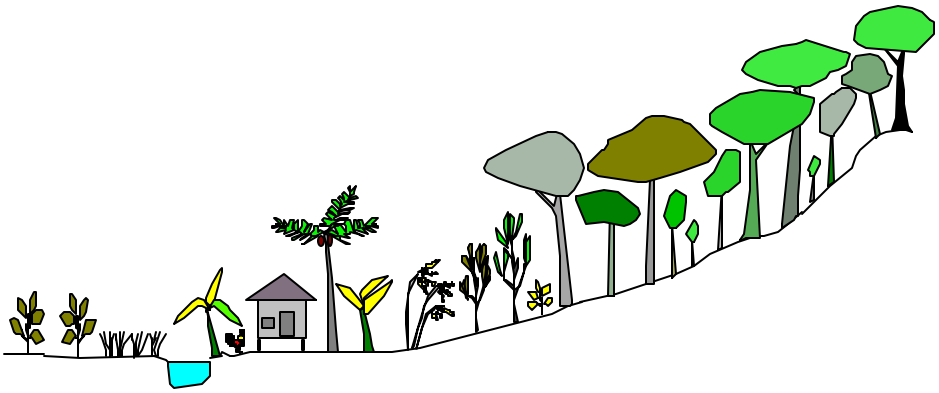
Social Forestry Development Project
Proyek Pengembangan Hutan Kemasyarakatan (PPHK)



Proposal for a

Forest Management System for Community Based Forest Management (CBFM) in Natural Production Forest

Prepared by W. Schindele and M. Lux

Sanggau, November 2001

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1. Introduction

Community Based Forest Management (CBFM) is widely understood as an approach whereby local communities become the main actors in managing their forests. Nevertheless, there is still a broad range of understandings how and where CBFM is implemented. The management approach as developed and proposed by Social Forestry Development Project in West-Kalimantan, Indonesia includes all forest related activities inside and outside existing natural forests. That means it refers to reforestation and land rehabilitation as well as natural forest management.

Regarding **natural forest management** the Social Forestry Development Project together with its counterparts from government institutions and communities follows the principle that the communities in CBFM should not only have the control over forest management but should implement all related activities as far as possible by themselves. This means, from planning over harvesting to marketing and protection the communities will be the main agents, supported by respective governmental and non-governmental institutions.[1]

The present paper aims at a general description as well as an explanation of underlying considerations and the rationale for a **forest management system** that is applicable to communities managing their forests on their own (Community Based Forest Management / CBFM). It departs from the need for simplicity of such a management system and represents the basis for subsequent and detailed guidelines about forest management planning, monitoring and control for CBFM[2].

The forest management system described has been designed for the management of primary forests which have been identified as permanent production forest during participatory village land-use planning (Tata Guna Lahan Desa Kesepakatan / TGLDK) and which are to be managed by a community (Community based forest management / CBFM) with the objective of timber production.

Yet, for its characteristics – especially simplicity, very low ecological impact, low input and a very strong involvement of the communities– it is in principle applicable also to other forest areas (i.e. logged-over forest, secondary forests) and ecologically more sensitive sites (i.e. water catchments, etc.), but needs to be modified accordingly.

The system is a result of longstanding experience of SFDP and it's counterparts in community based forest management and is presently being tested in the project's model area.

In this presentation of the system the **basic requirements and principles** of a forest management system for CBFM will be illustrated in the following section. After this a **silvicultural system** is developed, that is based on simple assumptions from experience in Dipterocarp forests inside and outside the SFDP working area. The system is believed to be sustainable on small units. Thereafter an area based **yield regulation** will be presented

[1] For the distribution of responsibilities refer to the respective SFDP Report (June 2001b).

