

3.3.4 Villager Support Program

(1) Necessity of the Villager Support Program

For recognizing sustainable forest management, the premise is that the forests would be managed to be sustainably utilized as forests but in reality, those forests are being used for other purposes due to various factors. Thus, the primary objective would be to avoid any decrease of forests.

To discontinue the forest decrease, it is essential to remove the 4 factors mentioned in section '3.3.3 Forest decrease and degradation'. The problem of forest dependency caused by immigrants has been improved but there are still some free immigrants coming into areas along with major roads, particularly Thack Nham protection forest and causing small-scale forest exploitation. In those areas, it is required to enhance the government's initiatives to cope with the immigrants.

The remaining 3 factors are deeply related with poverty. The poverty causes difficulty in investment (including human resources) to enhance productivity, making local people exploit the forest areas to secure daily foods and to sell woods as fuelwood. All the activities cause decline in forest cover. Unless dependency on forests by local people (including free immigrants) suffering from poverty is mitigated, the total decrease in forest will never be discontinued even if forest operations are properly managed. To attain sustainable forest management, it is vital to support poor people to resolve food shortages and to create other income sources so that they do not need to exploit forests. On the other hand, it is also important to encourage local people to participate in collective forest management through activities for poverty alleviation such as income generation by afforestation and improvement of health and hygiene. By these measures, forest area would be enlarged and forest decrease and degradation would be diminished.

(2) Objectives of the Villager Support Program

The Villager Support Program involves one measure to protect forests. In order to protect forests, it is necessary to prevent agricultural encroachment into the forestlands. However, it has been and will be difficult to restrain villagers' activities by law or the police force. People advance into forests primarily for reasons of survival. FEs must maintain managed forests to utilize them rotationally and on a permanent basis. If forest rotation is observed strictly, any decline in the forests itself jeopardizes the necessary preconditions for sustainable production. Therefore, the FEs are required to make an active contribution towards improving the living standard of villagers who dwell in forests managed by the FEs, especially in terms of food self-

sufficiency and securing BHN, and in establishing a system whereby the FE and villagers can share profits from forests.

Objectives of the Villager Support Program are as follows:

- 1) The project secures land for rice paddies that is sufficient for achieving the target volume of annual food production per head set by the government (350 kg/year/head, in rice conversion) and guarantees the right to use land.
- 2) FEs and the forest management service support the improvements in land productivity mentioned above in cooperation with regional administrative bodies (communes). Ideally the land should be prepared near existing communities.
- 3) Shifting cultivation would be controlled with measures; i) to convert shifting cultivation land to permanent farms with agroforestry practices and ii) to reduce dependency on shifting cultivation for food production. At the same time, collaborative sales would also be promoted in order to enhance cash income generation.
- 4) The annual income of low-income minority ethnic groups would be raised to 80% of the present average income in communities by activities to convert grasslands into agroforestry farms, promote two periods cropping of paddy rice in flatlands, cultivate fodder trees and promote stall feeding of animals.
- 5) In the sever areas with forest degradation whose altitude is below 1,000 m in the southern region, industrial afforestation would be promoted in order to rehabilitate forests and enhance job opportunities in cooperation with local people as well as relevant authorities.
- 6) FEs and the commune forest service conduct afforestation in accordance with Government Ordinance 661 and provide opportunities to generate income through contracting with people living in rural communities for afforestation work. The use of forests by villagers for agriculture and animal husbandry during afforestation should be permitted until planted trees close the forest canopy. FEs make efforts to spread technologies in cooperation with the organization for spreading agricultural technologies in communes.
- 7) Communes conduct various activities to ensure BHN for rural communities. The forest management service cooperates in the construction of facilities that are necessary for these activities, such as water supply, health care and electricity, and supports maintenance and management of these facilities.

(3) Target groups of the Villager Support Program

Various activities to achieve the purposes mentioned above are to be conducted for villagers who would be in desperate circumstances without support. Communities both of mountainous ethnic minorities and immigrants who are likely to seek ways of survival for forest resources would be covered by the program.

(4) Target areas of the Villager Support Program

The first target area is the land designated for the achievement of the target volume of food production (350 kg/year/head) indicated in the Villager Support Program. To calculate the area necessary for this it is first necessary to estimate where the land lies. Basically, support is given to raise the productivity of existing farmland and rice paddies. In communities that are short of rice paddies, the target area is a neighboring flatland or slope where a rice terrace can be made. Crop fields can make good the shortage of rice paddies. Naturally crop fields are to be maintained permanently; improvement of home gardens, including the planting of fruit trees and forage trees for livestock, is given priority.

Once food production targets have been met, the land necessary for activities to generate cash in order to improve the villagers' living standard is provided. Conversion from shifting cultivation to permanent crop fields is promoted, as is the cultivation of perennial crops and vegetables with trees. The land provided for these activities is used by villagers and excluded from forest management. It is desirable that the target areas are located near communities because they are used as permanent crop fields and are labor-intensive land where per hectare productivity is high. Preferentially, grasslands near communities are provided for villagers, in accordance with Vietnamese policies aimed at raising the productivity of grasslands, included in Program 327. Bush and fallow areas are targeted secondarily.

It is necessary to take steps for the distribution of land for villagers' exclusive use based on laws pertaining to the land, and to gain understanding or to receive support from commune administrative bodies and all the villagers within the communities. There are no firm rules as to how target areas are chosen. If villagers do not use existing grasslands, bare land or bush, then afforestation would be conducted there to restore forests. Also, these are the target areas where the FE and the commune forest service preferentially promote various support activities. The supposition that grassland, bush or fallow areas within about 1 km of communities are suitable areas to be targeted is realistic. The results of area calculations of the target areas within about 1 km of communities indicated in the Villager Support Program are presented later. Requirements for the target areas are as follows:

- In detail, the target areas include land which is almost sufficient for the impoverished group to expand farmland for their food self-sufficiency.
- The target area is located within daily commuting range of the village. (This is on the supposition that there is not a hut adjacent to farmland.)
- The long-term purpose of the Villager Support Program is to prevent the decline of forests.

If we assess the target areas comprehensively based on these requirements, we can estimate the target area required precisely. (One block supposes that the target areas total about 1,000-1,500 ha. If there is a community in the center of the target area, a circle with a 1 km radius has an area of 314 ha ($1,000 \text{ m} \times 1,000 \text{ m} \times 3.14 = 3,140,000 \text{ m}^2$.) In this case, the target area is grassland whose area is about 30% of the estimated total area of the block. If there is a target area within about 2 km of communities, the target area is 1,256 ha ($2,000 \text{ m} \times 2,000 \text{ m} \times 3.14 = 12,560,000 \text{ m}^2$.) This supposition is not realistic, however, because this target area is almost equal to the total area of the block itself.

As a target area where various activities for enhancing farmland productivity and for creation of new income-generating opportunities will be identified and allocated, grassland near communities will be preferentially selected. Most of such grassland was used for shifting cultivation, so there is a strong possibility that someone living in a community nearby has the traditional right to use the land. When we plan the Villager Support Program in relation to actual agricultural improvement, we need agreement at the villager meetings from the persons who have the traditional right to use the land, including their successors. In order to select a firm location and target groups after consulting with villagers, the proceedings are to be transparent.

(5) Menu of activities supposed in the Villager Support Program

For each concrete activity of the Villager Support Program, a plan which is suited to the socioeconomic circumstances of villagers should be selected by their common consent. Each activity should not be rigidly predetermined by the master plan. In the master plan, several basic menus, described below, are provided to be considered alongside the following data for each commune, village and hamlet:

- Ethnic minorities
- Income composition
- Extent of grassland and farmland
- Differences in natural conditions such as presence of mountain streams, topography, and altitude.

With this basic framework provided by the master plan in mind, it is expected that administrative leaders and planners will develop a concrete working plan by selecting, integrating and adapting these menus in each villager meeting.

a. Program for alleviating food shortages

This program gives preference to villagers, mainly mountainous ethnic minorities and some immigrants, who depend heavily on shifting cultivation and communities where

impoverished villagers might conduct these activities in the future. The program supports these villagers and communities in improving productivity by constructing small dams and waterways, establishing rice paddies, and raising two crops a year. Forest managers distribute newly developed land for rice paddies and crop fields, assist villagers in executing engineering works for logging operations, and engage in activities related to maintenance of waterways.

b. Program for the control of shifting cultivation

This is the activity chiefly for mountainous ethnic minorities conducting shifting cultivation. Each support activity is the same as the content of Program a. mentioned above, but support for conversion from shifting cultivation to permanent crop fields is of primary importance. Promotion of agroforestry practices is required. Guidance from an agricultural management system that integrates the planting of perennial crops and the raising of livestock by guaranteeing the use of land near houses plays a leading part in this program.

c. Program for income generation

This program creates opportunities to generate cash income through the producing and selling of products and cash crops other than crops for self-consumption, and gives preference to mountainous ethnic minorities that can lead self-sufficient lives but basically covers immigrants who are under the similar situation. Basically the program strengthens the production capacity of grasslands on hillsides by introducing agroforestry and promoting the production of crops to produce cash income by conversion to permanent crop fields. The program is concurrent with the agroforestry program or divided into some independent subprograms according to variations in natural conditions of areas where the target communities are located, and requirements for their market access. Subprogram items are livestock, beekeeping, NTFPs, fruit trees, vegetables, other products related to agriculture, bamboo and rattan work and other processed goods.

d. Program for industrial afforestation

This program promotes industrial afforestation using land (grassland or bush on hillsides) distributed to villagers, and provides opportunities for employment and income growth using land other than limited arable land. In cooperation with the FEs and afforestation companies, this promotion and provision is carried out in areas less than 1,000 m above sea level where fast-growing trees such as acacias can be raised. The program mainly targets families who have grown-up children, have been distributed a limited amount of arable land, and have surplus labor except for farm work.

e. BHN program

This program gives preference to mountainous ethnic communities which are far from roads. Activities include cooperation with and support for the establishment and maintenance of drinking water resources (wells or purified water tanks), sanitation (construction of toilets) and small-sized generators in small streams.

