

## Part 2

### CENTRAL HIGHLAND FORESTRY DEVELOPMENT PROGRAM

The period 1997-2000 & 2010

#### I. Out-look and objectives of Central Highland forestry development program:

##### 1. Out-looking of sustainable development:

Forestry should be developed as a basis for all activities of economy, culture and society in Central Highland, for development of economic sectors base on sustainable and in balanced with eco-environment. Forest areas and Forest production can contribute stable growth of other economic sectors in the region.

- Establishment and protection of existing forests (including protection forest, special-use forest and production forest) make forest utilization effective.

- Classification of 3 forest types all over the country, ensuring harmonisation, rationality and sustainability for each region making high natural potentials, bringing mix advantages for development and utilization.

- To shift forest logging to forest protection, establishment and development, silviculture activities should be given the first priority under sustainable agro-forestry method to create stable and safe eco-system as well as meeting increasing demands of forest products of society and of export.

- Development of social forestry, encourage all economic factors concentrate to forestry silviculture; consider household's economy as motivation factor for development and State enterprise has an important role to assist remote people agro-forestry method and slope cultivation.

- Shift logging from natural forest to forest plantation based on concentrated industrial plantation with strategy to use land capacity most effectively, to motivate labors and to balance ecology.

- Consideration to apply science and technology as important factor to forestry productivity. It is needed much attention to silviculture technology and forest products. Improvement technology and equipment for forest product processing to produce high quality products competitive edge on the market based on material saving, quality goods improvement and forestry sector added value increasing.

- Forestry activities and Forestry economy must be under the State's management. It is necessary to consider the State Enterprises as main and decisive role of forestry production, establishment, development, logging, processing and forestry product marketing.

- Establishing concentrate forest areas base on classification of 3 forest types in each area, province, district and commune. Identify forest owner and make new owner through forest allocation (households, village community, commune, district, State forestry enterprise,...) to promote development of forestry based on protection forest as main objective.

##### 2. Objectives:

###### 2.1. Common objectives:

- to Protect existing forest areas to keep watershed protection function, conserving gene and bio-diversity and to improve sustainable forest product capacity.
- to Establish concentrated forestry areas to increase capacity of forest production and other economic sector in the region besides consideration protection.
- to Establish concentrated industrial plantation areas together with processing industry (chip paper, special products,...).
- to Assist rural people to settled cultivation on slope land combining agro-forestry to improve living standard and to stop destroying environment and natural sources expense.
- to Establish Central Highland's economic system to contribute balancing population density in the county, to strengthen potential of Central Highland, to protect border areas and to increase GDP.
- to Develop social forestry, make all economic factors taking part to forestry silviculture, State economy should contribute for it, as central role of organization, planning, processing industry and marketing . Considering household economy as motive force of development of socio-economy.

## 2.2. Specific objectives:

### a. in Environment sector :

- to Protect existing natural forest areas and new forest plantation.
- to Establish new 3 forest types though restoration and regeneration, afforestation and agro-forestry model implementation, increasing forest cover strengthen protection function, controlling water source, resisting erosion... to improve eco-environment useful for human life.

The objectives of environment as follows:

Items	1997-2000	2001-2010
Forest protection (existing forests and new forest plantation)	3,279,200	3,297,200
	180,000	620,000
- Restoration and rehabilitation of natural forests	80,000	100,000
- New forest planting, agro-forestry	100,000	520,000
Forest cover increase from 56.7%	62.2%	73.4%

### b. in Economy sector:

#### \* needed activities in 1997-2000

- to Classify 3 forest types (protection forest, special-use forest, production forest) though legal documents and permanent sites.
- to decrease deforestation areas, to Establish appropriate institution, to specify duties and rights of authorities, organizations, units and households for taking part into forest managing activities and forest silviculture to make potentials of Central Highland higher on the first period of forestry development program.
- to start program of industrial plantation including planning of low- material forest planting areas, mother trees plantation such as seedlings, nursery and consider state enterprises as important factor in forest planting program.

- to renew processing industry all over Central Highland.
- to evaluate existing forest enterprises to establish an appropriate system and management boards of protection forests and special-use forests.

\* in 2001-2010.

- to establish forest product processing network with appropriate scale, material saving for reducing material demand pressure on natural forest, increasing forest product added value and benefit from forestry on National economy in the Central Highland area.

- to increase GDP of forestry sector from 968 billion Dong (1994) to 1,252 billion Dong in 2000 and 2,376 billion Dong in 2010.

- to contribute by processing to increase industrial GDP and to improve GDP structure in the region.