[2] These guidelines have been finalised in a short term consultancy in 2001 and are currently used for the preparation of a respective decree by the district regent (SFDP June 2001c).

which again has the advantage of simplicity. The section **determination of timber extraction and tree selection** will illustrate how the amount of timber extracted will be determined and how harvested trees are selected. The extraction of timber is determined by tree numbers only while seven selection criteria will ensure sustainability under different aspects. Following this, **harvesting, controlling and monitoring as well as the management planning system** will be briefly outlined. Finally, a short **analysis of economic and institutional aspects** will be given and some **conclusions** from the presented forest management system will be drawn.

2. Principles and basic requirements

Aside from the requirements for sustainability and simplicity the forest management system is based on two fundamental principles that allow for a drastically simplified forest management planning, monitoring and control system:

1. The timber is processed on site with mobile sawmills and thus no skidding with heavy machines is required.
2. There are very low capital and fixed costs.

If the first principle is not met, the system cannot be applied at all. The second is rather a matter of degree. Due to the simplicity of the technology to be used the system can work basically with very low input and thus needs only generalised financial planning. Yet, the higher the capital input and the higher the fixed costs the more detailed the financial planning should become.

The forest management system developed for CBFM is based on the following considerations:

Requirements
- simple and practical
- basics and relevant issues only
- low input (financial, training, extension, supervision)
- easy control and monitoring
- sustainable (economical, ecological, social)
- low risk of resource over-utilisation
- open to further development

The financial capacities of local communities are very limited, which requires a system that is operable with a minimum of investment cost. For the same reason the working capital[3] needs to be minimised. Most of the local people have no experience in commercial forest harvesting and as such their technical skills need to be developed first, which calls for a technology that is robust and simple to be used. Also, the managerial and organisational skills of the local communities are limited and their educational level is most often low too. This calls for simple planning and administration systems which concentrate on the basics and deal with the most relevant issues only.

It is the responsibility of the Forest Service (Dinas Kehutanan) to provide technical assistance to the communities and to monitor and control forest management activities.

[3] This is needed for operational costs, that have to be borne before first revenues are generated (salaries, fuel,…). Cash-flow for CBFM should be as quick as possible.

Taking into account on the one hand the number of communities to be assisted and controlled, once CBFM is introduced throughout the province, and on the other hand the limited capacity of Dinas Kehutanan and other involved parties in terms of human resources, mobility and finance, it is clear that CBFM can only be successfully introduced if the system does not require a high input in terms of technical assistance and if it can be easily controlled and monitored.

The forest management system has to ensure sustainability in economical and ecological terms and shall be designed in such a way, that over-utilization and degradation of the forest resource is almost impossible in order to keep the control efforts low. For marketing reasons it shall comply with the international standards set for certification.

Considering the spatial distribution and the average size of the remaining primary forests, the system needs to be applicable also for smaller forest areas. However, there is a lower limit: The forest resource to be managed by a community must be of a size[4] that allows a continuous and stable flow of revenue to the local communities.

Finally, the system needs to be open to further development, depending on the increasing capacities and skills of the communities.

3. Silvicultural System

The silvicultural system to be applied in the management of primary forest is a selective cutting system. The number of trees to be felled is limited based on silvicultural considerations and takes into account that the system shall be sustainable even on small management units. Only mature trees above a specified cutting limit[5] are harvested if, in addition, the following criteria are met:

- there are sufficient mother (seed) trees in the remaining stand to ensure natural regeneration of the created gaps;
- trees to be extracted must be spatially evenly distributed;
- species to be extracted are mixed;
- they are not located on a steep slope or within a river buffer.

Characteristics
- Selective cutting system
- Limited number of trees
- Species specific cutting limit
- Natural regeneration

Effects
- Sustainable within small units
- Bio-diversity maintained
- Ecological criteria met

[4] Example: The annual cutting area required to justify the investment for mobile sawmill and portable winches is about 50 ha. Taking into consideration a cutting cycle of 20 years, then the minimum forest area to be managed by a community would be 1000 ha.

[5] It is proposed to use at the beginning an overall minimum diameter for all species. At a later stage species (group) specific cutting limits can be introduced, which would have the advantage, that bio-diversity is not changed in favour of species which grow smaller in size by over-using species which grow big. It is based on the fact, that tree growth is to a large extent species specific. Species specific cutting limits can be calculated by analysing already existing inventory data of primary forests within (West-) Kalimantan.