(6) Priority for implementation of the program

The Villager Support Program should be comprehensively promoted through combining various menus according to socioeconomic and natural conditions. Beneficiaries of each menu are limited, but it is a primary objective that all the villagers receive some benefits and perform their appropriate duties.

From the overall point of view of existing forest and the extent and condition of grasslands, differences in appropriate agricultural management according to altitude, and differences in ethnic composition, the investigated areas can be classified in four groupings according to their various natural and socioeconomic conditions as follows:

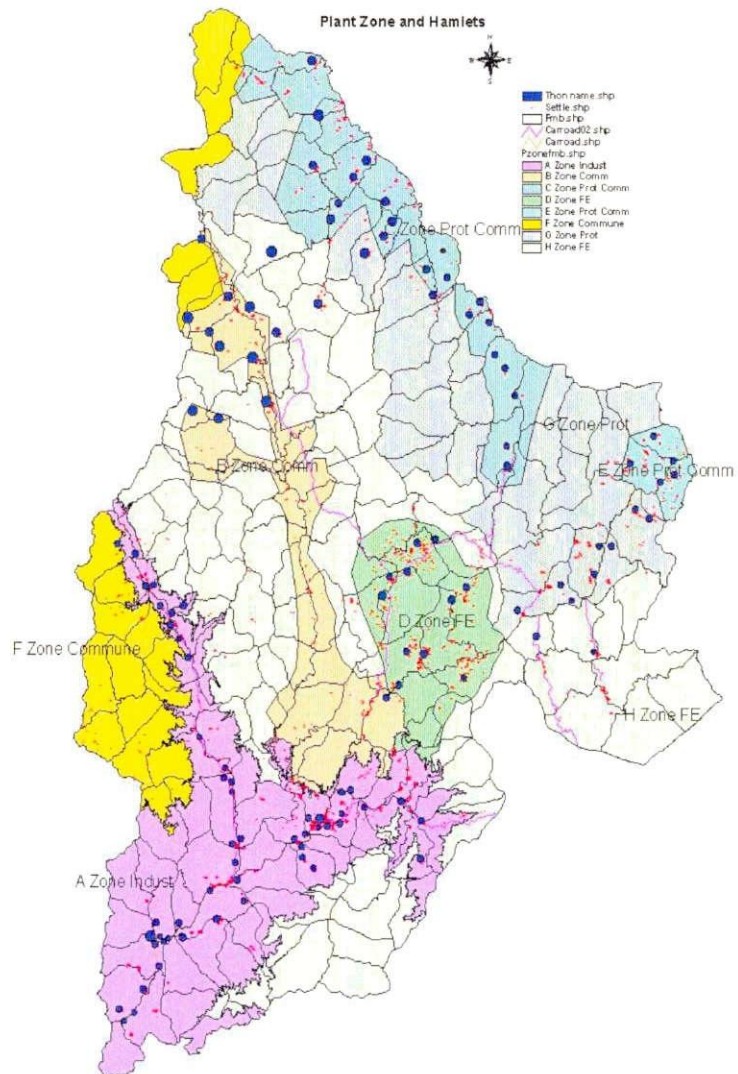


Figure I-3.3.7 Zoning considering criteria for villager support

- Southern communes
- Central communes in forests managed by FEs
- Northeastern communes in protected forests
- Eastern Po E communes

From this point of view, target areas are classified into zones based on afforestation activities.

The core activities for villager support aim to prevent the advance of impoverished farmers practicing shifting cultivation into forests by encouraging self-sufficiency in food. To specify target areas for the Villager Support Program also involves the demarcation of land use of existing grassland by villagers and the forest rehabilitation plan. The target areas are classified into eight zones (A-H) indicated in Figure I-3.3.7.

Land use by the Villager Support Program is based on the following basic principles: i) The existing agricultural land shall be approved to be continuously used by villagers who are now using it, ii) According to the circumstances, special attention is needed for villager's livelihood, some part of natural forest may be approved to be used for cash crops, iii) While, depending on whether the concerned place exists within production forest or protection forest, or area intended for FE's wood production forest or not, and on differences in access conditions with the concerned land or hamlet to market, development condition of surrounding agricultural land, etc., contents of the Villager Support Program will be greatly different. In principle, conversion of the forest areas into agricultural land shall be extremely limited, meanwhile the existing low level used land or discarded slash-and-burn fields shall be rehabilitated to forest by villagers themselves as far as possible.

The Villager Support Program itself is not only limited to forestry-related activities such as agricultural land improvement, agroforestry support, and promotion of participation in tree planting activity, but encourages villagers to participate in forest rehabilitation through various support activities, this is also an important purpose. Such promotion activities to facilitate forest rehabilitation participation by villagers are not limited to those implemented by FEs; they should be conducted in cooperation and share with agricultural extension service by commune responsible organizations, educational promotion activities, and in various fields such as family planning, the spread of sanitation, social education and anti-illiteracy education.

Zone A belongs to agricultural area where all the available land for agriculture has been developed and local people have encroached into the hilly area. Cassava, for example, has grown into the hillside area and the bush seems to be used by people in any way. In addition, it will be impossible to stop advancement of conversion bush into agricultural land. In this zone, therefore, the Villager Support Program should give priority to a plan for income generation such as agroforestry practices in the hillside area. As food shortage is not a serious issue in the area, limited households would be the target of the program.

In Zone B, flatland along river is developed to paddy field and most of following slopes are used as slash-and-burn field. As people are not so concentrated, farmland is not rapidly expanding under the present situation. In this zone, grassland and bush along rivers are regarded as the target area for the

food shortage alleviation program and income generation program. Forests will be excluded from the areas for local people since they are under FEs management as important forestry production area.

In Zone C and E, the target area falls in villages scattered in protection forests of Thach Nham PFM area and Dak Ring Commune where grassland is expanding. Since forests in this area should be managed for the main purpose of maintaining and strengthen function on watershed, conversion of grassland and bush into agricultural land should be avoided as far as possible, therefore, target area is strictly defined within existing grassland. In addition, introduction of agroforestry is given first priority in the Villager Support Program as much as possible. In this area, the major inhabitants are Xe Dang (in Ngoc Tem Commune, there are Ko Dong people whose life style is similar to that of Xe Dang) and they rely on livestock, particularly cattle for their livelihood. Accordingly, in the income generation program, introduction of fodder tree plantation and silvo-pastoral practices are to be encouraged to prevent developing new grazing land.

Zone D is characterized by paddy cultivation in valleys practiced by Mon Nam people. A considerable part of the existing grassland has already been afforested and there is little area for developing new upland farms. In this zone, improvement in productivity of paddy fields will be a main component for the food shortage alleviation program and income generation program.

Zone F is a degraded forest zone under the control of the commune and unified hamlets are limited. Grasslands are raised mainly from slash-and-burn and each area is not so large . A number of local people have settled in hamlets along the provincial road where an important issue is to control slash-and-burn cultivation in hilly areas. Therefore, the shifting cultivation control program should be given priority in the area. Again, in the area facing with Zone A, the income generation program through agroforestry practice needs to be encouraged. In this zone, the target group is those who practice shifting cultivation.

In Zone G, hamlets dispersed in forest areas in protection forests of Thach Nham PFM area and Dak Ring Commune, which are not many in number are the target. As slash-and-burn agriculture is a main activity, small grasslands are scattered. Since this zone is the core of natural forest for wildlife conservation, it is expected to rather reduce the existing grassland and restore it to forest. Accordingly, villagers need to bear conservation and management activities mainly for natural forest. In this zone, therefore, local people should be encouraged by agricultural support through the food shortage alleviation program which intends to convert existing grassland into farmland, while it is desirable to develop plantation activity by wildlings in the remaining grassland. This activity can be considered as one of the plantation support fund by Decision 661.

In Zone H, the target is hamlets dispersed in forest areas intended for FEs' main wood production activity. In this zone, decrease of forest areas seriously causes negative effect on FE's sustainable

forest management. Conversion of forest into agricultural land should be avoided. Therefore, the target area for the Villager Support Program is limited to the existing grassland and instead, improvement in productivity of the existing agricultural land will be supported. Hamlets situated in forest zones managed by FEs are few and those are remote from roads as well. Accordingly, in this area, BHN program is to be given priority. As local people are prone to be affected by FEs' activities, FEs should provide local people with assistance for developing new farms or paddies and should give consideration on organizing meetings with local people at the stage of planning of FEs' operations.