Annual forestry production :

Items	unit	1997-2000	2001-2010
Material production			
1. Round wood	m <sup>3</sup>	1,020,000	900,000
2. Bamboo	10 <sup>6</sup> trees	83.5	215.0
3. Rattan	tons	25,000	85,000
4. Pine resin	tons	10,000	27,500
Forest product processing			
1. Construction sawn timber	10 <sup>3</sup> m <sup>3</sup>	287.1	500
2. MDF Fiber board	10 <sup>3</sup> m <sup>3</sup>	200	540
3. Plywood and particle board	10 <sup>3</sup> m <sup>3</sup>	444.9	1,096.9
4. Paper and paper pulp	10 <sup>3</sup> tons	500	2,500
5. Laminated board	10 <sup>3</sup> m <sup>3</sup>	222.4	548.5
6. Finest forest products	10 <sup>3</sup> m <sup>3</sup>	55.6	70.0
7. Fine art handicraft	10 <sup>3</sup> m <sup>3</sup>	7.5	15.5

c. Society:

+ 1996-2000

- to hold training course for staffs and forest land allocation to 40,000 households who living on shifting cultivation working 130,000 labors taking part into forestry silviculture.

- migration of 15,000 households from other areas (the North) establishing new economic zone in some prosperous areas of Central Highland to balance population density in the country, to strengthen human resource for Central Highland, to safe border and to improve GDP.

- to stabilise living condition for 200,000 households taking part into forestry silviculture.

- Steadily, to improve income of forestry labors to contribute elimination hunger and poverty for the ethnic minority people in the region and newcomers.

+ 2001-2010

- migration 25,000 households from other areas (the North), establishing new economic zone in some prosperous areas of Central Highland to balance population density in the country, to strengthen human resource for Central Highland, to safe border and to improve GDP.

- Training course for staffs and people to participate settle production and living for 300,000 households working 130,000 labors taking part into forestry silviculture.

- to develop more occasions to create jobs and to improve living standard for local people steadily.

- to organize some new rural zones, town and residence groups with convenient infrastructure for development base of the whole region (Central Highland).

#### d. Security:

- to establish residence groups for some communes nearby country border with improvement their living standard to stable politics, social demands and security for border area of the country.

- to establish border line as 'shield' to safe socio-economic activities of the region.

## II. Land use planning for Central Highland:

### 1. Land use out-looking:

Appropriate land use is very important to stable and sustainable development of all communities in the region, solving all problems come from land use for wrong purpose.

Land use planning in Central Highland should be identified base on following point-view:

- + Priorities for urban development, residence and new construction, road upgrade, irrigation, mining,... under planned program.

- + Keep appropriate land for construction of hydro-power projects meet a demand of enough energy for industrialization and modernization.

- + Keep land for establishment of border line for security.

- + The first priority should be given to agriculture development base on natural condition, socio-economic condition, ecology balance and infrastructure condition such as irrigation system, road, population,....

- + The keep land for forestry development (except other land : rocky mountain, small river and stream, non-ever-used land,...).

### 2. Land use planning:

#### 2.1. Master planning of land use for the whole region:

Base on master plan of socio-economic development of Central Highland, land resource should be used as follows:

Statistics of Land areas under using purpose.

Items of land use	Area (1,000 ha)	Percentage (%)
Total natural area	5,559.9	100.0
Forestry land	4,094.5	73.7
- Forest cover land	3,155.2	56.7
- Non-forest cover land	939.3	17.0
Agriculture land	1,063.3	19.2
- On-going cultivation land	579.5	10.4
- Bare land and denuded hill	483.8	8.8
Other sectors' land	100.0	1.7
Non-ever-used land	302.1	5.4

2.2. Forestry land planning:

a. 3 forest types identification :

- Base on master plan of forestry development of Central Highland and master plan of socio-economic development of Central Highland.
- Base on Prime Minister Decision No 656/TTg dated 13 September 1996 on socio-economic development of Central Highland the period 1996-2000 & 2010.
- Base on Overview program of forestry development for provinces in the region.
- Base on investment projects for special-use forest, protection forest and production forest in the region approved by the State.

Forestry land use is specified under 3 forest types

Unit of area : 1,000 ha

Purpose of use	Items	Total	Kon Tum	Gia Lai	Daklak	Lam Dong
Total	Area	4,094.5	865.0	1,084.9	1,403.3	741.3
Forestry land area	Percentage	100.0	100.0	100.0	100.0	100.0
Protection forest	Area	1,244.4	378.4	302.0	341.7	222.3
	Percentage	30.4	43.7	27.8	24.4	30.0
Special-use forest	Area	438.3	82.1	38.0	181.9	136.3
	Percentage	10.7	9.5	3.5	13.0	18.4
Production forest	Area	2,411.8	404.5	744.9	879.7	382.7
	Percentage	58.9	46.8	68.7	62.6	51.6

2.3. Assessment of land use planning for Central Highland:

a. Point-view of sustainable land use:

Sustainable land use should be concerned in first by many countries and communities. Sustainable land use must be considered as follows:

- Fertility of land is improved continuously by erosion control.
- Land must be used rationally base on both tree species and land condition ;

rationality between long-term trees and short-term trees , between protection forest trees and production forest trees.

