

## ***Volume I Master Plan on the Study Area***

### **Part 1 Study objectives and process**

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#### **1 Objectives**

The objectives of the development study are to prepare a forest management plan in order to establish sustainable forest management in Kon Plong District of Kon Tum Province, located in the most important forest areas of the Central Highlands. This will involve:

- (1) Preparation of a master plan to describe the forest management principles for the whole district and to integrate watershed management, biodiversity, and forest production. The targeted area is approximately 230,000 ha of Kon Plong District in Kon Tum Province.
- (2) Preparation of a forest management plan based on the results of a forest inventory and to conduct a feasibility study for a model area.

The framework of the study regarding the long-term objectives and the logical relationships among the study activities is shown in the summary below.

## Summary of the Feasibility Study on the Forest Management Plan for the Central Highlands of Vietnam

<b>Objectives and Outputs (Overall Goal)</b>	
Forests in the Central Highlands are to be maintained and expanded for sustainable production as well as wildlife conservation	
<b>Mid-Term Objectives (Project Goals)</b>	
a. The Forest Enterprise implements a Plan to achieve sustainable forest management and to secure benefits for the communities as well as preserving natural habitats and biodiversity b. Forest Management Plans for Forest Areas of the Central Highlands are formulated and implemented c. Technical training on forest operations for communities is developed through contracted NGOs	
<b>Short Term Objectives (Study Objectives)</b>	<b>Assumptions</b>
a. Forest Management Guidelines (Master Plan) for Kon Plong are presented b. Forest Management Plan of the Forest Enterprise is prepared c. Officers of Kon Plong District obtain the knowledge and motivation to conduct Forest Management Planning and carry out related operations	<b>a. Policy concerns</b> • Objectives of Program 327 are maintained • Government acts positively on its 5 million hectare afforestation program  • Forest Enterprises are maintained and playing key roles in forest management  <b>b. Price Index concern</b> • Logs and NTFPs prices are maintained at the same level as other goods  • No special events cause a major change in labor costs  <b>c. Wildlife Conservation</b> • No unknown species is discovered to require the creation of major protection areas  <b>d. ITTO C&amp;I, Labeling</b> • The current direction of discussions is maintained  <b>e. Natural Disasters</b> • No natural disasters occur equivalent to a 100-year event
<b>Outputs</b>	
a. Forest Management Guidelines (Master Plan) and Land-use / Vegetation Maps for the target area (Kon Plong) b. Forest Management Plans and Forest Type Maps for the area of the Forest Enterprise (Model area) c. Technical Manuals for Management Planning d. Aerial photography of Kon Plong District e. Base Maps covering six Forest Enterprise areas	
<b>Activities / Measures</b>	
a.1 Collection of general data and information on nature and society a.2 Study on the forest management conditions of the FEs a.3 Survey on wildlife conservation and the social economy of communities a.4 Aerial photographic interpretation for land-use/vegetation mapping b.1 Surveys for forest inventory and aerial photograph interpretation b.2 Preparation of a Forest Inventory document b.3 Surveys for introducing agroforestry b.4 Interview surveys on the socio-economic situation of local communities within the model FE areas b.5 Surveys on wildlife b.6 Price and market surveys on logs and NTFPs b.7 Cost surveys and analysis of forest management operations b.8 Evaluate for ITTO C&I, biodiversity, and cost performance c.1 On-the-job training for management planning procedures d.1 GIS database covering the model area as a tool to assist in plan simulation and monitoring	