3.4 Demarcation for forest operation units

3.4.1 Guidelines on forest demarcation into forest operation units

In the case of concretely specifying stands for logging operation in production forest intended mainly for timber production, the following points should be taken into consideration.

(1) Maintenance of forest multifunction for water, soil and land conservation

For water, soil and land conservation, the following areas should be set aside from areas where ordinary leveled selective cutting ratio is applied, and construction of logging roads should be avoided.

- a. areas with a slope angle of more than 30 degrees
- b. areas sensitive to maintaining forest functions without forest cover.

In contrast to the manifestation of forest function on water, soil and land conservation, in sensitive areas, each function is judged with the strengthening of negative effects caused by the removal of forest cover. Greatly influenced areas need to take care to maintain of forest cover. Practically, after geographical features are analyzed on a micro-topography level, geographical features, slopes and the number of streams (complication of geographical features) are respectively divided into categories and according to the combination of the categories, the degree of influence on each function in the case of removal of forest cover is estimated; Secondly, as required to simultaneously show the three functions, the degree of total influence is estimated and then areas in high risk where function manifestation will be threatened are specified.

(2) Definition of areas for villagers

For villagers living in forest areas and maintaining a traditional lifestyle, significant land should be prepared to assist their living standard improvement. For this purpose the following forests should be set aside from ordinary forest operation areas:

- a. Grassland surrounding the hamlet which the villagers can cultivate continuously
- b. Small valley flat parts where paddy fields can be developed around the hamlet
- c. Grassland where agroforestry farming can be developed
- d. Grassland surrounding houses for livestock grazing

In FEs' forest management, it is important to pay attention to local people, especially to villagers who have been traditionally living among forest areas. Therefore, it is required in advance to assume places possible to be independently used by villagers (taking consideration of allocation to the villagers legally in the future). In assuming the area of such places, the following are taken into account: to grasp the number of householders in a hamlet and the area of presently-used paddy fields, permanent farms and land made arable by the slash-and-burn method by aerial photographs, to estimate land area necessary to secure villagers' basic living, and for deficiency of arable land in comparison with the present situation, to allot and distribute in order bare land, grassland and secondary forest within the range of distance where villagers can daily walk to from the center of their hamlet. In the case that grassland appropriated for deficiency of arable land does not exist within the range, it will be necessary to take measures so as not to induce further cultivating or burning of natural forests. For this, a supporting attempt to raise productivity in the existing arable lands within the range is prepared, arranging forest works by contract base, forest protection observation, tree planting in grassland under the control of FE, grant of access rights for collection and the use of these by-products in natural forests, etc.

Any area from the areas intended for FE's ordinary forest management with a high possibility of being used by villagers in the near future and incorporated into the area intended for the Villager Support Program development should be excluded. As this measure also means to prevent expansion of slash-and-burn land, priority should be given to hamlets in forest areas and concrete land use methods should be determined hamlet by hamlet in consultation with villagers.

The areas used preferentially in the Villager Support Program are grassland and bush located within about 1 km of communities. According to the protocols of the Villager Support Program, this land is distributed to villagers as land for their exclusive use and excluded from land managed by the FE in principle. Figure I-3.4.1 indicates the extent of such land.

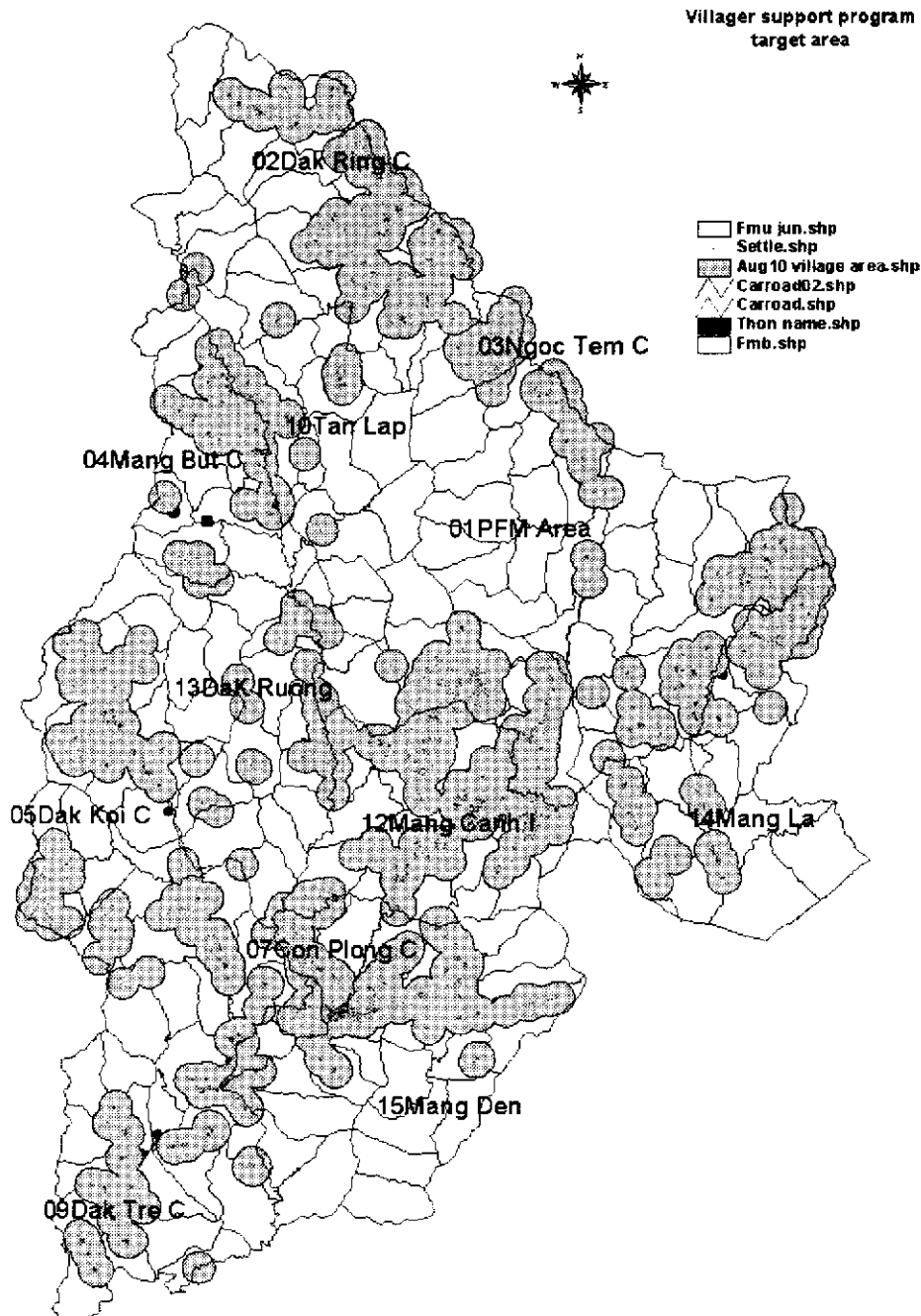


Figure I-3.4.1 Target area for the Villager Support Program

(3) Forests for biodiversity conservation

For wildlife and bio-diversity conservation, other than the protected areas the following areas should be kept as closed natural forests or natural ecosystems suitable for target animal and/or plant propagation or purposes for smooth transfer .

- a. bio-corridor for large mammals moving from a strict protected area to another strict protected area for interchange between groups.

- b. small areas approximately 100 ha for each place where special plants (endangered, rare, endemic, etc.) and animals (birds, insects, reptiles, amphibious, etc.) are propagating.
- c. small bushes surrounding water channels for small animals and birds to rest and hide.

For wildlife and bio-diversity conservation, a sufficient area of natural forests should be set aside. Forest enterprise areas must be selected in the light of protection of wildlife, especially such large mammals as tigers and bears. It is basic for the protection of large mammals to secure natural fields for adequate feeding, safe retreats for propagation, nesting places and chances for interchange between individuals or groups for mating. Therefore, the previously outlined bio-corridor net of natural forest should be set aside, and human traces should not be left within the net. It is desirable to arrange this corridor so as not to leave the existing protected areas isolated. Incorporation of degraded areas into the corridor areas nominated should be avoided, and a zone of a series of natural forests should firstly be selected from within the existing protected area, areas excluded from management forests are to give attention to the above-mentioned forest functions.

Regarding a suitable scale of bio-corridor for bio-diversity conservation, international agreement has not yet been clarified. In the light of safety of animal transfer, it is inevitable in a sense that a difference in possible range will be caused depending on differences among kinds of intended animal groups, forest constitution of surrounding areas and social economy. In the case of assuming a national bio-corridor, the corridor will be suggested with a view to broadening the range, instead easing conditions of natural situation and restricting land use of forest conversion into agriculture, etc. On the other hand, in the very natural forest of Kon Plong is not assumed that forest enterprise will conduct rapid removal of surroundings. The corridor is not expected to be a wide zone but is expected to strictly exclude traces of human activities. Since most of the existing natural forests are assumed to be intended for logging areas, it will be appropriate in this master plan to assume a zone of about 3 km width of bio-corridor integrating a core part of almost 1 km and each 1-km width of buffer area (intercepting artificial influences from surrounding forests intended for logging operation) on both sides.