- Utilize all existing land source for identified objectives to increase productivity for demand of society and upgrading eco-environment.

As the above mentioned point-views, land use capacity is different due to conditions of economy, society and land type of each area. But, land use efficiency could not reach 100%.

So far, land use efficiency of Central Highland is just 69.9% (not including illegality of land use in some areas) of which:

- Land use for forestry objectives :	56.8%
- Land use for agriculture objectives:	10.4%
- Land for permanent use:	2.7%
- Non-ever-used land:	30.1%

To increase land use efficiency, bare land and denuded hill sources should be developed to appropriate using objectives ensuring sustainable land use.

b. Land use planning since now until 2010.

\* Land use efficiency:

So far until the year 2010, land use efficiency will be increase up 93.8% from 69.9% of which:

- Land use for forestry objectives :	70.2%
- Land use for agriculture objectives:	19.1%
- Land for permanent use:	4.5%
- Non-ever-used land:	6.2%

\* Agro-forestry production combination:

Potentials of Central Highland could satisfy all demands of production for agriculture and forestry sectors. So, in bare land and denuded hills, there were agriculture land, forestry land ,residence, infrastructure,... Therefore, land use must be rational under sustainable use view. Combination of economy sectors creates synchronize development of socio-economy of each area and make the most of agriculture and forestry product value.

That is why bare land and denuded hills nearby national road 14, 19 ,25, 26, 27,... have already been planned for development of both agriculture and forestry trees. It is rationale and indispensable combination.

\* Land use plan on forestry:

Forestry land use plan bears in long time. Now, because of forest product demand pressure, population increasing and industrial material forests could not replace natural forests, total natural forest areas are still planned for production forest. The latter years, after oriented period of program, when industrial forest will be able to satisfy the demand of economy, industrial sector of the country would be developed and need protection and special-use forests with higher scope for ensuring safe and keep environment, land structure on forestry should be

changed rationally.

#### Suggestion of land structure on forestry sector

Unit: 1,000 ha

Land use purposes	1996-2010		After wards 2010	
	Areas	Percentage	Areas	Percentage
Total forest land area	4,094.5	100.0	4,094.5	100.0
Protection forest	1,244.4	30.4	2,000.0	48.8
Special-use forest	438.3	10.7	600.0	14.7
Production forest	2,411.8	58.9	1,494.5	36.5

#### c. Conclusion of land use planning:

Land is productive tool of agriculture and forestry sectors. Mobilization of land source for different purposes is necessary and timely. However, feasibility of the program depends on some factors such as : possibilities of capital investment, labors, development of biology technology and science, product marketing and especially policy mechanism system of the State. The program , we identified land use efficiency until the year 2010 as 93.8% due to some following reasons:

- Population of Central Highland is not crowded, not enough ability for using existing land source.
- Capital investment will be done as Central Highland is one of some areas given the first priority for economic development.
- Processing capacity is still low and it will be restrict to land use.
- Land planning for production sectors should satisfy the demand of agriculture production.

As above mentioned land planning is rationale and high feasibility on Central Highland forestry development program.

#### III. Forestry development contents:

Base on master plan of forestry land use, implementation progress the period 1996-2000 & 2010 as follows:

##### 1. Forest resource establishment:

Central Highland has weak socio-economic condition. But it has potentials for development. As well as it is a important watershed area of rivers and streams with big potentials for hydro power in the country. To establish forest resource under planned objectives also play a role of environment protection, investment for forestry must be paid much attention.

##### 1.1. Forest protection

###### a. Object:

Including existing natural forest and restored forest and new forest plantation after basic investment period. To protect natural reserves, historic and cultural forests that have gene of precious animals of the region.

b. Areas:

3,155,200 ha of existing forest area (including natural forest and forest plantation) and some plantation areas and restored forest areas.

c. Solution:

- Contribute prevent shifting cultivation activities to stop burning tree for cultivation of remote area people.

- forest protection network of all authorities to protect forests effectively.

- Strengthen investment for basic facilities and equipment's for forest protectors of all authorities, including forester of communes and villages.

- Education for ethnic minority children about forest protection as for leading role on forest protection and management activities and agriculture and forestry extension activities in the ethnic minority area.

- Make management data for each logging area, compartment, forest block and transfer to households with policy to allocate forests to households and make them participant in protection forest . Forest will have their own owners.