## 2 Methodologies

### 2.1 The study area

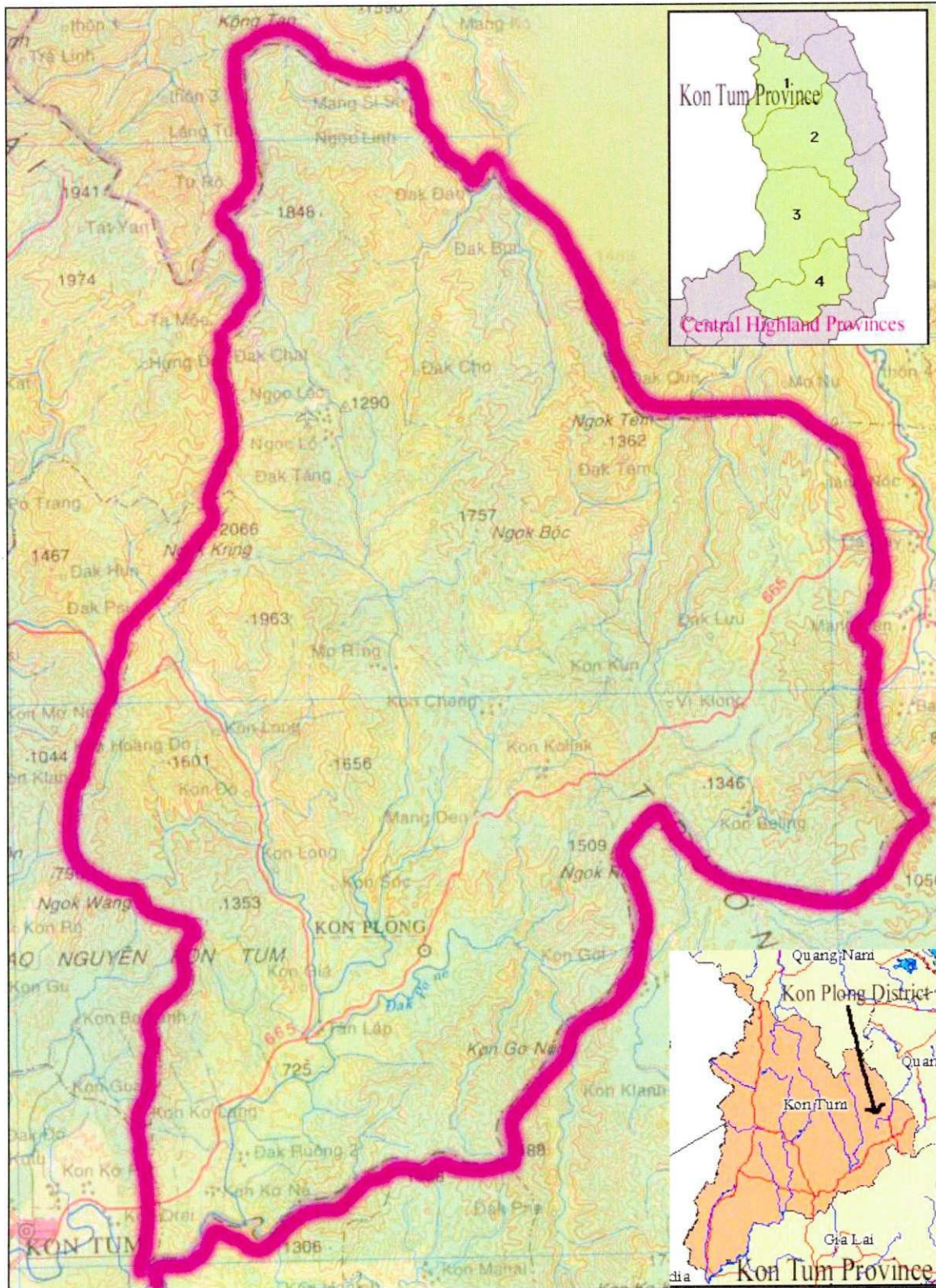


Figure I - 2.1 Location of the Study Area (Kon Plong District, Kon Tum Province)

### **(1) Total study Area**

The Study area covers approximately 230,000 ha of Kon Plong District<sup>1</sup> in Kon Tum Province located in the Central Highlands. The forest management survey includes research on the marketing routes and markets for forest products, and the environmental survey includes research on sanctuaries in the vicinity of the study area.

### **(2) Model Area**

The model area will be selected based on its development potential and importance after surveying all Forestry Enterprise areas in the initial field survey.

## **2.2 Methodology and process**

The study is divided into two phases. The first phase was conducted from February 2000 to December 2001, and mainly considered the preparation of a master plan for Kon Plong District. Field surveys were conducted from February to May 2000 and from March to June 2001, and the second phase was conducted from February to September 2002, mainly to consider the preparation of a model management plan for a Forest Enterprise area.

The term FEs in this report is defined as state forest enterprises consisting of forest enterprises and state-owned limited companies such as Konplong Forestry Agriculture Industry Investment Development and Service Company. In addition, the Konplong Forestry Agriculture Industry Investment Development and Service Company is also mentioned as the Mang Canh II forest enterprise which is the former name of the company .