The decision which tree is to be felled is done on-site in the forest prior to felling (timber cruising) by using a simple set of criteria (refer to Table 3).

The maximum number of trees to be extracted is based on the following considerations:

Tropical forests are uneven-aged and multi-structured. Trees die individually and the gaps created in this way are soon regenerated naturally mainly by dipterocarp species (gap opportunists).

The silvicultural system applied follows this principle by limiting the opening of the forest to 20% which is equal to 2000 m^2 per ha (Table 1). This means that with 5 periodic cuts (i.e. 10.000 m^2 divided by 2000 m^2 = 5) the total area is theoretically cut and regenerated.

The average gap size (area to be regenerated) created by a falling tree is estimated[6] at about 200 m^2. It follows that a maximum of 10 trees per ha can be extracted at each periodic cut (i.e. 2000 m^2 divided by 200 m^2= 10). This maximum number will be reduced according to the criteria shown in Table 3. As the economic threshold in terms of m^3 harvestable volume is quite low, forest operations are also profitable with far less than 10 trees per ha are to be harvested.

Table 1: Calculations for tree extraction and cutting cycle

20% opening of forest	10.000 m^2 * 0.2 = 2000 m^2
Number of cuts to regenerate whole area	10.000 m^2 / 2000 m^2 = 5
Average gap size	200 m^2 per mature tree
Number of trees to be harvested	2000 m^2 / 200 m^2 per tree = 10 trees
Estimated production period	100 years
Cutting cycle	100 years / 5 = 20 years

The cutting cycle depends on the production period (i.e. the time required for a tree to grow to harvestable size), which is different for different forest types. For dipterocarp forests the production period is set at 100 years which results in a cutting cycle of 20 years (i.e. 100 years divided by 5 rotations). Within this period the gaps will be regenerated naturally. However, to be on the safe side, this needs to be checked before the next cut is being implemented. A production period of 100 years with a minimum cutting diameter of 60 cm would assume an average diameter growth of 0.6 cm per year. This is well below the assumption of 1 cm annual growth that is used so far in the Indonesian selective cutting system (TPTI). Even if this diameter growth will not be reached in certain cases, sustainability will be achieved by applying the criteria mentioned in Table 3.

Both the maximum number of trees to be harvested per cut and the cutting cycle represent a silvicultural ceiling for a simple harvesting system that from the technical point of view bears

[6] Based on experience. This is a conservative estimate as the created gap is not completely cleared from all trees (clear cut equivalent).

a low risk of resource over-utilisation. Ecological sustainability will be ensured by minimum cutting diameter. Economic sustainability for the second and following cuts is again achieved by having low capital and fixed cost, thus having an economic threshold that is far below the maximum allowable number of 10 extracted trees per hectare and cut[7].

For dipterocarp forests the cutting limit is set at 60 cm, however, the biggest trees shall be harvested first. The analysis of various cruising and inventory data has proven, that in primary forests, the average number of trees above 60 cm is in most cases well above 10.

4. Yield Regulation

The yield regulation is based on the described silvicultural and harvesting system. As the silvicultural system is sustainable within small units, yield can be regulated easily based on area control; that means it is based on the area allowed for harvesting per year (Annual allowable cutting area = AAC_{Area}). This is done for each major forest type separately as the production periods are different. The annual allowable cutting area will be determined during the course of management planning.

Characteristics

- Based on silvicultural and harvesting system
- Control by area
- Estimation of minimum harvestable volume

Effects

- Simple
- No resource assessment required

$$AAC_{area} = Area/CC$$

AAC_{area} annual allowable cutting area
Area area of forest type
CC cutting cycle = production period / number of rotations

For economic reasons it is important to know how high is the minimum harvestable volume per year.

$$AAC_{vol} = N*Vol_{tree}*AAC_{area}*f_{inop}$$

N number of trees per ha = 10
Vol_{tree} usable timber volume
f_{inop} correction factor for inoperable areas[8].

