is displayed in Annex 8.
Identification and description of measures needed to protect the forest resource is the aim of the last category. Referring to the lack of small-and medium-sized trees, participants stated that activities which necessitate the use of fire (namely hunting and shifting cultivation) are to be banned from the forest block. Additionally, as already identified during data analysis (refer to Chapter 2.5.3 for details), it was stated that harvesting of trees below 27 cm diameter will not be permitted in the entire forest block. Besides village head, village forest management board and three especially assigned forest protection teams, every villager was identified to be responsible for obeying the activities stated under protection.

2.6 Data analysis and management planning - Ea Khang

2.6.1 Data aggregation

The species list compiled during data analysis of Ea Boah was complemented with additional species found in the forest block named Ea Khang and data aggregation was implemented following the same procedure (refer to Chapter 2.5.2). As participants were already familiar with the procedure, data aggregation was completed in about half an hour.

2.6.2 Data analysis

Generally, the same procedure was applied as in the course of data analysis of data collected from Ea Boah. Participating staff of Ea H’Leo Forest Protection Unit and ACO were very helpful in facilitating the group work, encouraging villagers to implement the various tasks. Respective histograms have been redrawn and are presented in Annex 6. Similar to the data analysis in Ea Boah, histograms started from 9 cm diameter upwards for reasons of scale and participants were informed about the situation in the lower diameter-classes. As has already been indicated during sample plot establishment, trees of nearly all diameter-classes were lacking behind the number postulated by the respective ideal model. Especially notable was the lack in the diameter-classes 12 - 14,9 cm and 24 – 26,9 cm. However, the abundance of trees between 15 and 17,9 cm diameter was seen to reach remarkably beyond the ideal model, with more than a third surplus.

2.6.3 Comparing demand and supply

Based on the first table of goals, problems and opportunities (Annex 7), the remaining quantities of timber needed for the various products were copied onto a new table. As far as the availability of trees for harvesting was concerned, data analysis had revealed a large surplus of trees in the blue diameter-class (from 15 – 17,9 cm). Thus, the demand for trees needed to built small grave-huts could be satisfied from this forest block, substituting the trees in the black diameter-class (9 – 11,9 cm) by trees in the blue diameter-class. The next issue was a debate about the trees needed for house building. Trees of diameter ranging between 18 to 20,9 cm (dots) had been identified necessary for roof construction (refer to Chapter 2.4). Participants were asked if they could substitute these trees by trees of the next lower diameter-class (blue), but responded that those trees would not be big enough for the manufacture of the desired beams. Due to the great abundance of trees in the blue diameter-class, farmers were allowed to cut the relatively small amount of 168 trees in the next higher class.
This, of course, is only an exception of the general rule, postulating not to cut any trees in diameter-classes where the actual tree number is smaller then the ideal forest model. However, this decision was additionally justified by the fact that the forest block is more likely to be protected by villagers if they can manage it, especially in the case of Ea Khang (and Ea Poah), being located far from the settlement area (access times between 1 to 2 hrs). Illegal logging has been observed during the establishment of sample-plots, where harvesting of trees with chainsaws and processing of logs onsite was frequently observed (as displayed in Figure 9). Considering the demand of various products built from timber, the problem to obtain trees for fencing remained.

![Figure 9: Processing logs onsite – illegal logging practices in Ea Khang forest block.](image)

### 2.6.4 Elaboration of the 5-year management plan

After specification of the amount of trees to be harvested within the following five-year period, participants stated that measure for improvement and protection are similar to the ones identified for Ea Boah, mainly due to the proximity of both forest blocks. Additionally to already stated protective measures it was stated that regular patrols of three forest protection teams, nominated by the village forest management board, would have to be carried out to gain control over the problem of illegal logging by outsiders. The completed table is displayed in Annex 8.

### 2.7 Data analysis and management planning - Ea Yu and remaining forests

The last forest block to be analysed was Ea Yu, where illegal logging was seen to be reaching furthest during the establishment of sample-plots. This has resulted in a very open forest stand, where crowns of the biggest trees were rarely making contact. The steps of
data analysis were repeated once more and participants were even more confident in drawing histograms and comparing respective bars of all trees and timber potential trees, as well as all trees with the ideal model. Histograms have been redrawn and are displayed in Annex 6. The comparison of the total number of trees within the single diameter-classes with the number of trees of the ideal model revealed that especially in the lower diameter-classes (< 14.9 cm) trees are of very low density. Although the number of trees in the largest diameter-class was seen to reach beyond the one of the ideal model, participants agreed not to cut any trees in this forest block. One reason for this decision was that the demand for medium- and big-sized timber can already be satisfied by harvesting of trees in the forest blocks called Ea Boah and Ea Khang (which was the reason to start the data analysis and management planning with those blocks). Another reason was the strong deficit of trees in the diameter-class from 24 to 26.9 cm, as well as in the lower diameter-classes. Thus, instead of a management plan a so-called protection plan was elaborated, in order to get a commitment by the participants. The same was done for all remaining forest blocks, where no inventory and management planning has been carried out, as harvesting of forest products was not scheduled for the next five years. Improvement options have not been included in these plans, mainly due to the consideration of opportunity costs. The protection plan for all of the seven forest blocks can be found in Annex 9. Participants stated that they see the necessity to prohibit shifting cultivation in their entire forest, but that the need for agricultural land would make it inevitable to permit clearing of land in narrow strips along the main rivers (as already identified during the establishment of forest protection regulations). They furthermore stated that no harvesting of trees should be permitted without prior inventory and management planning. Harvesting of dead trees and debris from shifting cultivation areas or illegally harvested trees within those areas would be permitted to satisfy the demand for firewood and fencing material. Demand for the latter however, cannot be satisfied at present.