### **2.2.1 Plan for the study**

The Study is being conducted or will be conducted following the operations of each phase:

*First Phase:* From the Preparation Work Period in Japan to the First Work Period in Japan

*Second Phase:* From the Second Field Survey in Vietnam to the Second Work Period in Japan and from the Third Field Survey in Vietnam to the Third Working Period in Japan

The activities in the first phase consisted of six (6) interrelated surveys and analysis as shown in the flow chart presented in Figure 1.2. These are: 1) aerial photography, mapping and digitizing for GIS, 2) Land use and vegetation mapping, 3) Natural conditions survey, 4) Wildlife survey, 5)

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<sup>1</sup> Kon Plong District was divided into two districts: Kon Ray and Kon Plong in January 2002. Nevertheless, in this report, Kon Plong District is regarded to cover both the new two districts.

Socio-economic survey, and 6) Forest management condition survey. The main tasks undertaken in each survey period are as follows:



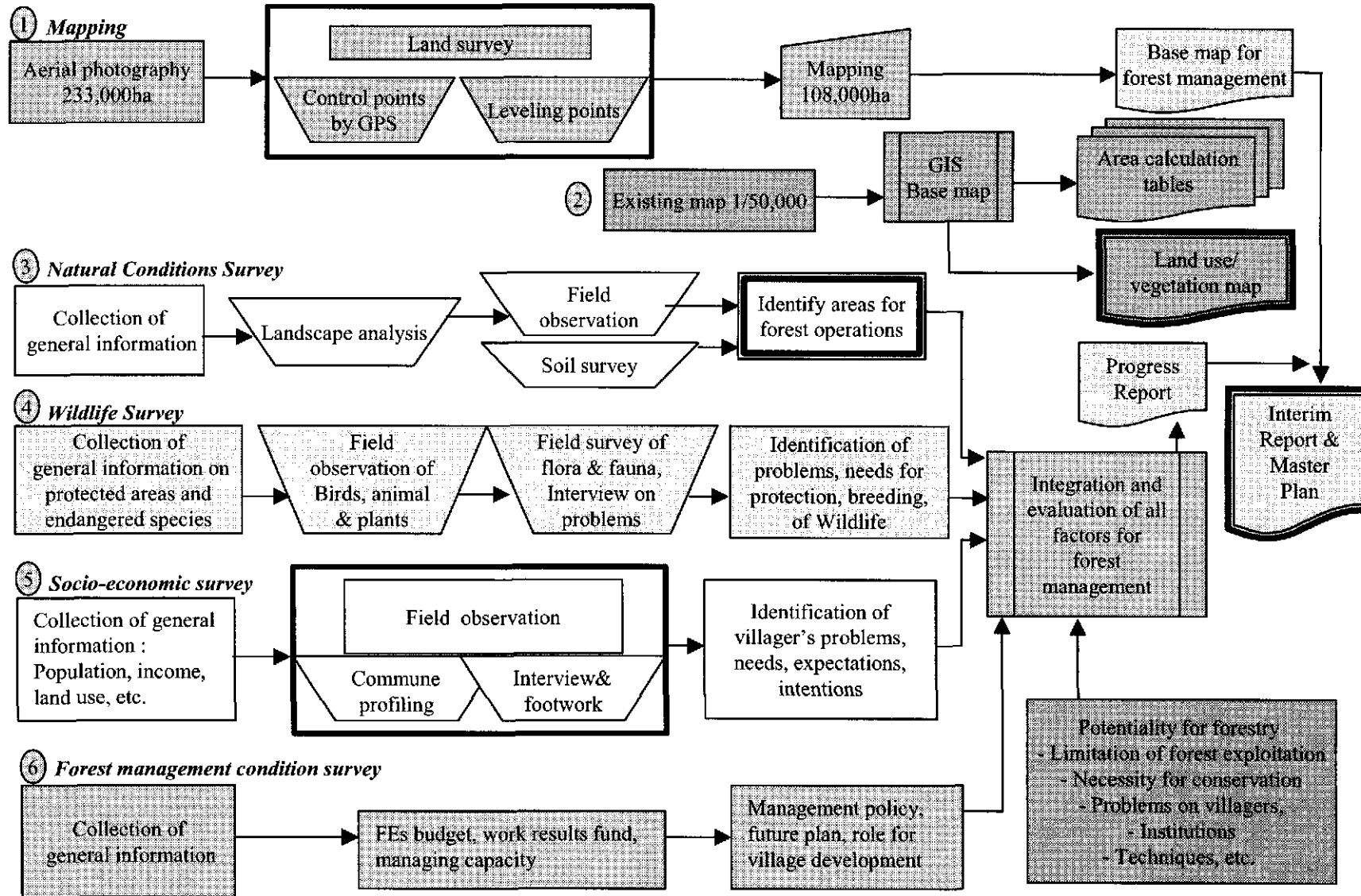


Figure I -2.2 Flow Chart of the Study (the First Phase)