[7] In industrial logging operations, harvesting stem-length logs with bulldozers, log loaders an heavy trucks, the lowest volume of commercial wood available before logging operations become profitable is typically 30-40m³/ha. Regarding minimum harvesting volumes with the proposed system refer to table 4.

[8] F_{inop} is an estimate that depends on topography which may vary between 0.7 and 0.9. Steep and inaccessible areas are classified as protection forest (hutan lindung) by the Participatory land use planning (TGLDK) and as such are already excluded from exploitation.

$Vol_{tree} = (Dbh_{stand}^2/4) * Pi * L_{log} * f_{tap} * f_{util} = 2.4\ m^3$

Dbh =cutting limit = 60cm
Pi 3,14
L_{log} average log length[9] = 15 m
f_{tap} taper factor = 0.7
f_{util} utilization factor[10] = 0.8

Following the above considerations a volume of 30m³/ha can be sustainably harvested every 20 years, which would be equal to a yearly harvesting of 1.5m³/ha. Out of the 30m³ due to a utilization factor of 0.8 24m³ will be economically usable.

5. Determination of timber extraction and tree selection

The annual harvesting area is further subdivided into harvesting units of approximately 5 to 15 ha following natural boundaries. The size of the harvesting unit depends on the topography and visibility in the forest. For each unit, the approximate area is calculated. This is necessary to control the number of trees per ha to be exploited[11]. In the absence of natural boundaries (e.g. in lowland forests) square or rectangular block of 10 size shall be surveyed and temporarily marked in the field.

Harvesting starts with the selection of the harvestable trees (timber cruising) based on a set of criteria (refer to Table 3). This is done in two steps.

Characteristics

- Selection of trees to be harvested in the field based on a set of simple criteria by staff of community.
- Participatory cruising

Effects

- Ensures sustainability and ecological requirements
- Simple, low input

First, all trees above the cutting limit are identified and it is checked, whether they stock on inoperable areas (criteria 1-3)[12]. This is done by using a simple tally sheet. These trees are to be marked. Based on the ratio *harvestable trees /total trees above cutting limit* the number of

[9] Has been derived from various cruising data.

[10] The utilisation factor is an allowance for decay, waste and breakage. Taking into consideration, that only short logs are hauled over a short distance, a factor of 0.8 is on the safe side.

[11] Although the measurement of the boundaries in the field represents a certain workload, the time needed for this is much shorter than that for tree mapping. The area can be calculated with the help of GPS measurements, by measuring with compass and tape or by counting of quadrants on topographic maps, if these are available.

[12] Trees which stock on steep slopes or river buffers are not to be replaced by other trees, otherwise the remaining area would be opened more than 20%. The reduction in harvestable volume is considered by the factor for inoperable areas.

trees to be selected on the remaining operable area is calculated. This is done in the field immediately after cruising.

Table 2: Example for the calculation of the total number of trees to be cut on a harvesting block

Harvesting block size	12 ha
Maximum number of trees to be harvested	10 trees/ ha * 12 ha = 120
Total number of trees above cutting limit	179 trees
Total number of harvestable trees	148 trees
Ratio	148/179 = .83
Total number of trees to be cut	120 trees * .83 = 100

In a second step, the trees to be finally harvested are selected (criteria 4-7) and are marked with a serial number.

Table 3: Criteria for the selection of trees to be harvested

No.	Criteria	Justification
1	Dbh above cutting limit	This ensures that only mature and over-mature trees are harvested, silvicultural reasons.
2	Exclude steep slopes (slope > 40°)	Ecological and environmental reasons, safety reasons.
3	Outside river buffers (10 m for small perennial rivers 50 m for rivers and streams)	Protection of riparian zones, environmental reasons.
4	Mother (seed) tree of commercial species within a range of 30 -40 m	This ensures, that gaps can be regenerated naturally, silvicultural reasons.
5	Distance from next tree to be harvested > 20 m	This ensures a more or less even distribution of gaps, silvicultural reasons[13]
6	Change species, if there is choice and take big trees first	Maintenance of bio-diversity, ecological and silvicultural reasons.
7	Consensus with adat land tenure holder	NTFP, sacred places, etc.