2.8 Forest time line

To raise awareness about the changes of the village forest and the underlying reasons, the forest time line exercise is carried out. Firstly, participants were asked to describe their forest thirty years ago, encouraging them to write catchwords on sticky notes which were then put up on the board (inside a drawn circle in the lower left corner). It was generally noted that the forest area was larger and precious trees (for example Cam Xe) were more abundant, especially in the areas known as Nang Let and Ea Kham, located in the vicinity of the settlement area. Furthermore, wildlife was frequently encountered in the forests, amongst the most prominent once comprising bears, tigers, monkeys, deer and even elephants. A second circle was drawn in the upper right corner, representing the present forest condition. It was stated that especially near the village forest degradation is common, or to put it in the words of one participant: "...there are no big and beautiful trees there anymore". The same was said about the abundance of wild animals, which are only seldom encountered today. As reasons for the decline of their forests, illegal logging by outsiders was mentioned manifold, besides shifting cultivation by villagers and outsiders. When it came to the identification of underlying reasons at village level, participants were asked to think about important changes within three periods: from 1970 to 1980, 1980 to 1990 and 1990 until now. The situation thirty years ago was described by lower living standards, lack of schools, electricity and infrastructure. As a result, diseases were common and the village population relatively small, which resulted in a smaller cultivation area, no production of cash crops (like coffee or pepper) and smaller herd of cattle. Lesser and smaller houses were said to have
been built in those days. The infrastructure improved over the last years with the building of the provincial route, a health centre and a new school. Today, the population is said to grow faster and coffee and pepper are being produced by wealthier households to generate some cash income. Underlying causes for the decline and degradation of the village forest were due to increasing exploitation of timber since the 1980s, due to the population increase and illegal logging by outsiders. For the same reasons, clearing of forest areas for agricultural production had increased.

One of the main outcomes of this exercise was the raising of awareness by participants about the ongoing process of forest degradation, realizing that in order to rehabilitate their forests, protection has to be enforced rigidly in the future.

2.9 Silvicultural capacity building

During the participatory elaboration of management plans for respective forest blocks participants obtain information about the number of trees they are allowed to harvest. Sustainable forest management additionally requires silvicultural capacity to make suitable selection of trees to be harvested. Therefore, following the training on inventory and management planning, rural people have to be provided with a simple but effective set of criteria for the selection of trees in the field.

Half a day was scheduled for the introduction and field testing of a set of criteria. The forest block of Ea Khang was visited, promoting discussions about important issues concerning the harvesting selection on the spot. Distributed handouts contained simple pictures illustrating the main issues to allow for participation by illiterate people. After the major issues had been addressed and exemplary acted out, participants were split into two groups. Each group was given the task to apply the set of criteria and select some trees for harvesting within a given area. After twenty minutes both groups joined to discuss their specific choices.
3 Conclusion and recommendations

Concluding the three weeks of implementation of participatory and management planning many insights about problems and opportunities could be obtained. The most important issues are summarized in this chapter prior to giving recommendations about further actions.

**Village specific issues:**

- As revealed during the blocking exercise (Chapter 2.1), current forest management rather focuses on adjacent State Forest Enterprise forests to satisfy the village’s demand for timber. Villagers furthermore stated that those areas are under management by Ta Li village since many generations. If protection of these areas via sustainable management is an objective it might by worthwhile to consider reallocation of these areas.

- One outcome of data analysis is that the current demand for construction timber can be satisfied via management of the forest blocks called Ea Boah and Ea Khang, both located north-east of the settlement area. Sustainable management of this forest blocks is also believed to result in enhanced protection against shifting cultivation and illegal logging by outsiders, as villagers get a stronger sense of ownership over their forests.

- The forest blocks Hue Set and Eam Sam Lon, located furthest north of the settlement area have not been fully demarcated due to the temporal constraint faced. However, a short visit during the participatory mapping exercise revealed a strong threat by outsiders, with many evidences of illegal logging and shifting cultivation encountered within those areas.
Illegal logging was seen to be far reaching, with processing of logs onsite wherever access via small tractor trails is not possible (even reaching as far south as Ea Khang). Immediate action is required to stop the ongoing degradation of these valuable forest stands. The commitment of participants to nominate three forest protection groups in order to patrol those areas on a regular basis might be a first step, but additional support might be needed to effectively protect these large and remote forest blocks.

- Women did not participate during the entire course of the training. Their current engagement with fieldwork was given as the main reason. However, as women harvest different forest products (especially non-timber forest products and firewood) than men, both genders should be adequately represented in the entire process of participatory forest management planning. For the organization of further training courses comprising a representative fraction of women, it might therefore be suitable to contact the village representative of the women’s union.

- Sustainable forest management, frequently consisting of rehabilitation of degraded forest ecosystems rarely produces remarkable short-term benefits for local forest user groups. However, during the course of the training, participants’ awareness of their forests especially regarding current problems and management options was raised considerably. This awareness and commitment to act against ongoing forest degradation can be seen as a key issue for the achievement of long-term sustainable forest management and thus poverty reduction.

**Evaluation of technical procedure:**

- Ideal forest models for the dry-dipterocarp and semi-deciduous forest have been elaborated with the long-term goal to predominantly provide timber for house building, as indicated to be of major concern during several interviews with local forest user groups in Dak Lak and Gia Lai. However, a remarkable demand for pole-sized trees exists, as revealed during the demand assessment in Ta Li village, with approximately 20,000 poles needed over a period of five years. Provision of such timber necessitates a forest structure that significantly differs from the structure envisioned by the existing ideal models. A first step is therefore to clarify whether main species of both forest types are able to regenerate vegetative (i.e. from coppice). With the given basal area of both existing models a new forest structure has then to be generated which provides timber of suitable dimensions. Such an ideal model has been elaborated by Wode and Branney (2003)\(^7\) for the context of CBFM in Son La. Introduction of life-fencing could be a valuable alternative provided that suitable species can be made available in the project area.

- Available cartographical material was of low quality, especially regarding the lack of important natural features such as small streams which are often essential for the orientation of rural people on the map. Field verification revealed that the displayed volume classification was outdated. Therefore, three additional days became necessary in order to delineate the forest blocks scheduled for inventory. Field verification furthermore

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\(^7\) Branney, P. and Wode, B. 2003. Silviculture Guidelines for Community Forest Management in the Song Da watershed. GTZ SFDP Song Da.
revealed valuable insights about current land management and current sources of conflict. It is therefore recommended to implement field verification prior to the establishment of sample plots in future training courses.

- Despite the blocking, no major problems were encountered following the procedure of the methodology and even illiterate participants were able to follow the various steps. Participation is of utmost importance to create a sense of ownership over the results and therefore sufficient time has to be allowed and frequent use of locally known examples should be made.

- Stepwise deduction of forest block timber supply from the village’s demand, starting with the best forest block, produced suitable results.

- Due to recent developments in the province, the schedule of the training course coincided with the beginning of the wet season and farmers were occupied with cultivation. This resulted in organisational shortcomings and delays of the implementation. For future convenience it should therefore be ensured not to schedule any training activities within this period.

- Participating staff from ACO and the Forest Protection Unit was confident in leading the groups through the various exercises, frequently promoting discussions amongst participants to clarify difficult issues.