**(1) Preparation work in Japan**

Collection of existing data and information, review of existing studies, plans and related operations

**(2) First Field Survey in Vietnam**

- a Collection of data and information required for the preparation of a forest management plan in the study area (natural conditions, socio-economic conditions, forest management, and environment)
- b Implementation of aerial photography, land surveys, and mapping by local sub-contractors
- c Implementation of socio-economic and environmental surveys by local sub-contractors
- d Preparation of a land use and vegetation map
- e Preparation of a master plan
- f Selection of a model area
- g Mapping of the area managed by the forestry enterprises in Kon Plong District (approximately 83,400 ha)

**(3) First Work Period in Japan**

- a Mapping of the area managed by a forestry enterprise in Kon Plong District (approximately 24,600ha)
- b Implementation of a preparatory survey for a forest inventory
- c Preparation of alternative plans for the Forest Management Plan of the Model Area

**(4) Second Field Survey in Vietnam**

- a Implementation of a forest inventory (plot survey; aerial photograph interpretation)
- b Implementation of natural condition survey
- c Implementation of socio-economic and environmental surveys by local sub-contractors
- d Collection of data and information required for cost analysis and evaluation for the Forestry Enterprise that manages the model area

**(5) Second Work Period in Japan**

- a Preparation of a forest type map
- b Preparation of a forest management plan
- c Preparation of a forest inventory book

- d Preparation of a draft forest management plan for the model area
- e Preparation of a Draft Final Report

**(6) Third Field Survey in Vietnam**

- a Explanation and Discussion of the Draft Final Report
- b Implementation of Technology Transfer Seminars