Adat land tenure holders should be involved in tree selection. Without their consensus, a tree will not be selected for harvesting.

[13] This criterion takes especially into account that harvestable commercial trees are often unevenly distributed over the area. The application of this criterion will also ensure that from a group of harvestable trees only one at a time could be used. If harvestable trees are very unevenly distributed this will lead to a reduction of maximum harvestable trees per cut.

The verification of these criteria in the field is quite simple and does not require specific knowledge. No measurements shall be made except for the minimum diameter at breast height (DBH), estimations are sufficient. No other data than tree numbers and species have to be collected and no data need to be processed. The data is presented in the form of maps showing the harvesting units and tally sheets showing the total number of trees and the selected ones. The selection of harvestable trees can be done entirely by staff of the community. As such the input required by the Forest Service (Dinas Kehutanan) is limited to monitoring and control only.

By applying these criteria sustainability is ensured and ecological and environmental standards are fulfilled.

6. Harvesting System

Harvested trees are converted into short logs in accordance with market lengths of sawn timber and processed on site with mobile sawmills. If the choice of the saw-milling technique and topography make it necessary, several logs are pulled together by hauling them with portable motor winches to a suitable site close to the felling place before they are processed.

The sawn-timber is carried manually to the block road and is from there transported with a tractor and trailer to the timber store.

This technology has been successfully tested by SFDP and proven to be simple, practical and profitable even under extremely adverse conditions (SFDP April 2001; SFDP June 2001b)[14].

Characteristics

- On-site processing (mobile saw)
- Portable power winch
- Short logs only
- Manual transport of sawn timber

Effects

- No skid trails
- Negligible damage to residual stand

This harvesting system has almost no impact on the remaining stand as no skid trails are required and as the hauling of short logs over a short distance does create negligible damage to the under-storey, only. The only disturbance to the forest is the gap created by felling of the tree and the small area cleared for the processing site. As neither heavy equipment (i.e. bulldozers) is used nor skid trail are required, the impact on the soil is almost nil and as such there are no negative impacts on the environment such as soil erosion and compaction, siltation of rivers and streams, etc.

[14] Apart from the technology described in the a.m. report, SFDP has tested and is being testing several other technical options for on-site processing. These are going to be documented at a later stage.

7. Control and Monitoring

Control and monitoring of harvesting activities shall contribute data for internal and external information with the following purposes:

- Checking whether criteria of sustainability have been followed
- Information of and accounting to community members about activities and production
- Basis for payment of taxes and fees

Characteristics

- Field check of stumps and criteria
- Control of area

Effects

- Low input required
- High transparency for all involved parties

Control and monitoring is done by counting the number of stumps and by checking whether the criteria have been observed. Control of the annual allowable cutting area is done by field checking of the harvesting map.

The modalities for control and monitoring and the penalties to be imposed in case of violation have to be jointly agreed upon between the community and Dinas Kehutanan and are to be specified in the Forest Management Plan.

For internal control representatives of the communities can follow the field checks and even can conduct it themselves in order to check the correctness of the information regarding production.

Payment of levies and taxes to the government should be based on the data received from the control and monitoring system as well. It is proposed that the number of extracted trees becomes the basis for calculation of taxes and fees[15].