**Feedback and future outlook:**

The training progress was presented to representatives at all administrative levels in a workshop held in Boun Ma Thout on the 18th of June 2004 (the list of participants is attached in Annex 10). It was acknowledged, that the method makes use of simple but effective techniques, leaving the responsibility over forest management with the villagers. Furthermore, credit was given to the distinction between timber- and non-timber potential trees, as well as the fact that the elaboration of management plans is depending on the village demand and forest block supply. Making use of ideal forest models to ensure a suitable minimum density of trees in forest blocks after harvesting was furthermore acknowledged. As far as weaknesses are concerned, it was stated that forest classification has to be further clarified, agreeing on common criteria as well as determining who will be responsible for this task in the future. Another practical advice addressed the hypothetical need to manage the forest blocks on a rotational basis to ensure a continuous supply of timber, an issue which could be of special importance where the forest resource is in a more degraded state. Finally, the need to translate the management plan into minority language and to prepare it as handouts for every household was brought up.

As far as an immediate plan for action was concerned, the need for further training courses in the project pilot area was mentioned, necessitating the need for training of trainers of respective staff to enable an independent continuation of the presented approach. The establishment of forest management boards (FMB) at the village level is another immediate step necessary for the promotion of CBFM. After approval of forest management plans at district level, annual work plans have to be elaborated with the FMB at village level, scheduling planned activities including respective time-frames and responsibilities. Last but
not least, the need for an effective monitoring system at village level was addressed, needed to ensure that the proposed measures are implemented according to annual work-plans. Decision 04/2004/QD-BNN clarifies responsibilities for timber harvesting at all administrative levels and should be taken as a base for further reference. The only question currently remaining unclear is a practical mechanism of benefit sharing in accordance to Decision No. 178/2011/QD-TTg and Circular No. 80/2003/TTLT/BNN-BTC. To come up with practical solutions within the legally set framework is of outmost importance regarding the implementation of the methodology in the broader context.
Part II Management planning approach in Jol village

4 Description of Progress

4.1 Introduction

The forest land allocated to Jol village is merely stocked with bamboo forest or has been converted into bare land (refer to Annex 1 for details). Thus, management planning based on forest inventory, described in chapters 2 and 3 is not necessary, as the outcome is lying at hand. Allocation of forest land has been done via issuance of individually owned red-book certificates, and a total of 16 out of 30 households received forest land. A total of twelve (including two women) out of the sixteen forest owning households participated in the training course.

First of all, the need to work together as a group rather than focussing too much on individual efforts was stressed. Four main steps were implemented in sequence: two transect walks covering the main land-use and vegetation types of the village; qualitative description of forest stands; qualitative assessment of the village demand for timber; and finally the development of management options, including reforestation and rehabilitation of existing forest remnants.

4.2 Transect walk and qualitative stand description

Two transect walks were carried out to obtain a representative sample of the various land-use types encountered in Jol village. At first a strip of fallow land was passed, covered only by weed locally known as Co hoi, an indicator for good soil fertility. At present, this land is used for planting of subsidiary crops. Men and women share the workload, men focussing primarily on soil preparation while women are engaged in sowing and weeding. The site could potentially be used for planting of hybrid maize (e.g. VN-10) or cassava. The next area that the group came across had been cultivated with wetland rice. Banana and hybrid corn were planted in rows between the rice paddies. Declining yield over the past years due to genetically eroded seed material and acidification of soils was given as the main problem of this area. Rice production was said to be potentially altered via soil improvement and introduction of new seed varieties.

A change of vegetation was encountered reaching the foothill of a small mountain. The area is densely covered by bamboo (Le and Loo) and infested by Imperata grass. Non-purpose trees of small to medium-size are distributed sparsely. Soil is suitable for cultivation but the steep slope restrains villagers from clearing plots for cultivation. Annual slash and burn activities by neighbours were said to considerably harm the bigger bamboo (Loo) and upcoming natural regeneration. Mature Loo and Le have the potential to be sold for manufacture of pulp and some parts of the area are suitable for clearance and establishment of plantations.
The forest area called Dak Buor is located adjacent to the bamboo forest. Conditions are favourable for upcoming of natural regeneration, the reason why a qualitative stand description was made. A pre-printed table-form was used to evaluate the three main vertical strata of trees and participants were encouraged to walk around and discuss about the various issues presented. The stand is immature and participants estimated the age of the largest trees to be around 10 years. Medium-sized trees are sparse, with very few individuals bigger than 15 cm diameter being scattered over the area. Main species included *Gui Sa* (valuable for house building), *R'Cung* and *Rtiu*. Trees of the lower stratum (< 10 cm diameter) are very abundant with some species growing in small groups. The canopy is low but generally closed. Bamboo covers less than 50% of the area and tends to occur almost exclusively in bigger groups. Weeds are only abundant where the canopy is opened, i.e. in spots where bamboo is growing vigorously. If properly protected from disturbances like shifting cultivation and illegal logging, this forest has potential to develop into a productive stand, which is mainly due to the abundance of natural regeneration.

The second transect started at a shifting cultivation field on a slope, planted with upland rice, hybrid maize and cassava. The topsoil had a depth of only 30 to 49 cm, being of low fertility. Erosion and leaching were said to be the main problems encountered. The next vegetation-type located a bit further up the hill is dominated by the smaller specie of bamboo (*Le*). Imperata grass and some shrubs occupy the more open areas and timber-sized trees are distributed very sparsely on top of the hill. Due to the poor soil fertility the area is unsuitable for cultivation. Annually occurring forest fires are due to hunting by villagers and outsiders as well as slash and burn cultivation. Potential uses included clearing for plantation establishment or grazing of livestock.

As villagers revealed that there was one forest area with bigger-sized trees suitable for house building, this area was visited separately to accomplish another qualitative stand description. The forest block is located on a hill named Bong Krieng, surrounded by bamboo and areas cleared for shifting cultivation. Crowns of the biggest trees are spaced not more than one crown extent apart from each other, resulting in a light permeable canopy. Medium-sized trees, ranging between 10 to 25 cm dbh, are distributed evenly over the area. Main species are *Ko Nia*, *Nang Ja*, *Nu Nay*, *Nu Hung* and *Ja rang*, which, apart from the first, are utilizable for construction timber. Bamboo (*Le* and *Loo*) covers the entire area and seems to
impair the upcoming of natural regeneration wherever occurring in high density. Weeds are only present to a marginal extent.