**(7) Third Work Period in Japan**

Preparation of the Final Report



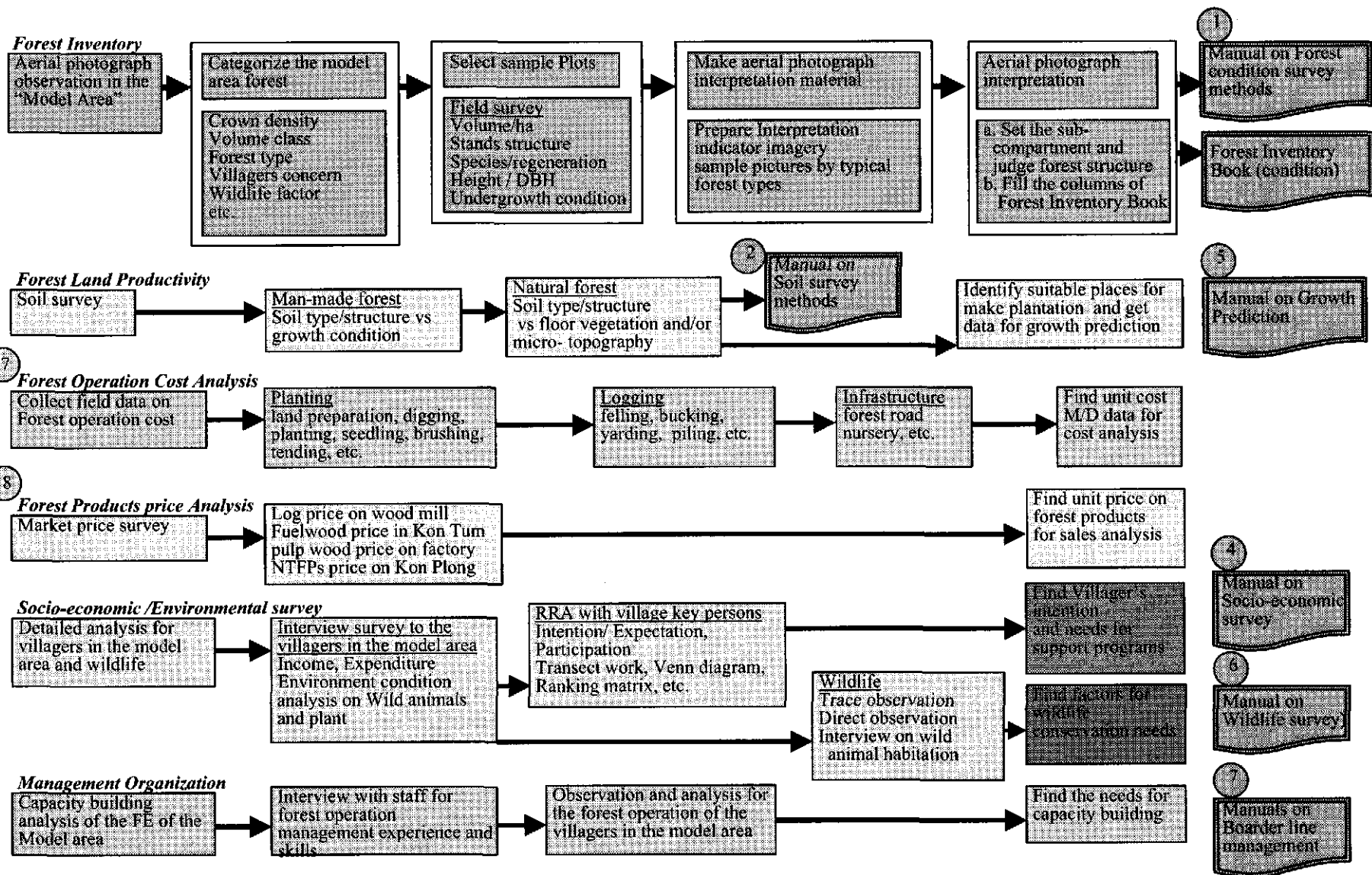


Figure I - 2.3 Flow Chart of the Study (the Second Phase)