It is unnecessary to strictly prohibit logging in the bio-corridor itself. Stopping operation in the time of transfer of intended life groups will ensure that animal transfer is not significantly disturbed as long as the crown of natural forest is not too broken. Assuming the present mechanical power and loading method, however, it will be unavoidable to disturb the forest floor by loading and by use of the tractor road to pull out big sized trees and by leaving a lot of artificial traces. As there is a high possibility that animals will avoid passing these places and seek another pass, the establishment of the corridor may lose its meaning.

The areas of the proposed bio-corridor located outside of the existing protection forest is expected to be categorized into the protection forest, or otherwise the bio-corridor is preferably managed under the

special use forest based on the forest law in Viet Nam. However, as the Study Team is responsible to retain the framework of land use demarcation authorized by the government, there is no change in functional classification of forests. Accordingly, the government authorities are requested to seek the best way to meet the objectives for bio-corridor for the future.

In protected areas for rare species living in a relatively narrow range, the scale is different by each species and not unitarily determined. In the southern part of Man Den FE area, the wild goat peculiar to the district, Serow is found to live. The activity range of the goat is in special steep areas of mountainside. Though concrete protection areas are not set up in this plan, places excluded from logging operation to steep land with difficulty of logging operation overlap substantial areas intended for protection. Regarding such specific wildlife protection, in actual operation planning, it is required to take consideration to confirm the existence of rarer species in intended areas, to select exclusion from operation areas according to the necessity of inhabitable environment conservation, or to secure feeding grassland and watering places. Especially, in the light of protection of flora and other life at the waterside, attention should be taken to set aside damp ground and steep slopes on both sides of streams.

3.4.2 Selection of yielding system for sustainable management on production forest

The zone of forests managed by FEs in Kon Plong mostly lays 1,000-1,400 m above sea level. As the district is an important water source as a whole, it is necessary to take attention so as not to significantly damage the multifunction faculty of forests. Though especially sensitive places are excluded from areas intended for operation in the above-stated 3.4.1 (1), certain consideration for operation in the remaining production area also needs to be taken. In addition, in view of altitude and soil conditions in areas more than 1,000 m above sea level, the existing natural forests should be excluded from clear cutting and conversion into single layer forest such as pine.

The following points should be taken into account to select operation methods (selective cutting including cutting ratio, clear cutting, etc.) for natural forest intended for production forest other than areas mentioned above in 3.4.1.

(1) Clear cutting and artificial forest regeneration

Clear-cutting of old and over-matured forest and conversion into artificial forest of high productivity are generally effective to strengthen timber productivity from a long-term view. However, the main distribution area of natural forest in Kon Plong District is mostly over 1,000 m above sea level and suitable area for the fast growing tree species, acacia, is limited. In the case of planting Kesiya Pine (*Pinus kesiya*), the annual average growing amount is estimated at around 8-10 m³/ha according to the present planting results. On the other hand, average growth of natural forest is estimated at 2 %;

hereafter growth rate is expected at 3-4 % except for old trees regarded as minus growing amount owing to selective cutting; accumulation of the present selective cutting stands is estimated at about 350 m³/ha: Assuming the calculating regression year of 20 % selective cutting as 20 years, the growth 20 years later is calculated at 520 m³ and so the annual average can be calculated at 12 m³/ha (350 - 70=280; 280 X (1 + 0.03)²⁰=520; (520 - 280)/20=12). Therefore, it can be said that the merit to convert natural forest into artificial pine forest by clear cutting will be limited. Naturally, growing amount of natural forest does not mean growing amount of so-called commercial wood species only: if the economical benefit of pine wood is high, clear cutting and new plantation may be considered. Accordingly, this matter depends on the manager's judgment from his analysis, prospects, perception and sense for the future.

(2) Areas where lower percentage cutting ratio is to be applied

In and around the bio-corridor shown in 3.4.1, selective cutting with lower cutting ratio should be applied as a logging method. Furthermore, in the upper stream of brooklets as the water source for valley paddy fields and drinking water, attention should be taken to reduce cutting ratio to about half of ordinary rate and to avoid disturbance of forest floor and mud flowing into streams and paddy fields, within the range of about 1 km of the upper stream part from collecting point of water. with steep slopes on both sides of brooklets.

(3) Production forest mainly used for timber production

Regarding production forest, natural forests other than areas stated in 3.4.1 are incorporated into stands intended for selective cutting. As shown in (1), clear cutting of natural forests and establishment of man made forest is not recommendable in this area.

(4) Forests to be intended for ordinary timber production

Forests in Kon Plong District are mainly managed under the responsibility of six FEs and a Protection forest Management Committee. Areas other than the areas managed by these organizations are in charge of forest units placed in each commune.

The main management purpose of the Thach Nham protection forest administered by the Protection Forest Management Committee, and protection forest managed by Dak Ring Commune, is to protect forests in the areas stringently, thus sustainable timber production must not be planned in these areas.

Areas controlled by Commune Forest Unit (Communes of Mang But, Dak Koi, Dak Ruong, Tan Lap, Dak Tre and Kon Plong Town) are the center of agricultural activity in Kon Plong District. Forest zone is dispersed and the remaining natural forest has already been degraded by influences of considerable

logging and burning. In this area, it is constitutionally not negative that companies or individual persons receive land allotment from the People's Committee for forest management and conduct wood production after making a management plan and getting approval. In the present situation, however, forest units of each commune regard maintenance and conservation of the remaining forest as a principle of management; a systematic foundation to inspect logging plans and supervise implementation has not yet been made; natural forest sufficient to meet selective cutting conditions is extremely limited. In view of the above situation, wood production is not planned in this area. Also, in production forests in Dak Ring and Ngoc Tem Communes, intentional timber production must not be planned for the same reason as mentioned above. From synthetic judgment, management of natural forests for continuous wood production shall not be expected in areas other than areas controlled by FEs.

3.4.3 Grassland and bush

While Kon Plong district has one of the higher forest ratios in Vietnam, a considerable area of grassland is expanding. Grassland has been also increasing especially in northeast protected areas where the forest has to maintain its crown cover for water conservation connecting to Quang Ngai. Furthermore, in areas along to the Dak Aloi River, and in the south Dak Nei River, population and agricultural land have been increasing, creating pressure towards entry into slope lands. Burned Dipterocarp forest was observed. Reforestation of such grassland is a main objective of this master plan.

(1) Areas to be planted for industrial purposes (low elevation areas)

Grassland 1,000 m or less above sea level is within a possible range to plant such trees as eucalyptus and acacia. Positive investment is expected. Pulpwood production is being promoted by paper companies in and around Kon Tum and Pleiku. By forming a sales network integrated with these production woods, potential ability of pulpwood production will be high. Recently it was reported that a paper production company was planning to construct a paper mill in Kon Tum Province. For this paper mill the company initiated new plantations with approximately 130,000 ha of plantation target by the year 2020. The plantation target area basically covers the proposed areas for industrial plantation for this master plan. Therefore, it is expected that the proposed industrial plantation would be implemented in close cooperation with the initiatives of the company.

The intended area is mostly shown in Figure I-3.4.2. However, the area is also an agricultural area and overlaps an area presently using slash-and-burn fields and slopes for cassava culture because of shortage of agricultural lands and paddy fields. In actually giving private companies charge of planting activity, it is necessary to take sufficient consideration to avoid conflict with villagers and to take time to make a plan with villagers' participation in advance. Generally, a traditional land use right for

fallows has been approved by hamlet constituent members. It is said that if a private company tries to abolish villagers' traditional rights with strong measures on the authority of national land allotment by a government agency, merits of industrial afforestation will often be lost owing to frequent occurrence of conflict and forest fires. Policy organizers should bear in mind that cases, experiences and lessons learned of many national and foreign companies' afforestation activity failures are strong and tense motivational power to introduce and develop social forestry policies in many developing countries.

(2) Areas to be planted for rehabilitation of forest functions

Most bare lands and grasslands 1,000 m or more above sea level are small areas of slash-and-burn fields or fallows. Areas 1 km or more distant from hamlets have difficult access, therefore, positive conversion into tree planting land by householders is considerably difficult. Such an area will be intended for patrol for the time being with a view to preventing slash-and-burn fields expanding and is expected to be naturally rehabilitated. It can be considered that grassland and bare land within 1 km distant from hamlets will be used somehow by villagers. Though part of the area can be used as paddy field or fixed cultivation field, it is desirable to use most of the area as agro-forestry or agro-pastoral land and create a condition whereby the ground surface is somehow covered with trees. Grassland within about 1 km from hamlets is a main target area of the Villager Support Program promoting such use by villagers.