4.3 Demand assessment

Unlike the precise determination of the village timber demand (as outlined in Chapter 2.4) the aim was to merely clarify which timber-dimensions are predominantly demanded. This understanding is needed for the creation of a long-term forest management vision. The approach has originally been developed by SFDP Song Da\(^8\) and the author wishes to express his gratitude for the genuine permission to adopt the training material.

Firstly, participants were asked to list the most important products they built from timber. Houses, animal sheds, fences, furniture and firewood were mentioned. Those products were sketched on paper and participants were provided with small cards, showing three diameter-dimensions, large (bigger than one hand-span), medium (about one hand-span), and small (less than one hand-span). Subsequently, small pictures with either one basket (small quantity), two baskets (medium quantity) or three baskets (high quantity) were distributed, which had to be grouped accordingly. The result is displayed in Figure 12. The outcome was that predominantly big-sized timber is needed for building of animal sheds, houses, furniture and coffins, while small-sized timber is used to a large extent for fencing and firewood. The question whether this timber can be provided by the village forest at present was denied and one participant revealed that forests belonging to Lak State Forest Enterprise have to be managed to satisfy the demand. A rather small fraction of timber for house construction was said to be cut from Bong Krieng.

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4.4 Elaboration of options for long-term forest management

Referring to the qualitative assessment of the forest stands in Chapter 4.1 and the assessment of the village demand in Chapter 4.2, various options for long-term forest management, including allocated forest land which is currently not stocked or severely degraded, have to be elaborated with local stakeholders. As the forest resource has been allocated to individual households the aim was to provide forest receivers with several options from which they can chose to adopt what fits best into the actual context of their allocated forest land. In order to ensure that stakeholders are enabled to make suitable choices regarding the required labour and capital inputs, work-plans have been elaborated for every option. Respective work-plans contain activities, time-periods, as well as responsibilities. The various management options are presented below.

**Plantation establishment**

To provide timber suitable for construction in the near future necessitates the establishment of plantations. Seedlings from species like *Eucalyptus*, *Melia* and *Acacia*, are already available from the local nursery, set up by Jol village with support from the RDDL project. Participants stated that in the future they would also like to plant local species like *Dau* and *Huong*. Areas formerly stocked with bamboo and Imperata grass have already been earmarked and cleared for the establishment of plantations and a total of fifteen households agreed to take part in the establishment and tending operations.

**Table 2:** Work plan for plantation establishment

<table>
<thead>
<tr>
<th>No.</th>
<th>Activity</th>
<th>Time</th>
<th>Responsibility</th>
<th>Village</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Soil preparation</td>
<td>25.6 – 1.7</td>
<td>15 households</td>
<td>Technical knowledge</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Application of Pesticides</td>
<td>5.7 – 15.7</td>
<td>“</td>
<td>Provide pesticides</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Planting</td>
<td>August</td>
<td>“</td>
<td>Technical knowledge</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>1st Weeding</td>
<td>August</td>
<td>“</td>
<td>“</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>2nd Weeding</td>
<td>September</td>
<td>“</td>
<td>“</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>3rd Weeding</td>
<td>November</td>
<td>“</td>
<td>“</td>
<td></td>
</tr>
</tbody>
</table>

**Agroforestry – planting of grafted Cashew**

Agroforestry generally means planting of perennial crops at wide spacing and growing of annual crops between or until there is a canopy closure. Grafted cashew was brought up as a first trial for Jol village, due to the elaborate procedure needed (as displayed in Table 3).
### Table 3: Work plan for the procurement and planting of grafted cashew

<table>
<thead>
<tr>
<th>No</th>
<th>Activity</th>
<th>Time</th>
<th>Responsibility</th>
<th>Village</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Collection of soil for the nursery and preparation of plastic bags</td>
<td>“</td>
<td>“</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Nursery tending</td>
<td>Juli - November</td>
<td>“</td>
<td>“</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Procurement of grafting material</td>
<td>November</td>
<td>“</td>
<td>“</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Grafting</td>
<td>December - January</td>
<td>“</td>
<td>“</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Tending</td>
<td>January – June</td>
<td>“</td>
<td>“</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Soil preparation</td>
<td>February – March</td>
<td>“</td>
<td>“</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Preparation of manure and chemical fertilizer</td>
<td>January – June</td>
<td>Provision of lime</td>
<td>“</td>
<td>Provision of NPK</td>
</tr>
<tr>
<td>10.</td>
<td>Tending</td>
<td>July – December</td>
<td>“</td>
<td>“</td>
<td></td>
</tr>
</tbody>
</table>

**Liberation of natural regeneration**

Plantations with fast growing tree species are needed to satisfy the immediate need for timber. However, where natural regeneration is available, simple measures such as protection and liberation of suitable species gradually leads to rehabilitation of bamboo and weed infested stands. A whiteboard was used to demonstrate the consequences in case a forest gets opened up too much and the qualitative stand descriptions made in Bong Krieng and Dak Buor were used as representative examples for areas where such measures could ideally be implemented. Saplings would have to be liberated three times in regular intervals throughout the wet season to give them a lead against surrounding ground vegetation.

### Table 4: Work plan for the liberation of natural regeneration

<table>
<thead>
<tr>
<th>No</th>
<th>Activity</th>
<th>Time</th>
<th>Responsibility</th>
<th>Village</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Selection of suitable saplings</td>
<td>Juli</td>
<td>Labor</td>
<td>“</td>
<td>Technical knowledge</td>
</tr>
<tr>
<td>2.</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Liberation</td>
<td></td>
<td>“</td>
<td>“</td>
<td>“</td>
</tr>
<tr>
<td>3.</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Liberation</td>
<td>September</td>
<td>“</td>
<td>“</td>
<td>“</td>
</tr>
<tr>
<td>4.</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Liberation</td>
<td>November</td>
<td>“</td>
<td>“</td>
<td>“</td>
</tr>
</tbody>
</table>
**Enrichment planting (sowing)**

Where natural regeneration is occurring in patches, enrichment planting might be an option to promote a more overall distribution. It is important that sowing is implemented in groups instead of strips to reduce damage by livestock.