- Apply advanced methods of forest fire forecast, forest fire control and prevention, and anti-insect by biology method on forest protection.

d. Implementation progress:

Implementation progress table of forest protection

Unit:  $10^3$  ha

Period	Total	Special-use forest	Protection forest	Production forest
1996	3,155.2	298.9	767.8	2,088.5
1997-2000	3,255.2	308.9	802.8	2,143.5
2001-2010	3,690.2	338.9	902.8	2,448.5

1.2. Forest rehabilitation:

1.2.1. Forest restoration:

Central Highland has high rainfall. Temperature and humidity are suitable for vegetation growth. Besides, forest cover rate is highest. Existing forests are seedling supply source for natural regeneration. As those advantages, possibility of forest rehabilitation is high including on bare land and denuded hills. The current status of natural forest in Central Highland reflexes the pre-climaxed. Rehabilitated forest area occupies 23.7% of the total forest area.

Of total bare land and denuded hill area, there are 700,000 ha of open land with scattered trees and shrub trees. There are 1,000 - 3,000 regenerated trees/ha. Forest restoration method is economical and effective for forest rehabilitation to cover bare land and denuded hills.

a. Object:



Including open land that could manage, protect and implement forest restoration methods (first period: protection forest, priority for important areas, production forest, priority for motive economic areas).

b. Areas:

Since 1997 to 2010, in Central Highland region will apply forest restoration method on convenient sites for natural regeneration, the total area : 180,000 ha, account for 11.8% of existing bare land and denuded hills and 19.2% of non-forest cover land for forestry. Duration is 5 years and after as object of forest protection. In which:

- Special-use forest: 20,000 ha
- Protection forest: 80,000 ha
- Production forest: 80,000 ha.

c. Technical solution:

- Increasing regeneration capacity to restore forest though forest fire control methods, insecticide prevention, animal impact and human's cutting.
- Design forest restoration approved, make management data for each logging area, compartment, forest block and allocate to owners.

d. Implementation progress of forest restoration in Central Highland:

Unit: Ha

Period	Total	Special-use forest	Protection forest	Production forest
1996-2000	80,000	10,000	40,000	30,000
2001-2010	100,000	10,000	40,000	50,000
<b>Total</b>	<b>180,000</b>	<b>20,000</b>	<b>80,000</b>	<b>80,000</b>

e. Effect forecast:

Six or eight years later, forests will be established completely. Forest cover reach will be 0.3-0.5m. Forest growing stock will reach 25 - 40 m<sup>3</sup>/ha protecting environment and supplying appliance wood and fire wood for the urgent demands.

1.2.2. Forest plantation and agro-forestry implementation:

a. Object:

Non-forest cover land, land with good condition for plantation, taking care, breeding, protection and product marketing. The areas nearby residence should be applied agro-forestry method and forest gardening and farming establishment. In which:

- Protection forest plantation: focus on watershed areas of Ba river, Se San river, Se Re Pok River and Vietnam borders to Laos and Cambodia; first priority of planting for important watershed areas of irrigation and hydro-power projects and for flooding areas.
- Special-use forest plantation: restore scenic sites of National Park: York Don, natural reserves : Mom Ray Ngoc Vin, Nam Nung, Ho Lak.
- Material forest plantation: focus on establishing concentrated material forests: paper

pulp, artificial wood and special products nearby forest product processing factories in the future.

b. Area:

1996-2010:

Total plantation:	620,000 ha
in which:	
- Protection forest plantation:	120,000 ha
- Special-use forest plantation:	30,000 ha
- Production forest plantation:	470,000 ha:

in which:

+ Pulp wood:	120,000 ha
+ Timber:	180,000 ha
+ Fiber board wood:	80,000 ha
+ Fire wood, appliance wood:	90,000 ha

c. Planting tree models:

- Protection forest: plant mixed tree species to create close forest for both protection and production. Planting tree species: indigenous species planted creating ecology layer, later. Lower layer is legume planted in order to improve indigenous trees on the first period and soil improvement.

- Production forest: plant mixed tree species under mixed economic model to create products with high productivity and to improve soil fertility continuously.

- Planting tree species determination:

Select fast growing trees with high economic value and suitable with each site condition, improving environment, assuring appropriate and sustainable use of existing resources.

- Protection forest planting : Teak, *Paramichelia*, *Canarium Subulatum*, *Anisoptera Costata*, *Anisoptera Scaphula*, *Daphniphyllum Atrobadium*, *Alstonia Scholaris*, *Hopea Odorata*, *Cassia Siamea*,...

- Material forest planting ( Pulpwood, plywood, chipwood) : *Acasia auriculiformis*, *Acasia fangata*, *Eucalyptus*, *Pinus kesiya*, bamboo,...

- Production forest planting: *Cinannomum Cassia*, rattan, *Pinus Merkusii*, ...