8. Management Planning System

The Management Planning System starts from the fact that investment and fixed cost for a community based forest management system as proposed in this paper is very low, and for this reason there is no need for a detailed long-term planning. This refers especially to economic planning, which can be based on rough estimates only. Furthermore, it is assumed that generally communities would not be able to manage and make use of detailed data. For this reason the management planning system as required to start with forest management should focus on the main issues and should not force communities to collect data that they will not be able to use, or make planning that they will not follow later on. The

Characteristics

- Forest Management Plan (20 years)
- Infrastructure and Harvesting Plan (5 years)
- Annual Operational Plan (1 year)

[15] Respective agreements and guidelines have to be developed.

low input management system with low economical and ecological risks can start with a very simple Management Planning System. The planning system can become more detailed as required by the communities, when they gain more experience.

Forest management planning is done on 3 levels.

Forest Management Plan (FMPL)

The planning period of the FMPL is set at 20 years with a mid-term review after 10 years. It shall be prepared jointly by Dinas Kehutanan and the community and contains a detailed planning for a testing (probation) period of three years.

The FMPL is kept short and sticks to the basic issues, but contains all elements required from a long-term management plan. It regulates, among others, the annual allowable cut (AAC), specifies monitoring and control mechanisms and contains a simple economic valuation. It sub-divides the forest according to working circles, districts and compartments which is used as reference for further planning (Forest Management Map).

Infrastructure and Harvesting Plan (IHPL)

The IHPL is set-up for 5 years jointly by the community and Dinas Kehutanan. It specifies the area to be harvested in this period. It contains a detailed plan for the establishment of main access and block roads, specifies the required equipment and infrastructure (i.e. timber store, field office, etc.) and provides a detailed cost and benefit analysis. It further subdivides the compartments into sub-compartments according to adat boundaries.

Annual Operational Plan (AOPL)

The AOPL is prepared by the community but must be officially approved by Dinas Kehutanan. It basically contains a work schedule which specifies where, when and by whom forest management activities are to be implemented and arranges for the required budget.

It determines the areas to be cut based on available work force and interests of the community members and further sub-divides them into harvesting units of approximately 10 ha.

9. Economic and Social Considerations

Due to the low investment cost for the harvesting equipment the forest management system is profitable even under the distorted market conditions that community based forest management is facing at the moment[16].Under more favourable conditions it would be even highly profitable and competitive with other forms of forest management (SFDP June 2001b).

In the following table key economic figures are given depending on the annual cutting area, which have been calculated based on recent data[17]. For each value a very conservative[18] estimate and a realistic[19] estimate is given. More detailed calculations are available at SFDP.

Table 4: Economic key figures for different annual cutting areas

Economic Figure	Conservative Value		Realistic Value	
	100 ha	200 ha	100 ha	200 ha
Economic threshold in number of harvestable trees per ha (net m3)[20]	7 (16 m^3)	5 (12 m^3)	3 (7 m^3)	2 (5 m^3)
Return on investment	9 %	84 %	39 %	163%

The economic threshold for forest harvesting under realistic conditions is very low. Already if 3 trees can be harvested per ha, the operation is economic. As such there is no actual need to over-exploit a harvesting block as under primary[21] forest condition, the number of harvestable trees will always exceed this figure.

[16] These are tariff export barriers, rampant illegal logging, for CBFM highly inappropriate wood administration system, tax payment scheme.

[17] This can be considered as a conservative estimate, as actual implementation in SFDP test area has started late 2000 and the peak of work efficiency has not been reached yet.

[18] Based on current sales price of Cooperative "Rimba Berseri", payment of reforestation tax. This price is relatively low and refers to the period when the community is introducing its products into the market.

[19] Realistic market price means that the communities would be able to at least partly circumvent the very unfavourable conditions mentioned before as soon as they have gained experience and reputation. It is as well assumed, that no payment of reforestation fund is made. It is proposed to exempt the community from the payment of the reforestation fund, otherwise it is difficult for them to compete with illegal logging. The argument in favour of this is that the silvicultural and management system applied minimises the need for reforestation after logging.

[20] Net m^3 refers to harvestable timber volume deducted by the utilisation factor (0.8). Thus, a standing harvestable volume of 20m^3 will become a net harvestable volume of 16m^3. As presented under yield calculation the minimum diameter of a harvestable tree is 60cm.