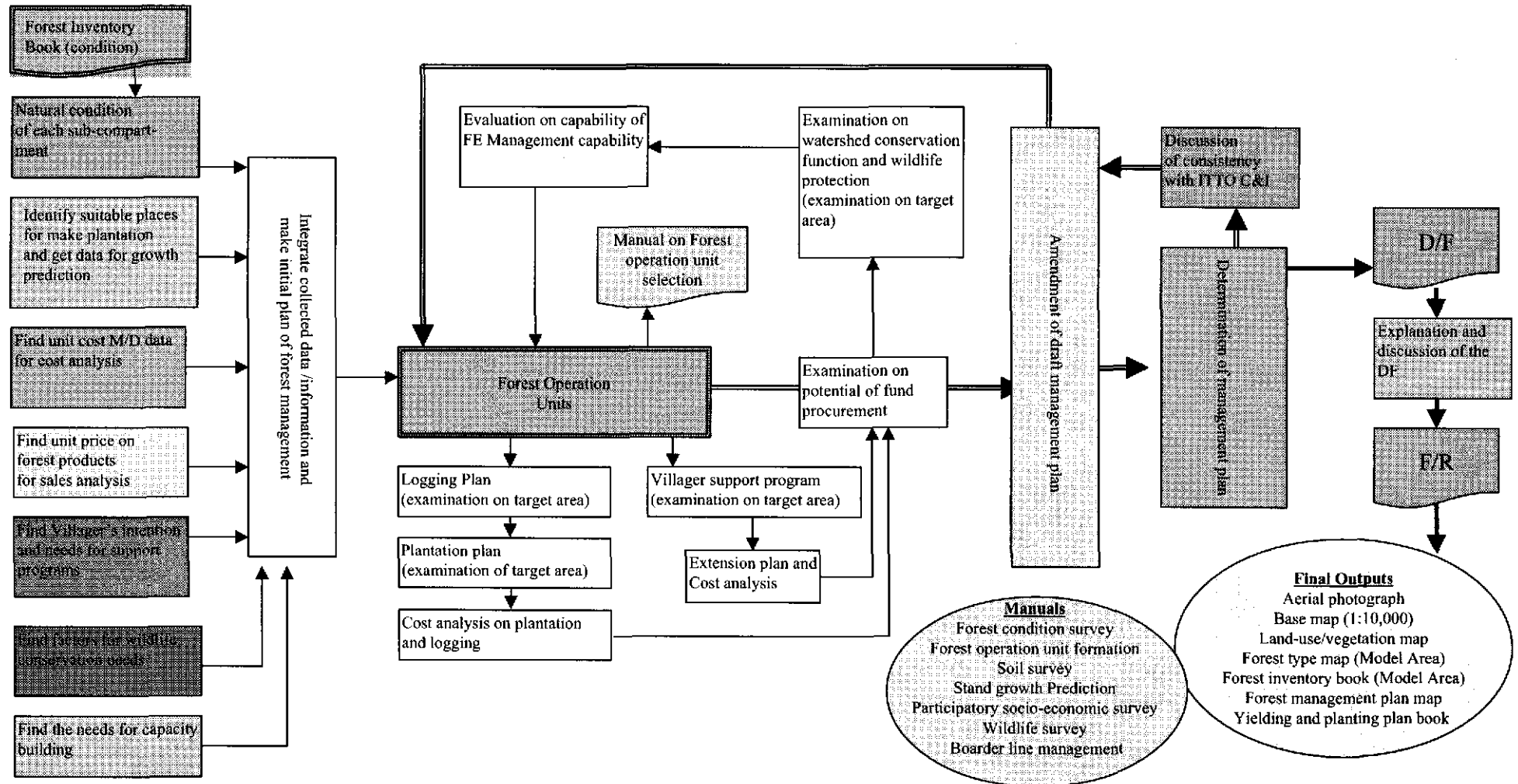


Figure I - 2.4 Formulation process of the Forest Management Plan

**2.2.2 Land use and forest cover**

To identify the current land use and forest type in the Study Area, several sources of information such as satellite imaginary data and aerial photographs were analyzed and the field forest survey was conducted to verify the basic information. All the information collected was, then, analyzed to develop a land use and vegetation map.

**(1) Materials and activities applied for the survey**

For finding out the current land use and forest type in the Study Area, several materials and activities are applied as shown in the table below.

<i>Items</i>	<i>Description</i>
1. Secondary information	Review and analysis of references related to vegetation and forest type
2. Aerial photograph	Photographs in 1991, covering almost the whole area of the Study Area
	Photographs in 2000, covering 20% of the Study Area
3. Satellite imaginary data	LANDSAT TM data collected in 1995 and 1997
	LANDSAT TM data collected in 2001
4. Forest sample plot survey	Data collected from 34 sample plots
5. Field observation	Observation for supplement of the sample plot survey for verifying the satellite imaginary data

Note: Aerial photographs taken from March to April 2001 were not available during the field survey term.

**(2) Forest sample plot survey**

The survey was conducted at selected sites considering the satellite imaginary data used as an indicator image for land use and forest categorization and efficiency of the field survey. The size of plots were established as a rectangular of 50m×20m, and the following items were measured in each plot:

- a Physical conditions: location (management area and GPS data), altitude, micro-topography, inclination (degree), slope direction
- b Biological conditions: forest category in the satellite imaginary data, forest type in FIPI definition, dominant species, crown density, undergrowth
- c Name (both local and scientific), DBH (diameter at breast height) and height of each woody species exceeding 10 cm in DBH.

### (3) Estimation of stocking volume in sample plots

To evaluate the forest status of each forest sample plot, stocking volume was estimated based on stem basal area, tree height and stem form factor. The equation applied in the Study is the one employed by Sub-FIPI, Qui Nhon, to Kontum Province and defined according to forest types as shown in the table below.

<i>Forest type</i>		<i>Equation</i>
II	Restored forest	$V = f_{0.43} * (SGi) * H_{lorey}$
III	Secondary forest	$V = f_{0.42} * (SGi) * H_{lorey}$
IV	Primary or secondary matured forest	$V = f_{0.41} * (SGi) * H_{lorey}$
R	Dipterocarp forest	$LnV = 0.00007 + 1.9825LnD + 0.8163LnH$ (Nha Xuat Ban Nong Nghiep, 1995)

where: V = volume, f = stem form factor, SGi = total stem basal area,  
 $H_{lorey} = \frac{\sum (G*H)}{SGi}$ , D = stem diameter, H = tree height

### (4) Preparation of land use and vegetation map

In preparation of a land use and vegetation map, the existing topographic map on a scale of 1/50,000 was used as a base map of the GIS database. The land use and vegetation map was prepared by zoning of land use and vegetation based on analysis and verification of LANDSAT TM data and information from aerial photography including field observation and forest sample plot survey.

The procedure of preparation for land use and vegetation map is shown in Figure 2.1 and the progress is as follows:

- 1) Land use zoning (town area, farmland, grass-land, secondary forest, forest) was performed in units of pixels based on analysis of LANDSAT data. Data on forest area were further decomposed to eight bands, and categorized in units of pixels.
- 2) Existing data regarding administration boundaries, place names, centers of villages (information described on the existing map on a scale of 1/50,000), and boundaries of communes, forestry enterprises, existing compartments, and forest use zoning (production forest, protection forest, special use forest) are stored on the map on a scale of 1/50,000 in GIS database. The mesh data on micro-topography, slope, water channel and elevation were also stored in GIS database.
- 3) The GIS base map was developed applying the data mentioned in 1) and 2), and was printed out as a tentative land use and vegetation map.