- Fruit tree planting : jack tree, custard-apple, Star-apple, longin, Durian, Rambutant,...

d. Silviculture technical methods:

To plant forest successfully and implement Ago-forestry models, it is necessary to apply some following methods;

- Apply scientific and technological achievements on agriculture, forestry, fisheries, biology,... to establish some models of sloppy land cultivation bringing into play of watershed protection function, improving planted tree productivity, controlling erosion and creating sustainable eco-system on sloppy land.

- Apply bio-technology to promote 3 main parts of seedlings making as follows:

- + Seedling made by cloning and breeding method.
- + Breeding with bio-technology products for anti-insect.
- + Tissue culture products made in nurseries.

- Select good quality seedlings, determine planting tree structure, planting method, cultivating method for each locality, each forest type ensuring well-grown planted tree, good crop and environment protection.

c. Material area determination:

In the past years, forest plantation was not to supply timber for wood processing industry and replace natural forest log. So the existing forest plantation is very poor, diverse of tree species and not meet the demand of supply timber materials. To satisfy demand of national economy, in according with eco-condition, planting tree must be considered with suitable area to material forest within Central Highland.

Planning of material areas must be followed some conditions as follows:

- Land which relatively concentrated for forest planting more than 30,000 ha.
- Same marketing situation.
- Near the road, 100 km is the furthest distance from planting sites to product consuming area .
- Nearby residence to supply local labors to forestry silviculture.
- Land must be suitable with eco-character of tree species for planting material forest.

As consideration of condition of Central Highland, material sites planned as follows:

+ Material forest sites : chipwood, artificial plywood, fiber board wood (MDF):

- Along to National road No. 19 : there are some districts: An Khe, Kbang, Mang Yang, Kon Chro of Gia Lai Province. Forest products and planted forest areas will be attracted and processed at An Khe Town on the National road No 19 : Pleiku - Quy Nhon.
- Along to National road No. 25 , there are some districts: Ajum Pa, Krong Pa of Gia Lai Province, Ea Hleo District, Buon Ho and the North of Ea Kar district of Daklak Province. forest products will be accumulated and processed at center of Krong Pa district on the National road No. 25: Buon Me Thuot - Nha Trang.

+ Paper pulp forest sites:

- Pulpwood sites along to National road No. 14, there are some districts: Dak To, Ngoc Hoi, Sa Thay of Kon Tum Province and Chu Pah of Gia Lai Province. Forest products will be attracted and processed at Center of Kon Tum Town.
- Paper pulp sites along to National road No. 28, there are some districts: Bao Loc, Lam Ha of Lam Dong Province, Dak Nong and Lak of Daklak Province. Forest products will be attracted and processed at Center of Bao Loc District of Lam Dong Province.

## Plantation scope of material forest sites

Unit : ha

No	Material forest sites	Area	Remarks
	Material forest planting total area	380,000	
1	Chipwood, fiber board	260,000	
a	Along National road No 19	95,000	
b	Along National road No 25	110,000	
c	Along National road No 26	55,000	
2	Paper pulp sites	120,000	
a	Along National road No 14	60,000	
b	Along National road No 28	60,000	

### 1.2.3. Scattered tree planting:

- Object: on the area of dwelling land, roads, canals, heritage sites, scenic sites.

- Planting tree group:

+ Shaded trees, scenic trees.

+ Fruit trees.

+ necessities wood, fire wood.

+ Agricultural protection trees.

- Amount and planting progress will be determined for each forestry development project of each locality.

- Effect: for amenity, shade, agriculture protection, environment protection, scattered trees also contribute settling demands of necessities and fire wood. Especially, planted scattered trees supply with a big amount of food and foodstuff improving protein for local people. In fact, in many past years, volume of fire wood from scattered trees played important role of social consumption.

### 1.2.4. Seedling produce:

#### a. Objects:

Forest plantation, restored natural forest, mixed natural forest after selected cutting with standards under regulation of Article 5 of outline on silviculture technical method.

#### b. Area and progress:

Unit : ha

Period	Total	Kon Tum	Gia Lai	Daklak	Lam Dong
Total	850,000	160,000	220,000	280,000	190,000
1996-2000	250,000	48,000	64,000	83,000	55,000
2001-2010	600,000	112,000	156,000	197,000	135,000

c. Technical methods:

- Planned breeding area must be designed and approved by authorities. The contents of design must be reflected exactly technical standard and the sites.

- Technical methods of tree making, times and cutting time must under the outline No. 14/12 (Former Ministry of Forestry).

- Breeding cutting can combine with wood use, fire wood and other forest products under acceptable conditions. But breeding cutting is not considered as first time of logging reducing forest class and impacting stability of production on business cycle.