With a view to maintaining forest multifunction (water, soil and land conservation), we excluded places with much negative effect on function manifestation faculty owing to removal of forest canopy from logging operation areas. In addition, very crucial zones in protection forest were excluded from wood production areas. A lot of grassland presently exists in such areas not assumed to be target areas for logging. Area classified as bush can also be a target place for forest tree stand improvement in protected areas.

(3) Areas to be planted and for forest stand improvement

Most widespread grassland is considered to be originally slash-and-burn field. It may be ideal for forest officers to make efforts to artificially or naturally regenerate all of this grassland to forest lands.

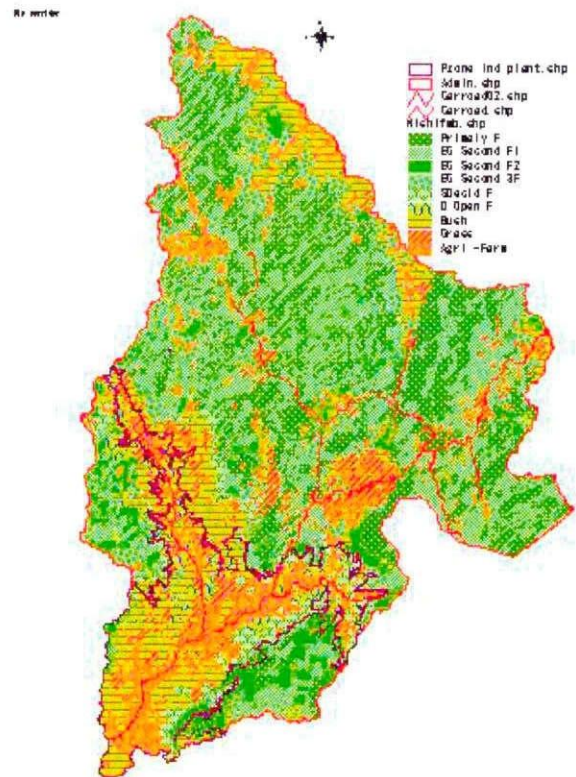


Figure I-3.4.2 Target zone for industrial plantation

In reality, however, there is a high possibility that persons with traditional rights are entitled to use slash-and-burn fields in most of the grassland and are waiting for fertility to recover. In addition, it will be impossible to refrain from use as agricultural land in the outskirts of Kon Plong Town and along the Dak Akoi River where the elevation is less than 1,000 m and population is increasing. Even if similar plantation is conducted, forest use purpose after plantation will be different between hamlets in such protected area as the Communes of Dak Ring and Ngoc Tem and hamlets in such production forests as Mang Canh Commune, and there is a great possibility that significant difference in benefits will be caused by plantation executors. Moreover, tree species that would be planted vary in each site. In considering such natural and social location conditions, it is necessary to study which should be more realistic, plantation in existing grassland, conversion into agroforestry land, or allowance of expansion of agricultural land, according to concrete characteristics of each area.

The target areas for afforestation include existing grassland, bare land and bush, with the exception of the target areas for the Villager Support Program. In areas under the control of FEs, the FEs are mainly responsible for the promotion of afforestation under an employment contract with farmers. With consideration for the contents of Government Ordinance 661, however, it is desirable that villager groups promote afforestation by contract where possible. From this point of view, the afforestation program and the Villager Support Program represent two sides of the same coin. Operators of the afforestation program should always consider the aspect of providing opportunities for villagers to gain income in order to complement the Villager Support Program, and give this priority.

In order to improve forest functions and increase timber productivity in the future, it is necessary to raise high value bush and young secondary forests, and improve forest stands. Improvement of forest stands includes such operations as:

- Planting useful species by line planting or nest planting after removing portions of bush
- Planting useful species in small vacant lots and/gaps produced within a forest stand from a variety of reasons
- Cleaning to improve the growth of young trees which are growing naturally
- Thinning of competing trees to promote the growth of well-formed trees.

These activities require thoughtful consideration and maintenance appropriate to the area; it takes a long time for these efforts to produce results. It is difficult for villagers to invest in bush near communities that are target areas of the Villager Support Program. As the area near communities is reserved land that will be used exclusively by villagers in the future, a long-term investment with a view to timber production is not suitable for this area. Therefore, the improvement of forest stands ranks as a complement to the Villager Support Program and targets bush and young secondary forests managed by the FEs outside the target areas of the Villager Support Program. It is expected that neighboring villagers will contract to improve forest stands as part of the program for alleviating food

shortages. In villages which could be targets for the BHN improvement program, to offer contracts for supervising protected forests as in the past and to provide income-generating opportunities through improvement of forest stands are important roles for the FEs.

Afforestation is seriously influenced by natural conditions. Its procedures must be decided according to the purpose of the afforestation project, available tree species and the socioeconomic aspects of neighboring villagers. In particular, the relationship with the Villager Support Program in the investigated areas is very important. The principle of the master plan is as follows:

- The afforestation plans for each investigated area, which are divided into the same zones as the Villager Support Program, should be considered separately in the master plan
- Afforestation conducted by villagers should be promoted through contracts with villagers
- From the point of view of afforestation, the zones mentioned before have been characterized.

Figure I-3.4.3 indicates the extent of grassland and bush which will be targeted for afforestation in each zone.

Previously-mentioned Zone A is less than 1,000 m above sea level and is a possible area to plant short rotation and fast growing tree species such as acacias and eucalyptus. The area has a lot of people and the lowest forest ratio at present. Assuming the area for the later-mentioned villager support project to be within 1 km distance from hamlets, most of the area will be covered by the program. The stretch of forest areas is limited; farmland, fallow after slash-and-burn farming or discarded lands are complicatedly distributed; and formal or informal land use rights are implicated. Without taking any measures, there is a high possibility that the agricultural area will expand in this zone. On the other hand, this is the front line to prevent population pressure and encroachment on inner forest conservation areas that threaten sustainable forest management. In this zone, grasslands, bare lands and secondary forests other than those intended for the village support program are attempted to be artificially planted as much as possible in principle. In addition, a part of the present agricultural land (bare land/less used agricultural land) is to be promoted to be artificially planted including agroforestry. Artificial plantation shall be conducted in industrial afforestation intended for pulp wood production mainly and directly by paper companies operating in Kon Tum and Gia Lai Provinces or by contract between paper companies and farmers who have traditional rights to use the land for slash-and-burn.

Zone B is a narrow area along the Dak Nghe River and a paddy field area surrounded by mountains with the peculiarity of natural Merkusi pine (*Pinus merkusii*). The zone is included in areas managed of each FE of Mang Canh I & II, Dak Ruong and Tan Lap. Slash-and-burn area spreading along the river is not so large, and presently used by ethnic minority villagers. The zone, if left as it is, will be a high possibility area following zone A to lead deforestation. It is expected to introduce a benefit sharing system for joint management with villagers and FEs mainly for pine plantation. This is a

method where FEs offer materials for nursing seedlings and prepare technical assistance, furnish funds and receive repayment at the time of yielding. As the area size of each villager's plantation is not large, a joint sales system with FEs will also be needed.

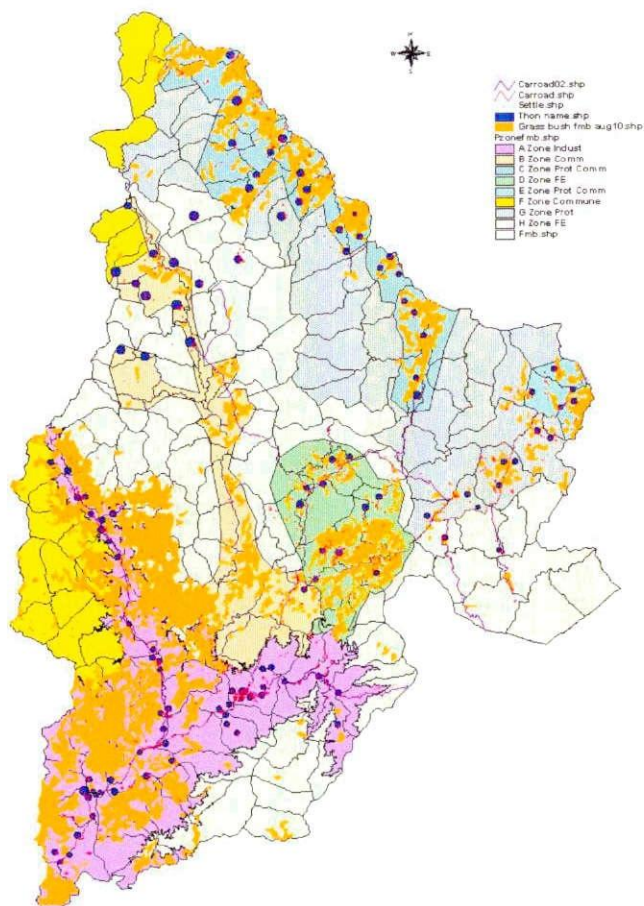


Figure I-3.4.3 Extent of grassland and bush targeted for afforestation in each zone

In Zone C, grassland within protection area included in each commune of Dak Ring and Ngoc Tem is regarded as the target area. The zone is mostly less than 1,000 m above sea level and it is possible to plant industrial plantation species. However, areas other than the target area for the Villager Support Program are distributed into small units and scattered slash-and-burn fields located mostly in inner isolated areas and may be difficult to develop as industrial plantation. In this area, priority should be given to take measures to prevent slash-and-burn field expansion through various activities in the Villager Support Program and to watch natural regeneration of grassland, bush and secondary forest in principle. Planning to conduct measures for forest improvement planting under canopy on dispersed inner areas of scattered parts excluded from the purpose of timber production is questionable in actuality from both viewpoints of farmers' benefit and management capacity of PFMC and communes. In this master plan, therefore, planting measures in this zone other than the Villager Support Program are not incorporated.