[21] This also applies for old logged-over forests. There is furthermore no need for a pre-harvest inventory as the economic threshold is met anyhow.

The return on investment is calculated for a harvestable commercial timber volume of 25 m^3 per ha – a figure that is in line with experience from SFDP working area. The high internal rate of return on investment means that this system is very resilient against changing market conditions thus providing the community with a low risk income and protecting it from losses. Private funding (i.e. bank credits) for the required initial investment would be possible, as well.

The harvesting system applied is labour intensive as most operations are done (semi-) manually. This provides job opportunities in the rural areas and the money spend on operation costs remain in the area (value added).

By involving the adat land tenure holders in the selection and identification of trees to be harvested (participatory cruising, selection by consensus) the interest of the "owner" is ensured and other aspects such as NTFP, protection of burial grounds, etc. are equally considered. This will help to minimize social conflicts caused by forest management.

10. Institutional and Organisational Requirements

Under the current situation of ongoing decentralisation in Indonesia the assignment of responsibilities to the different institutions should be seen as a preliminary picture. This especially refers to community based forest management, which is a new concept. A general idea of the involvement of different parties in the set up of CBFM has been prepared earlier (SFDP 1999). An in-depth analysis about distribution of responsibilities for implementation of CBFM has been conducted after the decentralisation process already has started (SFDP June 2001a). The following is only a generalised overview of involvement of government institutions for implementing the proposed forest management system.

Committee for district planning and Development (Badan Perencanaan dan Pengengembangan Daerah - BAPPEDA)

- Supports participatory village land use planning and preparation of the respective agreements(Tata Guna Lahan Desa Kesepakatan – TGLDK)

District Government (Pemerintah Daerah- PEMDA)

- Checks and approves FMPL, IHPL and AOPL.

Forest Service (Dinas Kehutanan) at district level

- Jointly prepares FMPL and IHPL with community and approves AOPL.
- Provides technical assistance on demand.
- Monitors and controls harvesting operations.

The involvement of other institutions at district level has been kept low. Only for the Forst Service (Dinas Kehutanan) there will be additional work. For the provision of technical assistance and for control and monitoring it may be necessary to for the forest service to establish additional field offices, once CBFM is generally introduced.

11. Conclusions

The forest management system described is designed for the implementation by village or even settlement communities and for this reason is kept as simple as possible while still ensuring sustainability of forest operations. The basic preconditions for implementing this drastically simplified system are that logs are processed on site to sawn timber and that there are very low fixed costs. By this it is possible to avoid cost-intense forest inventory and pre-harvest tree mapping. Sustainability is ensured by following a simple set of criteria and some conservative silvicultural assumptions that are based on experience in dipterocarp forests. By applying the criteria the timber extraction can be determined and trees can be selected by community members that only need to be shortly trained. External and internal transparency is also given as government as well as community representatives can easily check the fulfilment of the criteria and by this also can estimate production figures. The system fulfils all the requirements specified at the beginning and takes into account ecological, economical and social requirements.

Investment costs are low and the system is highly profitable if the minimum size of the resource is met. Consequently, economies of scales are almost nullified by this approach, which allows decentralisation of forest management on settlement level.

As the system is very simple and does not require any sophisticated resource assessment, it can be introduced immediately to other areas with a minimum on training input, once village land-use planning has been conducted and the respective agreement (TGLDK) has been prepared.

The inputs required from Forest Service (Dinas Kehutanan) are limited to the joint preparation of the Forest Management Plan and the Infrastructure and Harvesting Plan, followed by technical assistance in the initial stage and control and monitoring.

The described system makes the area-wise introduction of CBFM in (West-) Kalimantan feasible. The very small environmental and ecological impact of the forest management system could make it an option for the hilly and steeper areas elsewhere in South-east Asia.

The proposed forest management system necessitates reconsidering the payment system taxes and fees to the government. The respective questions are raised in another SFDP - Paper (SFDP June 2001b) and have to be discussed with the involved parties.

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