1.2.5. Forest enrichment:

a. Object:

Including forest plantation, rehabilitation forest, poor natural forest belonging to production forest.

b. Area and implementation progress:

Unit: Ha

Period	Total	Kon Tum	Gia Lai	Daklak	Lam Dong
Total	390,000	50,000	80,000	140,000	120,000
1996-2000	135,000	23,000	27,000	45,000	40,000
2001-2010	255,000	27,000	53,000	95,000	80,000

b. Technical methods:

- Planting tree species: planting tree species selection should be under business purpose and eco-condition. It is given first priority to the indigenous species with high economical value and fast growing such as: *Michelia Mediocris*, *Hopea Odorata*, *Anisoptera Costata*, *Cinnamomum*, *Dipterocarpus Alatus*, *Canarium*, *Alstonia Scholaris*, *Choerospondias Axillaris*,...

- Enrichment methods under lines or groups need being followed former forest bed condition and eco-character of enrichment species.

1.3. Socio-economic solution on forest rehabilitation:

a. Forest land allocation:

Land allocation to households, individuals must follow Governmental Decision No. 02/CP dated 05 January 1994 to stable, long-lasting forestry . Forest land allocation to Forest Enterprises must be followed Governmental Decision No. 01/CP dated 04 January 1995.

Land allocation to Households: agriculture land, agro-forestry land, fruit-tree land and land for livestock in order to create stable living standard for local people joining forest planting and forest protection activities.

Land allocation can be approved to other economic sectors that have investment capital for forest plantation and forest development.

The households be allocated land is permitted no income tax in first business cycle. The households be allocated protection forest will be permitted production under forest trees and getting benefit when in logging time.

b. Participation to forest plantation:

\* Protection forest and special-use forest plantation:

Due to the isolated areas of protection and special-use forest and diverse planting tree species, participation of householders especially, new households is important. Forest land allocation ensure household's job and their income, prevent them from come back burn and cultivation and contribute to success of cultivation settlement campaign.

Protection forest and special-use forest management board has to guide local people, check and finance directly for labors.

\* Forest plantation in material plantation areas:

- Households: In the areas nearby residence, Forest land allocation will be carried out to each household. Local state-own Enterprises will be service of seedlings, fertilizers, insecticide and advanced technology.

- State-own enterprises: In fact, material forest plantation areas is not near residence and households can not accept forest land allocation. On those areas, State-own Enterprises has to have a leadership to establish material forest plantation.

c. Forest planting organization:

At forest planting areas, it is necessary to establish management board for material forest, protection forest or special-use forest. Their duties and activities are as follows:

- Technical transfer to local people.
- Material supply: seedlings, fertilizer, insecticide.
- Finance to forest planting for local people.
- Service on buying agro-forestry products of local people.
- Design and organize production system for local people.

1.4. Forest product areas in Central Highland:

+ The North of Central Highland:

There are some districts: Dak Lei, Dak To, Ngoc Hoi, Ngoc Ha, Sa Thay of Kon Tum province and Chu Pah of Gia Lai province. The areas are located to the North of Central Highland along to Vietnam border with Cambodia and Laos. The existing vegetation here is ever-green broad leaves forest, natural Pinus kesiya forest and bamboo forest or mixed bamboo forest. Those areas create concentrated material forest meeting the demands of timber supply and pulp material supply.

b. The East of Truong Son Mountain:

There are some districts: Kon Plong of Kon Tum province, An Khe , Mang Yang, Kon Chro of Gia Lai province. This area is transition climate area between Central Highland and Coastal region. The rainy season is a lit bit late and longer than that in the center of Central Highland. Due to condition of topography and climate, there is only mix forest. The area has a transport network connecting districts and common forest product consumption place : An Khe Town. The area is suitable for timber production.

c. The West of Truong Son Mountain:

There are some districts: Kuc Co, Chu Prong, Chu Se of Gia Lai province, Ea Hleo, Krong Puk, Ea sup of Daklak province. This area is relatively plain, along to Vietnam border between Cambodia. Its rainfall is lowest in Central Highland. The characteristics of climate, land created tropical climate-typed vegetation with simple species structure, hard wood, slow growing, good natural regeneration and leaves falling down on dry season. Due to plain location , road construction is convenient. National road No. 14 is border to the East of material areas. Due to characteristics of vegetation and climate, products in this area could supply for basic construction and export.

d. The South of Central Highland:

There are some districts : Dak Mini, Lak, Dak Nong, Dak Lap of Daklak province and Lam Ha, Bao Loc of Lam Dong province. This area has typical strongly sheer topography. Vegetation is hard wood and this area connect some districts ; Dak Nong, Lak, Lam Ha and Bao Loc. it is suitable for timber and paper pulp production.