Zone D is grassland spreading in Mang Canh Commune, most of which is planted at present. It is finely divided into small hills and streams, mountainous paddy fields are distributed around small brooklets. Kesiya pine was mainly planted in this area, but the expected plantation result was not significantly achieved owing to the existence of damages by insects. Unsuitable soil condition is also considered to be one of the causes of obstructing growth of planted trees. Though it would be natural to plant trees in the other grasslands, it is realistic to postpone conducting plantation activity other than in protection forests in block 484, 485 and 489, and watch natural regeneration. Many hamlets are dispersed in this area, where it is expected to introduce agroforestry in the Villager Support Program. Of course, it is necessary to select a part of soil in good condition for agroforestry practices. FEs' positive cooperation is also desirable to cultivate paddy fields in small valleys. It is considered to be realistic to study the possibility of plantation again at the time of advancement of villagers' cooperation and participation for plantation activities.

Zone E is intended for grassland under the control of Mang La FE. It is also a protection forest, and located near a national road. Planting activity in protected area is positioned as a main activity of Mang La FE, therefore, it is expected to utilize funds through program 661 as much as possible and organize contractual basis planting activities with householders in outer areas of the Villager Support Program. The zone, exceeding 1,000 m above sea level, is not intended for industrial afforestation, but *Pinus kesiya* will be the soundest species.

Zone F, 1,000-1,300 m above sea level, is a production forest outside of FEs. The northern region is managed under Dak Ring Commune, and the southern one is under Dak Koi Commune. As surrounding forests are relatively young and do not have enough stock even for selective cutting, deforested areas are also continuously observed for natural regeneration and rehabilitation. Plant of Dipterocarps which appears in a region of relatively low elevation is expected in the future, but it is not advisable to implement full-scale planting operation because of limited technical experience. Therefore, systematic planting activity in this area will be suspended for the time being. It is favorable to develop planting activity so as to prevent encroachment into natural forest area expected for future growth, by forming a plantation zone as an extension procedure of the Villager Support Program.

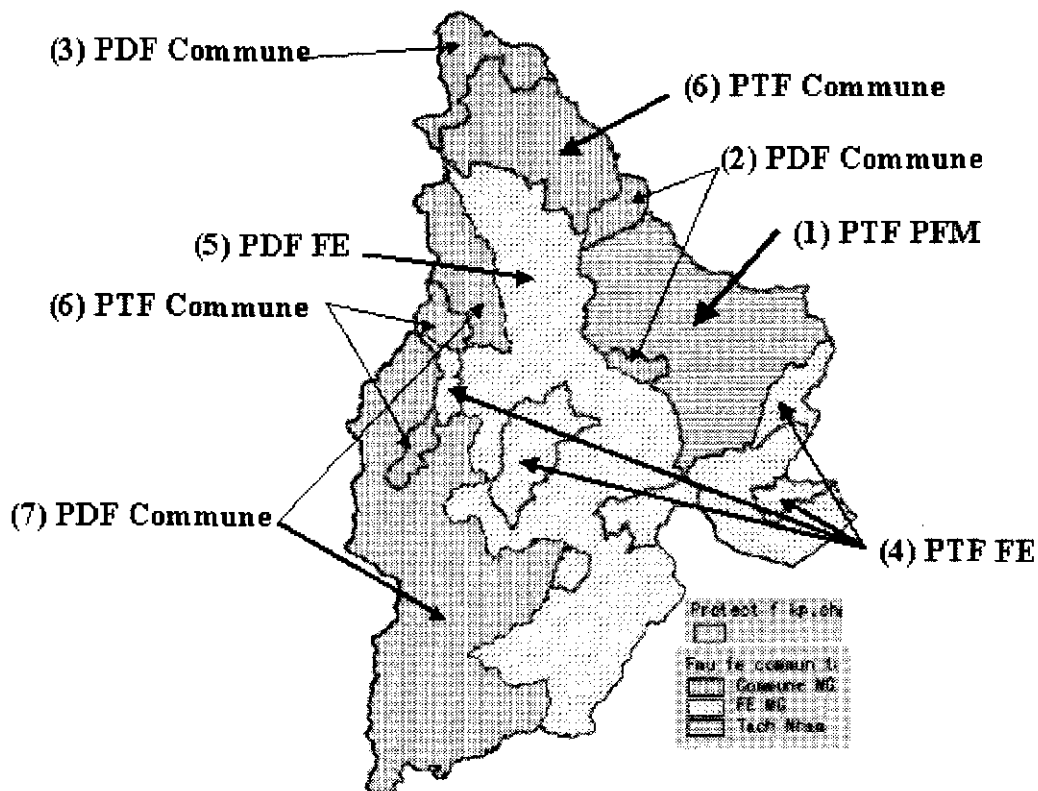
Target areas in Zone G are small areas of slash-and-burn fields dispersed in natural forest areas in the protection area. Areas of grassland, which are not covered by the Villager Support Program, are not so large. Through the Villager Support Program, the highest priority is put on the prevention of further expansion of slash-and-burn field, and it is expected to appeal to villagers to restore the field to agroforestry field and forestlands. Systematic planting activity in this area is not planned.

In Zone H, grassland within production forest area intended for selective cutting under the control of FEs is excluded from target areas of the Villager Support Program, it is expected to implement planting activities under the initiatives of FEs. Of course, this area is intended for industrial afforestation for timber production. However, since this area is mostly 1,200-1,400 m above sea level

and the main planting tree species is *Pinus kesiya*, high productivity cannot always be expected. In future, it is expected in this area to introduce indigenous useful tree species and to conduct afforestation research for various natural forest constituent tree species. In an attempt to return the benefit of wood production to forests as much as possible, the area should be planted as far as funds permit. As the areas unit size is limited, this area is incorporated in plantation plans in view of FE's management conditions.

3.5 Guidelines for forest operation by each operation unit

From a viewpoint of forest operation, Kon Plong district is roughly divided into the existing natural forest area intended for wood production for selective cutting and the existing grassland targeted for planting operation. Areas adjacent to hamlets intended for the Villager Support Program are mixed into the above areas, which are managed and controlled by three different authorized bodies. This section mentions individual attentive matters for forest operation, planting operation and the Villager Support Program in the light of characteristics of management and administration bodies, and natural and social conditions of each area. The target area is divided into 7 groups as shown in Figure I-3.5.1.



PTF (protection forest) PDF (Production forest)

Figure I-3.5.1 Seven (7) grouped areas for forest operation guideline

- (1) Protection forest managed by the Protection Forest Management Committee
- (2) Production forest managed by communes (the location is connected with important protection forests)
- (3) Production forest managed by communes (the location is isolated)
- (4) Protection forest managed by FEs
- (5) Production forest managed by FEs
- (6) Protection forest managed by communes
- (7) Production forest managed by communes (the distribution of forests are fragmented/small units)

**(1) Protection forests managed by Thach Nham Protection Forest Management Committee
(Strict protection area)**

a. Logging operation

Basically, logging operation by means of commercial production is prohibited.

b. Rehabilitation of natural secondary forests and bush

In the case of rehabilitation of secondary forest (tree stand improvement or promotion of dominant stand regeneration and growth condition improvement), lower story of shrubs/small trees (approximately less than 14 cm in DBH) shall be allowed to be harvested only for domestic use by the ethnic minorities. This kind of rehabilitation work should have to be carried out based on contractual agreement between the management authority and individual householders and endorsement by village authority (head of the village, village elders, etc.) The contractual works are requested to carry on in an open and trustable manner, and it should be identifiable by every villager that the activities are formal or informal.

c. Planting operation

The grassland areas surrounding the village, where villagers can commute every day from their houses as well as outskirts areas of village support programs should be replanted. The planting is carried out for environmental rehabilitation purposes, therefore, planting species should be selected from the species existing in the surrounding areas. The seedlings may be collected from natural forests (wildlings).

d. Village support programs

The most important activities are assistance in sanitation and providing water needed for people's daily life. The second most important activity is the extension on efficient and sustainable use of NTFPs unless disturbing forest crown and affecting the ecosystem in natural forests. Thirdly,

grassland around villages, the villagers shall be given authorization to develop their farm if they agree, and to deploy agroforestry practices (mixed plantation with tree-oriented products and fast growing cash crops, and domestic animal husbandry). In view of the fact that the basic living conditions such as daily water and sanitation have yet to become sufficient as the target area is remote and hamlets are scattered, the program should give priority to assist in improving productivity by agroforestry and enhancing BHN.