- 4) By comparing information from the aerial photograph taken in 1991 with a tentative land use and vegetation map in 3), sites needed for field verification were selected.
- 5) LANDSAT TM data collected in 2001 was analysed in a way that land use and forest types were classified with the same system applied in 1), and the data were categorized in units of pixels. The data were, then, stored in GIS and the tentative land use and vegetation map in 2001 was printed out.
- 6) Based on the tentative land use and vegetation map to which 2001 LANDSAT data was applied, field verification including forest sample plot survey and observation was carried out. Vegetation and land use boundaries were, then, drawn on the tentative map and the land use and vegetation source map was prepared.

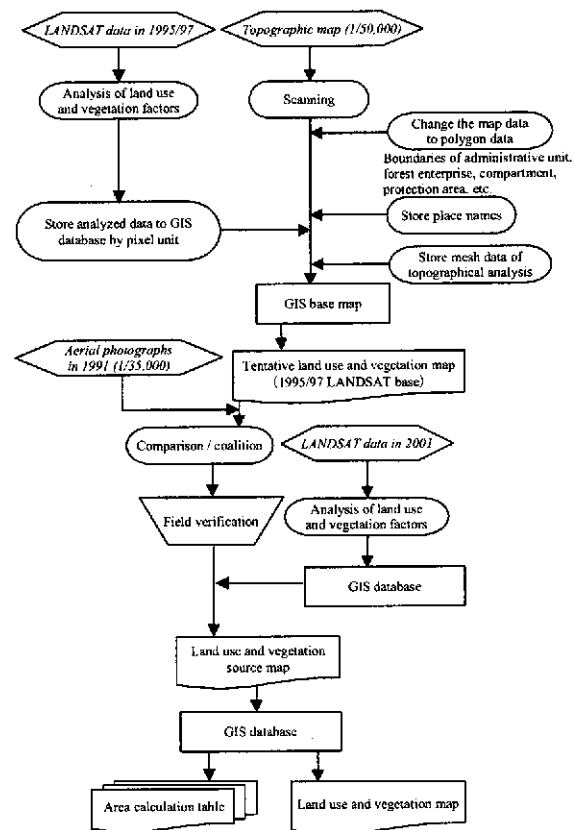


Figure I -2.5 Flow chart on land use and vegetation mapping process

- 7) The following outputs were printed out from the GIS data base:
  - a Area calculation table
  - b Land use and vegetation map
  - c Forest type map and compartment map of each forestry enterprise
  - d Mesh map of natural conditions (overdrawn on the compartment map)
  - e Land use change map (comparison between satellite data in 1995/97 and 2001).

### 2.2.3 Socio-economic analysis

Quantitative and qualitative data were collected through the Annual Socioeconomic Statistic Reports in Kon Plong (1998, 1999 and 2000) from Kon Plong District People's Committee Office. Other information was obtained from interviews with commune/village leaders or elders using questionnaires during the field survey term. The interviews were implemented by a local contractor (FIPI) in all the communes (12) in the Study Area. The interviews were conducted individually with leaders and with groups of key persons in the villages.

#### **2.2.4 Wildlife and environment**

Information and data were collected from published and unpublished papers and reports on activities of wildlife surveys nation wide, and contact was made with national, international and independent organizations to verify this information such as the World Bank, bilateral international development organizations, NGOs such as WWF and Birdlife International, etc., and MARD and FIPI.

The field survey was implemented mainly through interviews with local people in the mountainous and isolated areas to collect their experiences of observing , large mammals such as tiger, serow, deer, old world monkey, etc. And a transect survey was conducted to detect signs of animal habitat and to estimate population density, potential nursery sites, transit sites, etc. The survey was carried out from the end of April to the middle of May 2001 in sites located near villages in Dak Koi, Dak Phe, Mang Canh, Po E and Ngoc Tem Communes and the area of a new road construction camp which is located 10 km north from Hieu Village.

#### **2.2.5 Forestry activities**

A survey on management and activities conditions for the six FEs operating in the study area was implemented to collect data by letting the FEs fill in several kinds of forms and to interview with persons.