**Table 5: Work plan for enrichment planting**

<table>
<thead>
<tr>
<th>No.</th>
<th>Activity</th>
<th>Time</th>
<th>Village</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Specify area</td>
<td>Juli</td>
<td>Labour</td>
<td>Technical knowledge</td>
</tr>
<tr>
<td>2.</td>
<td>Field check</td>
<td></td>
<td></td>
<td>Nominates collaborator at district level</td>
</tr>
<tr>
<td>3.</td>
<td>Digging holes – soil turnover</td>
<td>August</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Seedling procurement</td>
<td>August</td>
<td></td>
<td>Financial support</td>
</tr>
<tr>
<td>5.</td>
<td>Seed germination</td>
<td></td>
<td></td>
<td>Technical knowledge</td>
</tr>
<tr>
<td>6.</td>
<td>Sowing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Tending/liberation/fire prevention</td>
<td>December</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Amendment activities</td>
<td>January</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Planting of guinea grass for livestock fodder**

Relieving grazing pressure on natural forests by providing alternative fodder sources for livestock and thus help upcoming natural regeneration is another option that has been discussed with local stakeholders. Establishing and managing Guinea grass requires relatively low inputs of labour. Ideally the site selected for growing Guinea grass should be close to where the cattle are quartered as usually a cut and carry system is used.

**Table 6: Work plan for planting of fodder grass**

<table>
<thead>
<tr>
<th>No.</th>
<th>Activity</th>
<th>Time</th>
<th>Village</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Soil preparation</td>
<td>August</td>
<td>Labour</td>
<td>Technical knowledge</td>
</tr>
<tr>
<td>2.</td>
<td>Seedling procurement</td>
<td>August</td>
<td>“”</td>
<td>Facilitate contact</td>
</tr>
<tr>
<td>3.</td>
<td>Fertilising</td>
<td>August</td>
<td>Provide manure and phosphate</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td>Planting</td>
<td>August</td>
<td>Labour</td>
<td>Technical knowledge</td>
</tr>
<tr>
<td>5.</td>
<td>Tending/weeding</td>
<td>August – December</td>
<td>“”</td>
<td>“”</td>
</tr>
</tbody>
</table>
Planting of bamboo for bamboo-shoot

Villagers revealed the desire to plant bamboo near rivers and to manage it primarily for production of bamboo-shoots (mang). Thus, a work plan was elaborated listing respective activities and time-frames.

Table 6: Work plan for planting of fodder grass

<table>
<thead>
<tr>
<th>No.</th>
<th>Activity</th>
<th>Time</th>
<th>Village Responsibility</th>
<th>Project Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Soil preparation</td>
<td>June</td>
<td>Labour</td>
<td>Technical knowledge</td>
</tr>
<tr>
<td>2.</td>
<td>Fertilising</td>
<td></td>
<td>“</td>
<td>Facilitate contact</td>
</tr>
<tr>
<td>3.</td>
<td>Seedling procurement</td>
<td>July</td>
<td>Provide calcium and manure</td>
<td>Provide phosphate and pesticide</td>
</tr>
<tr>
<td>4.</td>
<td>Acclimatisation of seedlings</td>
<td></td>
<td>“</td>
<td>“</td>
</tr>
<tr>
<td>5.</td>
<td>Planting</td>
<td>August</td>
<td>Labour</td>
<td>“</td>
</tr>
<tr>
<td>6.</td>
<td>Tending</td>
<td>August – December</td>
<td>“</td>
<td>“</td>
</tr>
<tr>
<td>7.</td>
<td>Watering (in case of severe dry-season)</td>
<td></td>
<td>“</td>
<td>“</td>
</tr>
</tbody>
</table>

4.5 Debriefing

Given the portfolio of work plans for the various options of forest management, forest receiving households are left with a choice of one or more measures for their allocated forest land. Thus, organization of a plenary meeting comprising all land receiving households, to determine how many households are actually going to implement the single options on their allocated land was agreed upon as necessary follow up of this training. Subsequently, the project receives feedback from the village in order to be able to provide necessary inputs (such as seedling material, fertilizer and technical knowledge). Some of the options presented (for example the introduction of fodder grass) should be introduced on a small scale (one or two households) and in case of success be replicated using respective villagers as resource persons, which will also minimize project input and guarantee for independent continuation by the villagers.

The final issues that have been addressed in the training was the necessity for fire management as well as progress monitoring at village level, being of special importance once capital and labour investments are made. Participants stated that many wild fires occur in the dry season due to hunting and shifting cultivation activities and agreed to establish fire-breaks to protect their afforestation and agroforestry trials. As far as monitoring is concerned, the need for an annual progress review at village level was clarified, enabling the evaluation of implemented measures and identification of necessary improvements.
Annex 1: Reference data on forest land use of respective villages in the project pilot areas

Table 1: Area of forest land (ha) subdivided into forest types, Ta Li village.

<table>
<thead>
<tr>
<th>Forest Type</th>
<th>Ia, Ib, Ic</th>
<th>IIa, IIb</th>
<th>IIIa¹</th>
<th>IIIa2, IV</th>
<th>Σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Natural Forest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Dipterocarp</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Semi-Deciduous</td>
<td>8,2 ha</td>
<td>602,1 ha</td>
<td>160</td>
<td>770,3 ha</td>
<td></td>
</tr>
<tr>
<td>Forest</td>
<td>159,7 ha</td>
<td>7,7 ha</td>
<td>167,4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Evergreen</td>
<td>66,2 ha</td>
<td>46,9 ha²</td>
<td>160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Bare Land</td>
<td>29,8 ha</td>
<td></td>
<td></td>
<td>29,8 ha</td>
<td></td>
</tr>
<tr>
<td>Total forest land</td>
<td>29,8 ha</td>
<td>74,4 ha</td>
<td>808,7</td>
<td>214,6 ha</td>
<td>1,127,5 ha</td>
</tr>
</tbody>
</table>

¹ = Figures had to be added in order to account for the totals; original figures obtained from the village Red Book Certificate.

Table 2: Area of forest land (ha) subdivided into forest types, Jol village.