(2) Protection forests in Ngoc Tem Commune Forest Unit (Block 429, 415, 414)

a. Logging operation

The area is located in the northern part of Ngoc Tem Commune, and between two protection areas. Block 415 is an important part of bio-corridor connecting two protection areas. Logging operation is difficult without constructing a logging road crossing the bio-corridor. Commercial logging operations should not be allowed in this area.

b. Rehabilitation of natural secondary forests and bush

The same as (1) b., basically this area is managed for wood production, therefore, bush and secondary forest are allowed to be converted into man-made forests. Nevertheless, since this area, as production forest, is isolated and limited to performing functions as timber production forest, the area shall be treated in the same way as surrounding protected area and included in protection forests in the future.

c. Planting operation

The same as (1) c. above.

d. village support programs

The same as (1) d. above.

(3) Production forests managed by Dak Ring Commune Forest Unit

a. Logging operation

This area is located in the northern region of Dak Ring Commune and is faced with difficulty for transportation. It is economically difficult to construct forest road because the unit of production forest is limited for implementing continuous timber production. Thus, in this master plan, logging operation is not planned. In the case that a new public road connects this area from Quang Ngai Province, the logging plan may be reviewed.

b. Rehabilitation of natural secondary forests and bush

Operations in the area shall be implemented in accordance with the policy mentioned in (1) b. In the eastern side of Block 372, there are patched grasslands. These lands are mostly covered by the target areas of the village support program. Therefore, a particular plan for forest stand rehabilitation by the initiatives of the commune forest unit is not planned.

c. Planting operation

Operations in the area shall be implemented in accordance with the policy mentioned in (1) c. above. Nevertheless, planting species should be selected not only from ones in natural forests but also from industrial planting species such as *Pinus kesiya*.

d. Village support programs

The same as (1) d.

(4) Protection forests managed by forest enterprises

a. Logging operation

Block 439, 440, 493 in Mang La FE should be treated the same as (1) a. Block 500 is the most important part in the bio-corridor connecting Kon Ka Kin Nature Reserve with Thach Nham Protection Forest. Logging operation should be strictly avoided. In principle, no human activity to Block 500 except academic research is expected. Villagers living within the Block 500 are expected not to cut large trees except for special traditional cultural occasions recognized by the authorities concerned. In this case, alternative plans shall be applied in the Villager Support Program stated later.

Block 484, 485, 489 and 477 of Mang Canh I FE, and Block 521 of Mang Den FE, Block 474 of Mang Canh II FE, Block 442, 448, 455, 461, 462 and 467 of Dak Ruong FE should be managed on the same level as crucial protected areas. These areas are allowed logging operation in lower rate and longer rotation periods of selective cutting rather than as in ordinary forest stands for selective cutting. The logged trees should be selected to meet the rules and standard in Vietnam but trees almost dead and with old empty stems should be left for natural animals' nests even if the trees are marked as logging stands. The over-matured stands should be counted as logged volume and the volume should be included within the total limitation of the selective cutting.

In surrounding hill summit area of Block 461 and 462 near the Dak Nghe River, a rare species of *Keteleeria davidiana* is confirmed. The area should be excluded from selective cutting operation areas in terms of biodiversity conservation. This species should not be selected for logging in the whole area of protection forests defined as the same as the crucial protecting areas.

b. Rehabilitation of natural secondary forests and bush

Bush and young secondary forests outside the target areas for the village support program are expected to enhance timber production with improving forest stands by natural forest management. It is important to control encroachment by slash-and-burn farming to forests for maintaining sustainable productivity, therefore, providing income generation opportunity for villagers is an important aspect. Thus, in areas surrounding the target areas of the village support program, FEs should arrange contractual works for rehabilitation (underplanting, thinning in natural secondary forests). The contractual agreement and works should be carried out in the same manner as (1) b. above.

c. Planting operation

Within these areas, grasslands are not expanding over large areas except for in the southern part of the Mang Canh FE management area. Protection forest areas are expected to follow a similar structure as the surrounding natural forests. Therefore, grassland smaller than 2 ha in unit is expected to regenerate naturally.

In areas wider than 2 ha and with no existence of mother trees in Block 455,461, 462, 467 within Dak Ruong FE and Block 521 within Man Den FE, pine trees shall be replanted. Especially Block 521 should be taken into consideration as there are many grasslands affected by slash-and-burn cultivation.

In Block 484, 485 and 489 managed by Mang Canh I FE, a significant percentage of grassland had been planted with *Pinus kesiya*. Yet, the planted trees do not show good growth condition. The causes of this poor condition are not confirmed but it is considered that they are affected by insect attack, bad soil condition and repeated slash-and-burn cultivation. Remaining grassland areas are in rather bad environmental condition, therefore, new planting operations should wait until the soil condition changes and grows a thicker humus layer.

d. Village support program

In Mang Canh II, Dak Ruong and Tan Lap FE management areas, the village support programs should be implemented in accordance with (6) d. described below. In block 521 in Man Den FE, the Villager Support Program shall be deployed with giving consideration to prevent slash-and-burn farming as the first priority. Funds provided by the Government Order 661 may effectively be used for this purpose.

(5) Production forests managed by forest enterprises

a. Logging operation

Logging within the production forest is planned as selective cutting. The methods for selective cutting have to follow rules and regulations in Vietnam. The points of principles guided by the government are as follows:

- Exploited forests must be prohibited from cutting until they get to the coming cutting cycle – it is 35 years after the previous cutting time, as stipulated by the state.
- Only forest areas which have come to the second cutting cycle and have obtained approval from the authorized bodies can be exploited.
- The producing unit can only start to carry out the cutting activities after obtaining all of the related figures and in all cases, the producing unit has to observe regulations written down in the cutting design. Concretely, only marked-trees are cut and the cutting volume stipulated in the design should be strictly followed. It is necessary to avoid cases where trees which are easy to access are cut and those which are difficult to access are left in the forest.
- After the logging operation has ended in some areas, it is necessary to report and call forest protecting staff and technicians to inspect whether the cutting procedures have followed the rules, the forest cleaning activities have been implemented, ensuring favorable conditions are created for the growth of other trees.

Monitoring activity is indispensable to secure implementation of the above-mentioned logging operation. The FE staff is requested to observe the contractor's works and detect differences between logging design and results even these results are unavoidable incidents. The day-to-day observation helps to recover the damages occurred from unexpected incidents. The following points should be especially noted as means of the monitoring activities.

In Vietnam, selection (marking) for cutting stands is basically implemented by the FIPI technicians in collaboration with inventory staff of local DARD who have sufficient experience and knowledge. The selected trees are marked by special hammer on three points of the stands. The most important point for sustainable management is to strictly maintain rotation period on yielding. For this, the authorities such as the Department for Forest Development of the provincial government should have to keep logging plan maps for more than 40 years to identify how many years ago the places requested to be harvested had been yielded. And the authorities should establish a system to disclose these maps to every concerned party. The transparency of the work is the most important and effective aspect to put pressure on management bodies and logging contractors not to conduct illegal activities through fear of having to make things clear.

The second point is not to allow cutting of stands except for hammer marked trees. In logging

activity, it is difficult to avoid felling trees on the hauling pass (trail for the logging tractor), and to avoid damage to remaining stands on loading or hauling. How to reduce cutting of these stands without hammer marks is another important point to the inspection of the results of the operation. In general, loggers expect an additionally permitted yielding limit for high value stands in any country, therefore, inspection rules are developed. There are recent movements for these phenomena in the world, civil ombudsman are deployed and accompany officers to observe and check inspection itself. A civil ombudsman system may not be appropriate in Vietnam and it may be difficult to deploy people to remote areas in such deep forests, therefore, foresters have to act as ombudsman. Details for the marking process may not be necessary to record here, suffice to say the FIPI and DARD surveyors will work following their standards and apply them strictly in every case.

b. Rehabilitation of natural secondary forests and bush

The target areas are mainly distributed in areas in Dak Ruong and Mang Den FE. Secondary forests and bush lands with scattered woods are located outside the target areas of the village support program. These areas are expected to lead to a more profitable wood species structure, nevertheless, direct management of spread planting by FEs may not be easy with limited human resources. Except to conduct contractual works with surrounding villages, enrichment planting is not advisable.

c. Planting operation

Grassland existing outside the target area for the village support programs should be converted into man-made forests which are more productive forest stands. The areas are mainly located in areas exceeding 1,000 m above sea level, therefore, pine species may be the most suitable for industrial purposes. Plantation activities, if possible, are expected to be carried out under contractual basis with local residents especially villagers practicing land use by the Villager Support Program. This type of contract can not only provide income generation opportunities for local people but also contribute to controlling the expansion of grasslands derived from slash-and-burn farming.

d. Village support program

Basically, existing farmland should be secured for use, especially paddy fields located in narrow flat areas along with small water channels between thick forests. The majority ethnic minority people in Mang Canh, Hieu and Po E Communes, the Mon Nam are mainly cultivating paddy rice, therefore, the village support program has to give first priority to improve productivity for their paddy fields and to maintain water resources. Second priority may focus on fruit trees growing in surrounding grassland and domestic animal farming. Agroforestry development may not be of interest to Mon Nam people, therefore, extension of agroforestry may need more time.