- a Annual implementation of the various operations from 1994 to 1999 (scale, income, expenditure, etc.)
- b Annual statement of account from 1994 to 1999
- c Management organization
- d Capital equipment (logging and skidding machine, forest road, management facilities including offices)
- e Buyer of timber (standing trees, timber, etc.)
- f Villager Support Program (target, contents, annual budget)
- g Public relations/education and training, and extension for villagers

## **Part II Master Plan for Forest Management in Kon Plong District**

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### **1 Key assumptions of the master plan**

Before the Study activities, the study team evaluated conditions, especially key assumptions, governing the study results. These conditions are viewed from five fields considering aspects such as concern for forestry policy, forest product pricing, wildlife protection, international movements for the sustainable management of forests, and natural disasters.

#### **(1) Forest and forestry policy**

The first issue to consider in forest and forestry policy is the basic framework of land use planning. The study used the land use plan presented by the Forest Protection Department of Kon Tum Province. The study maintained Block boundaries (including Block numbering and the system of block arrangement), and Protection Forest boundaries. Under forestry law, the protection forest is categorized as watershed areas, natural ecological protection areas, and other areas. In the new regulations mentioned, the protected forest is divided into three levels of protection: very critical areas, critical areas, and less critical areas. The existing land use plan does not mention this categorization, so the study team took the protection areas of Kon Plong District as being categorized as watershed protection areas, and the boundaries of critical areas and less critical areas were examined and proposed based on the field survey.

The second issue is afforestation policy. The Vietnamese government is implementing the '5 million hectare new afforestation plan'. This afforestation plan is being implemented through various systems to assure land use rights for forest enterprises, companies, individuals, and householders. These systems will greatly affect local communities; therefore, the study is carried out based on the national policy for this 500 million afforestation not changing.

The third issue concerns the Forest Enterprises. The government is enforcing rationalization of state enterprises. This policy aims to replace FES that do not have suitable management capability, and transfer the managed forests to provincial government. In this context, the six Forest Enterprise management organizations are being evaluated according to their management capacity for future activities. Consequently, the six forest enterprises have sufficient natural resources; therefore, the plan under discussion assumes that these forest enterprises will keep their management states.



## **(2) Prices for forest products**

A national road through Kon Plong District towards Quang Ngai District is currently being rapidly improved. Access to Quang Ngai due to the improved national road may provide better supply potential to a small-scale domestic market. Similar changes may occur in various other fields. For example, the discovery of new natural resources may create major employment opportunities. On the other hand, new industries created by overseas investment may increase wage levels leading to a substantial decline in log values.

Such drastic changes in the economic structure cannot be predicted and the inclusion of too wide a range of potential changes will result in failure of the plan itself. Therefore, in this plan, it is assumed that no change will occur over the next 10-20 years in the relative price structure for logs based on the current analysis, NTFPs and commodities, and the price structure for wages, fuel, services and other related goods or duties are not predictable.

## **(3) Wildlife protection**

Viet Nam enjoys a rich and diverse natural environment. In 1998, the existence of the Javan rhinoceros was reported. A new species has also been identified that represents the largest newly discovered mammal in the 20th century. Viet Nam, therefore, has the potential to harbor undiscovered wildlife that are of worldwide significance. If scientifically important wildlife is discovered in Kon Plong District, the Government will be obliged to review the protected area system for the district, and will likely amend all the long-term forest management plans that have been previously proposed. In this plan, it is assumed that significant discoveries of wildlife that would require complete change to the current protected area system will never occur.

## **(4) Sustainable forest management**

Current international forums concerning forest management are strongly advocating the implementation of sustainable forest management practices. In this context, a new movement to insist on elimination of timber without labels from world trade is arising. One standard for the international recognition on sustainable management is referred to as 'criteria and indicators' by ITTO. The specific requirements are as follows: the forest operations, including the extraction of wood, do not exceed the sustained yield nor threaten the maintenance of biological diversity; planning for the verification of sustainability is fully established and in addition an indispensable condition is that records from planning to implementation are maintained; the planning and implementation process is disclosed to local communities or third parties; the opportunity for communities to participate in the preparation and implementation of forest plans is guaranteed; and the process of decision making related to

diversified forest management is transparent. This study assumes that Viet Nam will respond to the requirements established by international organizations, disclose information, implement management involving community residents, and in particular, support local communities by carrying out a communication with the residents.

**(5) Natural disaster concerns**

If a serious natural disaster affects the designated areas covered by the plan, forests that have been set aside for production or bio-diversity conservation may not be able to fulfill these functions. This plan is being considered on the assumption that no serious natural disasters that destroy forest sustainability will occur.