<table>
<thead>
<tr>
<th>Forest Type</th>
<th>Ia</th>
<th>Ib</th>
<th>Ic</th>
<th>Σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Bamboo Forest</td>
<td></td>
<td></td>
<td>55,4 ha</td>
<td>55,4 ha</td>
</tr>
<tr>
<td>2) Bare Land</td>
<td>95 ha</td>
<td>62,5 ha</td>
<td>157,5 ha</td>
<td></td>
</tr>
<tr>
<td>Total forest land allocated</td>
<td>95 ha</td>
<td>117,9 ha</td>
<td>212,9 ha</td>
<td></td>
</tr>
</tbody>
</table>
Annex 2:  List of participants at district and commune level – PFRA training course Ta li village

At District level

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nguyen Ngoc Hoa</td>
<td>Vice head of ACO</td>
</tr>
<tr>
<td>2</td>
<td>Hoang Anh Kiet</td>
<td>Staff of Ea H'Leo Forest Protection Unit</td>
</tr>
<tr>
<td>3</td>
<td>Trinh Ngoc Tri</td>
<td>Staff of Ea H'Leo Forest Protection Unit</td>
</tr>
<tr>
<td>4</td>
<td>Nguyen Trung Lap</td>
<td>Staff of Ea H'Leo Forest Protection Unit</td>
</tr>
<tr>
<td>5</td>
<td>Do Phi Hung</td>
<td>Staff of Ea H'Leo Forest Protection Unit</td>
</tr>
<tr>
<td>6</td>
<td>Huynh Ngoc Dai</td>
<td>Staff of Ea H'Leo Forest Enterprise</td>
</tr>
<tr>
<td>7</td>
<td>Phan Van Quynh</td>
<td>Staff of Ea H'Leo Forest Enterprise</td>
</tr>
<tr>
<td>8</td>
<td>Nguyen Buoc</td>
<td>Staff of Ea H'Leo Forest Enterprise</td>
</tr>
</tbody>
</table>

At Commune level

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Nga Van Thanh</td>
<td>Head of Ea Sol Militia, member of Forest Management Board</td>
</tr>
<tr>
<td>10</td>
<td>Truong Dinh Chinh</td>
<td>Militia of Ea Sol PC</td>
</tr>
<tr>
<td>11</td>
<td>Nay Sar</td>
<td>Policeman of Ea Sol commune</td>
</tr>
<tr>
<td>12</td>
<td>Lu Van Son</td>
<td>Policeman of Ea Sol commune</td>
</tr>
<tr>
<td>13</td>
<td>Nay Loang</td>
<td>Policeman of Ea Sol commune, member of Forest management Board</td>
</tr>
</tbody>
</table>
Annex 3: Ta Li Village Forest Map – displaying the various forest blocks distinguished during the PFRA training course
## Annex 4: Block description summary table

<table>
<thead>
<tr>
<th>Block Name</th>
<th>Size (ha)</th>
<th>Access time</th>
<th>Forest type</th>
<th>Forest age</th>
<th>Harvesting in next 5 years?</th>
<th>Main products</th>
<th>Abundance of bamboo</th>
<th>Last fire occurrence</th>
<th>Ground covered by weed</th>
<th>Grazing pressure</th>
<th>Logging history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nang Let</td>
<td>45,5</td>
<td>&lt; 1 hr</td>
<td>Dry-Dipt.</td>
<td>young</td>
<td>no</td>
<td>some</td>
<td>annual</td>
<td>&gt; 50%</td>
<td>high</td>
<td>2003/2004</td>
<td></td>
</tr>
<tr>
<td>Ea Sam Nho</td>
<td>&lt; 1 hr</td>
<td>both</td>
<td>Dry-Dipt.</td>
<td>young</td>
<td>no</td>
<td>some</td>
<td>annual</td>
<td>&gt; 50%</td>
<td>high</td>
<td>2003/2004</td>
<td></td>
</tr>
<tr>
<td>Ea Kham</td>
<td>20,3</td>
<td>&lt; 1 hr</td>
<td>Dry-Dipt.</td>
<td>young</td>
<td>no</td>
<td>some</td>
<td>annual</td>
<td>&lt; 50%</td>
<td>Low</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Chu Pa</td>
<td>72,9</td>
<td>1 – 2 hrs</td>
<td>Dry-Dipt.</td>
<td>young</td>
<td>no</td>
<td>some</td>
<td>annual</td>
<td>&lt; 50%</td>
<td>medium</td>
<td>2003/1998</td>
<td></td>
</tr>
<tr>
<td>Ea Yu</td>
<td>43</td>
<td>1 – 2 hrs</td>
<td>Dry-Dipt.</td>
<td>medium</td>
<td>yes</td>
<td>construction timber/bamboo</td>
<td>some</td>
<td>Only in areas of shifting cultivation</td>
<td>&gt; 50%</td>
<td>No grazing</td>
<td>2004/2004</td>
</tr>
<tr>
<td>Ea Khang</td>
<td>50</td>
<td>&lt; 1 hr</td>
<td>Dry-Dipt.</td>
<td>medium</td>
<td>yes</td>
<td>construction timber/firewood/ Bamboo</td>
<td>plenty</td>
<td>annual</td>
<td>&lt; 50%</td>
<td>Low</td>
<td>2002/2004</td>
</tr>
<tr>
<td>Ea Boah</td>
<td>107</td>
<td>1 – 2 hrs</td>
<td>Dry-Dipt.</td>
<td>mature</td>
<td>yes</td>
<td>construction timber/firewood</td>
<td>some</td>
<td>annual</td>
<td>&lt; 50%</td>
<td>no grazing</td>
<td>never</td>
</tr>
</tbody>
</table>

**Remarks:**

1. Blank fields indicate that the respective area has not been delineated.
2. Three categories: less than one hour; one to two hours; more than two hours.
3. Two categories: dry-Dipterocarp forest; semi-deciduous forest (including evergreen forest).
4. Three categories: matured; medium; young.
5. Only for blocks, where harvesting of forest products is intended within the next 5 years.
6. Three categories: none; some; plenty.
7. Three categories: none; less than 50% of ground covered; more than 50% of ground covered.
8. Four categories: none; low; medium; high.
9. First number indicates the year of the last green-logging (i.e. living trees), last figure the year of the last dead-wood extraction (primarily firewood).
10. Dry-Dipterocarp forest in the lower part of the area and semi-deciduous forests in the transition zone towards Chu Phot mountain.
11. Participants referred to small ground-fires, spreading rapidly throughout the block.
12. Participants could not remember exact dates, but stated that both would have been more than five years ago.
13. Villagers stated that they have only cleared some areas for slash and burn cultivation in the block, but that illegal logging by outsiders is taking place every year.