2. Forest product :

2.1. Forest product resource:

a. Point-view:

Natural forest structure in Central Highland

List	Area		Capacity	
	Area (ha)	Percentage	Volume (m3)	Percentage
Natural forest	3,108,900	100.0	282,943,200	100.0
Rich forest	203,500	6.5	44,001,900	15.6
Fair forest	622,200	20.0	92,152,600	32.6

Central Highland has richest natural forest resources in the country, great potentials of forestry. The area of rich forest, fair forest and mixed forest as production forest is 561,166 ha with average 155 m3/ha (permitted productivity occupies 30% of forest capacity). Forest is not only product value but also environment protection. Because of watershed area, the role of eco-protection is important. However, the period 1997-2010, the forest product will be supplied for Central Highland is still depend on natural forest logging. And then, forest products will be provided from two sources : natural forests and forest plantation.

b. Object:

+ Natural forest : including poor forest , fair forest, broad-leaves and coniferous mixed forest and mixed bamboo forest are production forests under outline of Former Ministry of Forestry.

+ Forest plantation:

+ Bamboo and rattan forest: including the forest areas that have enough planting cycle.

c. Logging capacity:

Logged products	Unit	1997-2000	2001-2010
Round wood	m3	1,020,000	900,000
Bamboo	tons	626,250	1,612,500
Rattan	tons	25,000	85,000
Pinus resin	tons	10,000	27,000
Fire wood	stere	2,000,000	6,000,000

d. Technical methods on forest logging:

- Identify exactly planned area of annual logging.

- To have annually forest logging area, it is necessary to have a plan and experimental before approval logging. The logging planner should be authorities work for forest investigation and planning under legal qualification.

- Harvested timber and should be contoried clearly according planning.

- Logging method:

+ Natural forest: selection cutting according diameter class and species.

+ Forest plantation: Clear cutting

\* Permitted smallest diameter for logging identified according age, species, wood group and should be approved by concern authorities.

\* Permitted logging volume is 35% of forest capacity  
(except fruitless logging).

Forest logging area could not be over 0.4% for natural forest.

- Selected logging cycle should be over the time needed for one growing cycle and forest quality must not be less than that of before-logging. Base on quality of before-logging situation, logging cycle is identified within 25-30 years for ever-green forest and 30-40 years for Dipterocapus forest.

- Methods of logging tree technique should be applied under outline issued by Former Ministry of Forestry.

2.2. Forest product processing:

a. Views on timber processing in Central Highland.

Central Highland has a lot of forests with annually big logging productivity. So large-scale processing capacity is needed. Forest product processing in Central Highland have following problems:



- There are so many small processing units ,which compete each other on buying and selling. In some cases, those units use illegal logged wood.

- Processing line is out of date and its productivity is low, resources is wasted.

- Products are only preliminary treated. So their value are not high. Then, Processing activities could not hire enough employer.

Forestry development of Central Highland must be together with forest product processing improvement. And, it is also motive factor of development of forestry sector.

b. Scale and activities of forest product processing centers:

\* Existing forest product processing centers upgrade:

Base on natural forest sources, possibility of investment, marketing, demand prediction and identification, there are some existing processing centers as follows:

- Forest product processing center, Kon tum Town:

Processing capability is 30,000 - 40,000 m<sup>3</sup> round wood/year.

Products are plywood, export products, sawn timber, fine handicraft and export bamboo products. The material sources come from the province.

- Forest product processing center , Pleiku Town:

Processing capability is 25,000 - 38,000 m<sup>3</sup>/year.

Products are plywood, laminated board, export products, sawn wood, rattan products. Material sources come from some districts : Chu Ph, Mang Yang, Chu Prong,, Duc Co, Chu Se and round wood provided from Cambodia.

- Ka Nak processing center ( K'Bang district, Gia Lai province):

Processing capability is 15,000-24,000 m<sup>3</sup>/year.

Products are sawn timber, export processed wood.

Material sources come from K'Bang. In the period 1996-2000, this center will still keep their former facilities. After 2000, it will be reorganized to An Khe Center.

- Processing Center , Buon Me Thuot Town (Dak Lak province):

Processing capability is 30,000 - 35,000 m<sup>3</sup>/year.

Products are plywood, particle board, processed wood, sawn wood , handicraft products, export bamboo products.

Material sources come from some districts: Ma Krak, Krong Pach, Krong Bong, Lak, Krong Ana, Krong No.

- Processing center Buon Ho ( Krong Buk district, Daklak province):

Processing capability is 50,000 - 60,000 m<sup>3</sup>/year.

Products are plywood, particle board, export processed wood, sawn wood.

Material sources come from some districts: Ea Soup, EAH'leo, Krong Nang, Krong Buk.

- Processing center , Gia Nghia Town (Dac Nong district, Daklak province):

Processing capability is 40,000 - 45,000 m<sup>3</sup>/year.

Products are plywood, particle board, processed wood, sawn wood , handicraft products, export bamboo products. Material sources come from some districts: Dak Nong, Dak Rlap, Dak Mil.

- Processing center , Da Lat Town ( Lam Dong province):

Processing capability is 20,000 - 25,000 m<sup>3</sup>/year.