In Man Den FE area, the Ba Na, the major ethnic people, are practicing slash-and-burn cultivation surrounding the Dak Phe River and on the mountain slope of the southern part of the Dak Bla River. In this area, the village support programs should be given first priority to develop agroforestry and to stop expansion of shifting cultivation. Then second priority may direct contractual industrial plantation connecting with agro-farm development.

In Dak Ruong FE area, the majority of residents are Xe Dang people who are practising slope cultivation of cassava. The village support program should give first priority to how to change the bush to industrial plantation in contractual condition especially the slope area connecting with flat field along the Dak Koi River. Grasslands and bush should be allocated to households and development of industrial plantations supported by paper companies should be invited. If appropriate, the FE may act as an intermediary between villagers and the paper companies.

In Tan Lap FE area, the majority are Mon Nam and Xe Dang. Grassland is not so expansive. People are mainly cultivating rice surrounding the Dak Nghe River and not such big areas are used for slop land cultivation yet. Therefore, the village support programs may focus on how to improve productivity of their paddy fields. Other hamlets are located in natural forest areas in isolated condition. The first priority for the village support program for those villagers may have to be given to improve BHN (daily water, infrastructure, health care and sanitation, etc.) and to find income generation sources. FE should give contractual rights to harvest NTFPs such as medical plants from natural forests. FE also should act as an intermediary between villagers and whole sellers in town. In flat areas where paddy cultivation is possible, the improvement of irrigation facilities is also effective in persuading these people to join forest protection activities especially against illegal hunting.

(6) Protection forests managed by Mang But, Dak Koi and Dak Ring Commune Forest Units (Block 374, 376-385, 390-392, 405, 409, 453, 459)

a. Logging operation

The commercial based logging operations have to be strictly prohibited in all of the areas. Dak Ring Commune is given special consideration as it contains the most important natural forests as the bio-corridor. Tree cutting by local people is treated the same as (1) a. above. In Block 405 and 409, as shifting cultivation is expanding, it is necessary to carry out sufficient observation and patrol.

b. Rehabilitation of natural secondary forests and bush

There are degraded secondary forests in Block 405, 409, and 459. These forests are being threatened by forest fire, therefore, front areas for agricultural land should be treated with

rehabilitation work. If possible, plantation shall be encouraged by group-based contractual work under the Program 661. To protect forests from shifting cultivation, joint efforts with villagers have to be the basis for any activities. Officials of Commune Forest Units are expected to act as good organizers and key persons for group formation. The implementation of rehabilitation in secondary forests should be carried out the same as for the areas mentioned (1) b. above.

The areas in Dak Ring Commune should be treated in accordance with Thach Nham Protection Forest mentioned in (1) b. above.

c. Planting operation

The same as (1) c. above.

d. Village support programs

The same as (1) d. above.

(7) Production forests managed by Mang But, Dak Koi, Dak Ruong, Tan Lap, and Dak Tre Commune Forest Units

a. Logging operation

Commercial based logging operation is not planned.

b. Rehabilitation of natural secondary forests and bush

Except the target areas for the village support program, forest rehabilitation activities are not planned.

c. Planting operation

Except the target areas for the village support program, grasslands and bush are the main targets for industrial plantation. For preparing fast growing material for pulp and paper, short rotation species are to be planted. Planting activities shall be implemented with contractual agreement with FEs or directly with paper companies. To allocate land use rights to the paper companies is one of the choices to realize efficient operation.

d. Village support programs

Basically the same as (6) d. above. It is expected to determine the practical menu with people's participation after examining the points of FEs' operations and conditions of target local groups.

3.6 Long-term focused targets on forest management in Kon Plong District

Assuming that all of the forest in Kon Plong District will be adequately managed for the long term with afforestation and villagers' participation in forest conservation and management on the basis of the concept of this master plan, an overall forest image to be a long focused target is drawn. This target value is an aim from a long-term view and ideal to the utmost. An implementation plan to determine to what extent the aim can be reached in the coming 10 or 20 years should be determined according to investigation into actual technical level, human and financial resources and by other effective means.

Long focused targets are estimated on the basis of the following views:

- 1) Protection forests and the existing natural forests where logging is not executed shall grow to climax natural forest and the conditions are maintained
- 2) Protection forests and the existing grassland and bare land where logging is not executed are artificially or naturally rehabilitated, converted into forest land and then grow to stands having similar forest type as natural forests
- 3) In natural forests designated for timber production in the areas under the management of the FEs, selective cutting in a 35-year cutting cycle is to be practiced, with the forests managed and maintained as mature natural forests
- 4) Grasslands in areas under the jurisdiction of the FEs, excluding areas identified for the Villager Support Program, are to be afforested, continuously managed and administered as man-made forests targeted for clear cutting by the FEs. In due course, areas left to regenerate naturally will grow into secondary forests, and eventually into mature secondary forests
- 5) Mature natural forests under the jurisdiction of the communes are to be continuously monitored and managed to maintain them as climax forests. Immature or open canopy secondary forests together with isolated stands will grow into mature secondary forests as time passes. Land excluding grasslands in the areas under the jurisdiction of the communes, and bush to be afforested is to be left to regenerate naturally into mature secondary forests
- 6) Areas of grassland and bare land, which have been identified for the Villager Support Program, are to be converted to paddy fields, upland fields and areas for agroforestry (all classified as 'land for agricultural use' for the purpose of calculations) as part of those programs, and excluded from 'forests'. Grasslands and bush in areas less than 1 km from the communities and not designated for agricultural use are to be left to regenerate naturally and monitored in future to follow changes similar to grasslands and bush in the naturally regenerated areas under the jurisdiction of the FEs and communes. However, in the event of population increase, either natural or through the government's immigration policy, it would be appropriate to consider these areas as reserved land, which may later be converted for agricultural use.

Based on the above assumptions, it is intended that the forests in the master plan's target areas will, through the process shown in Table I-3.6.1 and Figure I-3.6.1 below, develop into mature natural forests covering an area of 190,000 ha, 83% of the entire area of 229,000 ha covered with mature natural forests. As for agricultural land, it is assumed that the respective Villager Support Program would be implemented in the first 35 years to utilize such land as paddy fields, upland fields or land for agroforestry. The existing area of about 6,800 ha would be more than doubled to 14,600 ha, and would help to eliminate food shortages and improve opportunities for income generation. Man-made forest stands, which at present cover about 5,300 ha, would approximately treble in area to 15,100 ha. Ultimately man-made forest stands in the protected forest areas (very crucial protection area) would be transformed into natural forests. Although these would slowly decline in area, after 100 years 14,600 ha would still be maintained. This projection is based on the assumption that man-made forest stands would be logged in a 30-70 year rotation, and be reforested after logging.

Table I-3.6.1 Target land use and forest condition

(unit: ha)

year	Matured natural	Secondary natural	Young secondly	Man-made	Rehabilitation
2001	109,825.58	16,203.87	33,874.73	5,301.25	0.00
2036	126,029.44	20,018.43	43,350.68	15,076.23	9,593.11
2071	146,047.88	43,350.68	9,593.11	15,076.23	0.00
2106	189,398.56	10,049.73	0.00	14,619.60	0.00

year	Grass	Bush	Agri & Agro	Total
2001	19,816.36	36,840.95	6,783.37	228,646.11
2036			14,578.21	228,646.11
2071			14,578.21	228,646.11
2106			14,578.21	228,646.11

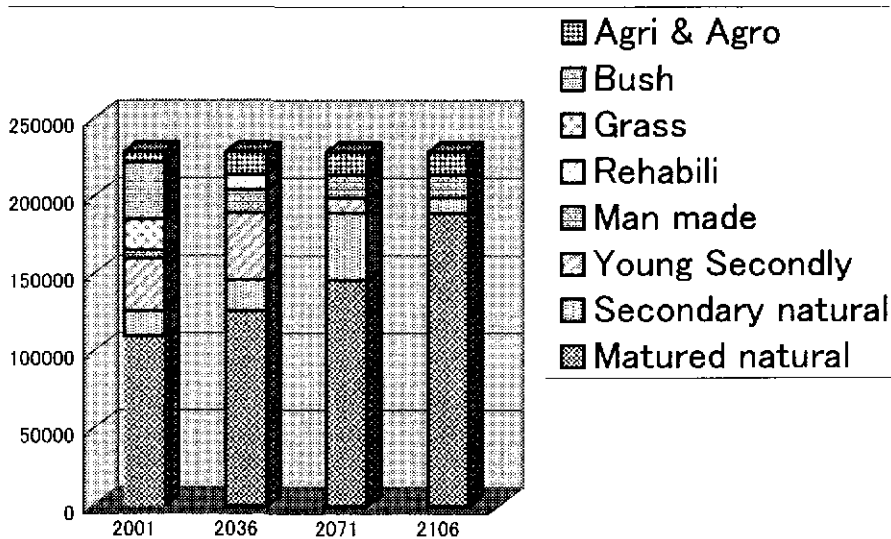


Figure I-3.6.1 Transition of forest condition and long-term target (unit: ha)