**Annex 4: Block description summary table (continued)**
<table>
<thead>
<tr>
<th>Block Name</th>
<th>Size (ha)</th>
<th>Access time</th>
<th>Forest type</th>
<th>Forest age</th>
<th>Harvesting in next 5 years?</th>
<th>Main products</th>
<th>Abundance of bamboo</th>
<th>Last fire occurrence</th>
<th>Abundance of weeds</th>
<th>Grazing pressure</th>
<th>Logging history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hue Set</td>
<td>87,8&lt;sup&gt;14&lt;/sup&gt;</td>
<td>&gt; 2 hrs</td>
<td>Dry-Dipt.</td>
<td>mature</td>
<td>no&lt;sup&gt;15&lt;/sup&gt;</td>
<td>none</td>
<td>annual</td>
<td>&lt; 50%</td>
<td>none</td>
<td>no grazing</td>
<td>never</td>
</tr>
<tr>
<td>Ea Sam Lon</td>
<td>&gt; 2 hrs</td>
<td>Dry-Dipt.</td>
<td>mature</td>
<td>no</td>
<td>none</td>
<td>none</td>
<td>annual</td>
<td>&lt; 50%</td>
<td>none</td>
<td>no grazing</td>
<td>never</td>
</tr>
<tr>
<td>Chu Phot</td>
<td>1-2 hrs</td>
<td>Semi-Dec.</td>
<td>mature</td>
<td>no</td>
<td>plenty</td>
<td>never</td>
<td>&gt; 50%</td>
<td>no grazing</td>
<td>never&lt;sup&gt;16&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:

<sup>14</sup> Western part of Hue Set, as delineated during the participatory mapping exercise.
<sup>15</sup> Villagers stated that the forest would be too far away for timber-harvesting.
<sup>16</sup> Due to the sacredness of Chu Phot Mountain.
Annex 5: Village product demand table

<table>
<thead>
<tr>
<th>Product</th>
<th>Household requirement per unit of product</th>
<th>Village requirement in the next 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>12 houses to be built:</td>
</tr>
<tr>
<td>10 trees (stilts/pillars)</td>
<td></td>
<td>156 trees</td>
</tr>
<tr>
<td>3 trees (beams)</td>
<td></td>
<td>588 trees</td>
</tr>
<tr>
<td>20 trees (planks - wall)</td>
<td></td>
<td>60 trees</td>
</tr>
<tr>
<td>15 trees (planks - floor)</td>
<td></td>
<td>168 trees</td>
</tr>
<tr>
<td>5 trees (roof)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 trees (roof)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 trees (roof)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 trees (roof)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 tree (doorframe)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>⇒ one to two new houses and one house to be rebuild each year.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merely residues from old houses used to construct stalls for domestic animals.</td>
<td></td>
<td>No assessment needed, as no trees are going to be cut for this product.</td>
</tr>
<tr>
<td>Demand for firewood satisfied by harvesting of dead trees, residues from logging and trees harvested for slash and burn agriculture:</td>
<td></td>
<td>⇒ 3420 local trucks in 5 years for the entire village (114 households)</td>
</tr>
<tr>
<td>⇒ 1 local truck per household every 2 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>⇒ about 648 local trucks each year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated trees needed for one</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coffin, one barrow and one small grave-hut:</td>
<td>About five coffins and grave-houses to be built:</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-----------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>2 trees</td>
<td>10 trees</td>
<td></td>
</tr>
<tr>
<td>4 trees</td>
<td>20 trees</td>
<td></td>
</tr>
<tr>
<td>4 trees</td>
<td>20 trees</td>
<td></td>
</tr>
</tbody>
</table>

- Enough to satisfy village-demand

<table>
<thead>
<tr>
<th>4 trees (pillars)</th>
<th>One forest protection hut to be built:</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 trees or</td>
<td>19 trees</td>
</tr>
<tr>
<td>10 trees (walls)</td>
<td>10 trees</td>
</tr>
<tr>
<td>10 trees (floor)</td>
<td></td>
</tr>
</tbody>
</table>

- One home garden per household
- 3 local trucks for each home garden (~ 0.5 ha)
- ~ 60 to 70 trees per local truck
- Poles needed for fencing in the next 5 years:

- 22,800 trees
- Insufficient to satisfy village-demand
Annex 6: Stem number – diameter distributions

Ea Boah

Stem number - diameter distribution
comparing all trees against timber-potential trees
Ea Boah forest block - 107ha

Stem number - diameter distribution
comparing all trees against the ideal forest model
Ea Boah forest block - 107ha

Annex 6: Stem number – diameter distributions (continued)
Ea Khang

Stem number - diameter distribution
comparing all trees against timber-potential trees
Ea Khang forest block - 50 ha

Annex 6: Stem number – diameter distributions (continued)
Ea Yu

Stem number - diameter distribution
comparing all trees against timber-potential trees
Ea Yu forest block - 43 ha

Stem number [N]

Diameter-class [cm]

0 1000 2000 3000 4000 5000 6000 7000 8000

7405
3863
3822
2548
3743
2309
2627
2229
2079
1035
2866
2229

All trees
Timber potential trees

Stem number - diameter distribution
comparing all trees against the ideal forest model
Ea Yu forest block - 43 ha

Stem number [N]

Diameter-class [cm]

0 2000 4000 6000 8000 10000 12000 14000

12900
12800
7405
3863
3822
2548
3743
2309
2627
2229
2079
1035
2866
2229

Ideal forest model
Tree numbers acquired through inventory
Annex 7: Table of Goals, Problems and Opportunities - Ea Poah

<table>
<thead>
<tr>
<th>Block name</th>
<th>Ea Boah</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management goal for block</td>
<td>Protection and cutting of big timber for construction</td>
</tr>
<tr>
<td>Main products</td>
<td>Timber</td>
</tr>
<tr>
<td>Main species</td>
<td>● Ca Chit</td>
</tr>
<tr>
<td>● Rang</td>
<td>● Huong</td>
</tr>
<tr>
<td>Demand (whole village) within the next five years</td>
<td>Houses (incl. forest protection):</td>
</tr>
<tr>
<td></td>
<td>175 trees</td>
</tr>
<tr>
<td></td>
<td>598 trees</td>
</tr>
<tr>
<td></td>
<td>60 trees</td>
</tr>
<tr>
<td></td>
<td>168 trees</td>
</tr>
<tr>
<td>Coffins and grave houses:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 trees</td>
</tr>
<tr>
<td></td>
<td>20 trees</td>
</tr>
<tr>
<td></td>
<td>20 trees</td>
</tr>
<tr>
<td>Fences:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>22,800 trees</td>
</tr>
<tr>
<td>Product availability in block</td>
<td>3518 trees</td>
</tr>
<tr>
<td>Demand and availability balance</td>
<td>![tree_icon] surplus</td>
</tr>
<tr>
<td></td>
<td>no trees available in other size-classes</td>
</tr>
<tr>
<td>Problems and opportunities</td>
<td>![tree_icon] Opportunities: enough trees of wave, cut to substitute orange and red diameter-classes for houses; coffins can be built</td>
</tr>
<tr>
<td></td>
<td>![tree_icon] Problems: lack of smaller-sized trees to built fences, houses and small grave-huts</td>
</tr>
<tr>
<td></td>
<td>![tree_icon] Problem: not enough firewood obtainable to satisfy demand</td>
</tr>
</tbody>
</table>
### Annex 7: Table of Goals, Problems and Opportunities - Ea Khang

<table>
<thead>
<tr>
<th>Block name</th>
<th>Ea Khang</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management goal</td>
<td>Protection and cutting of medium-sized timber for construction</td>
</tr>
<tr>
<td>for block</td>
<td></td>
</tr>
<tr>
<td>Main products</td>
<td></td>
</tr>
<tr>
<td>Main species</td>
<td>• Ca Chit  ● Cam Xe  ● Huong  ● Le</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand (whole</td>
<td>Houses:</td>
</tr>
<tr>
<td>village) within</td>
<td>168 trees</td>
</tr>
<tr>
<td>the next five</td>
<td>Coffins and grave houses:</td>
</tr>
<tr>
<td>years</td>
<td>20 trees</td>
</tr>
<tr>
<td></td>
<td>20 trees</td>
</tr>
<tr>
<td></td>
<td>Fences:</td>
</tr>
<tr>
<td></td>
<td>22,800 trees</td>
</tr>
<tr>
<td>Product availability in block</td>
<td>2499 trees  ● enough bamboo available</td>
</tr>
<tr>
<td>Demand and</td>
<td>2459 trees  ● surplus</td>
</tr>
<tr>
<td>availability</td>
<td>2915 trees  ● left over</td>
</tr>
<tr>
<td>balance</td>
<td></td>
</tr>
<tr>
<td>Problems and</td>
<td>• <strong>Opportunities</strong>: enough trees to build grave-huts, substituting the trees in black diameter-class by trees in the blue one; for house building additionally allowed to cut dot-trees</td>
</tr>
<tr>
<td>opportunities</td>
<td>• <strong>Opportunity</strong>: enough bamboo (Le) available to satisfy demand</td>
</tr>
<tr>
<td></td>
<td>• <strong>Problems</strong>: lack of smaller-sized trees to built fences</td>
</tr>
</tbody>
</table>
Annex 8: 5-year management plan - Ea Boah

<table>
<thead>
<tr>
<th>Block name</th>
<th>Ea Boah</th>
<th>Block goal &amp; silvicultural system</th>
<th>Protection and cutting of big timber for construction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td><strong>Activity</strong></td>
<td><strong>Description</strong></td>
<td><strong>Quantity/Unit</strong></td>
</tr>
<tr>
<td>Utilisation</td>
<td>Cutting of big-sized trees</td>
<td>for building of houses and coffins</td>
<td>823 trees (&gt;27cm)</td>
</tr>
<tr>
<td>Improvement</td>
<td>Climber cutting, pruning, removal of dead trees, cutting bushes/thorny shrubs</td>
<td>harvesting only permitted if climber has died completely (in accordance to traditional law), facilitation of upcoming natural regeneration</td>
<td>entire block</td>
</tr>
<tr>
<td>Protection</td>
<td>No forest fires, no harvesting of small- and medium-sized trees</td>
<td>prohibition of hunting and shifting cultivation in the forest block, no cutting of trees below 27 cm diameter</td>
<td>entire block</td>
</tr>
</tbody>
</table>
## Annex 8: 5-year management plan - Ea Khang

<table>
<thead>
<tr>
<th>Block name</th>
<th>Objective</th>
<th>Activity</th>
<th>Description</th>
<th>Quantity/Unit</th>
<th>Year</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Utilisation</td>
<td>• cutting of medium-sized trees</td>
<td>• for building of houses and small grave-huts</td>
<td></td>
<td></td>
<td>• village head</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• according to harvesting regulations</td>
<td>● 168 trees (18-20,9 cm)</td>
<td></td>
<td>• village forest management board</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>● 40 trees (15-17,9 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improvement</td>
<td>• climber cutting</td>
<td>• harvesting only permitted if climber has died completely (in accordance to traditional law)</td>
<td>● entire block</td>
<td>X</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• pruning</td>
<td>• facilitation of upcoming natural regeneration</td>
<td>● 50 ha</td>
<td>X</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• removal of dead trees</td>
<td></td>
<td></td>
<td>X</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• cutting bushes/thorny shrubs</td>
<td></td>
<td></td>
<td>X</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Protection</td>
<td>• regular patrols</td>
<td>• prohibition of hunting and shifting cultivation in the forest block</td>
<td>● entire block</td>
<td>X</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• no forest fires</td>
<td>• no cutting of trees in diameter-classes other than stripes (18 - 20,9 cm) and blue (15 - 17,9 cm)</td>
<td>● 50 ha</td>
<td>X</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• protection of remaining stand</td>
<td></td>
<td></td>
<td>X</td>
<td>☐</td>
</tr>
</tbody>
</table>

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Annex 9: Protection plan for remaining forest blocks

<table>
<thead>
<tr>
<th>Block name</th>
<th>Block goal</th>
<th>Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td><strong>Activity</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Protection</td>
<td>● regular patrols (especially Hue Set and Eam Sam Lon)</td>
<td>● no hunting and shifting cultivation in the forest blocks (for the time being, shifting cultivation allowed along the rivers called Ea Sol, Ea Sam and Ea Yu; restricted to areas infested by weeds and bamboo)</td>
</tr>
<tr>
<td></td>
<td>● protection against forest fires</td>
<td>● no cutting of any living trees, but dead trees and debris from illegal logging/shifting cultivation allowed to collect for firewood and fences</td>
</tr>
<tr>
<td></td>
<td>● no harvesting activities without management plan</td>
<td>● the entire area of the mentioned forest blocks</td>
</tr>
</tbody>
</table>
Annex 10: List of participants at the debriefing presentation of the training progress on CBFM; held in Boun Ma Thout on the 18.06.2004

<table>
<thead>
<tr>
<th>Province level</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>District level</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commune level</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>16</td>
</tr>
<tr>
<td>17</td>
</tr>
<tr>
<td>18</td>
</tr>
<tr>
<td>19</td>
</tr>
</tbody>
</table>