Processed products are plywood, particle board, processed wood, sawn wood ,

handicraft products, export bamboo products. Material sources come from some districts of Lam Dong province (except Lam Ha, Bao Loc).

\* Construction of some new processing centers in Central Highland:

- Processing center, An Khe Town:

Processing capability is 55,000 - 80,000 m<sup>3</sup>/year. Products are plywood, particle board, export processed wood, sawn wood, fiber board. Material sources will come from some districts: An Khe, Kon Chro, K'Bang and some areas in Mang Yang district including existing natural forest and forest plantation and future forest plantation.

✓ - Paper mill, Kon Tum:

Capability: 50,000 - 100,000 tons of paper powder/year. Material sources will come from natural forests of some districts: Dak Lei, Dak To, Ngoc Hoi, Sa Thay of Kon Tum province and Chu Pah district of Gia Lai province. For a while, material sources are bamboo and natural Pinus. the latter period, material sources will come from forest plantation of the above mentioned districts.

- Paper mill, Bao Loc:

Capability: 50,000 - 100,000 tons of paper powder/year. Material sources come from natural forests of Bao Loc and Lam Ha districts of Lam Dong province, Dak Nong district of Dak Lak province. For a while, material sources are bamboo and natural Pinus. the later, material sources will come from forest plantation of the above mentioned districts.

c. Forest product processing capability in Central Highland.

Products structure and progress

Products	Unit	Total	1996-2000	2001-2010
1. Building sawn wood	10 <sup>3</sup> m <sup>3</sup>	778.1	278.1	500.0
2. Fiber board MDF	10 <sup>3</sup> m <sup>3</sup>	740.0	200.0	540.0
3. Plywood	10 <sup>3</sup> m <sup>3</sup>	578.2	166.8	411.4
4. Paper and paper powder	tons	3,000.0	500.0	2,500.0
5. Particle board	10 <sup>3</sup> m <sup>3</sup>	963.6	278.1	685.5
6. Laminated board	10 <sup>3</sup> m <sup>3</sup>	770.9	222.4	548.5
7. Finest processed wood	10 <sup>3</sup> m <sup>3</sup>	125.6	55.6	70.0
8. The others	10 <sup>3</sup> m <sup>3</sup>	385.5	111.2	274.3
9. Pinus resin	10 <sup>3</sup> tons	33.75	9.0	24.75
10. Handicraft	10 <sup>3</sup> tons	23.0	7.5	15.5

d. Forest product processing solutions:

- Reorganize wood and forest product processing sector. All processing material only will be concentrated in the above mentioned centers. Strictly force stop running business of some units do not have business licenses.

- Private-own processing units with limited capital, old production line and raw processing will be stoped their business licenses.

- Invest for new technology processing line through cooperation with foreign

countries, joint venture in the country producing high quality meeting the demand of market, saving resources and improve material- use ratio.

To implement the processing duty, for Central Highland, it is necessary to upgrade its infrastructure such as electricity network, transport system, urban planning and service development.

- Training technical and management staffs who have enough ability to receive and apply world advanced processing industry.

- Encourage all economic factors, organization inside and outside the country for investing to processing industry.

- To keep annual forest production plan, Taking appropriate advantage of natural forest material sources, and it is necessary to plant material forests under plan for each area.

- Put on target as 85% of annual logging capacity of which 40% of processed wood and 45% for basic construction timber. The remain 15% of round wood capacity export outside for joint ventures contributing development of socio-economy.

- To stable production for all sectors and organizations taking part in investment to processing industry, the policy of the State on Forestry, especially on processing and consumption of forest products must be stable within 10 - 15 years.

### 2.3. Product marketing:

- Domestic market:

First product market is within the region, the remain supplies for South East mainly through trading companies or joint ventures for production development.

- Foreign market:

Exporting to Taiwan, Japan, Singapore, Hong kong and other East of Europe.

- Processed timber marketing:

In the region: 30 % of total processed products

Outside the region: 30% of total processed products

Export: 40% of total processed products.

## IV. Investment and effects:

### 1. Labor-force demands:

Unit: persons

Period	Total	Forest protection	Forest restoration	Forest plantation	Forest breeding	Forest enrichment	Technique and silviculture staffs	Forest land allocation
1996-2000	140,570	2,730	960	32,200	3,000	1,000	50,000	50,680
2001-2010	216,880	3,180	2,560	70,000	4,500	3,000	82,960	50,680

2. Investment capital demands:

a. Total investment capital is 4,637 billion VN Dong; in which:

- The period : 1997-2000:

+ Demand: 1,707 billion VN Dong.

+ Average: 427 billion VN Dong.

- The period: 2001-2010:

+ Demand: 3,930 billion VN Dong.

+ Average: 393 billion VN Dong.

b. Investment capital under period and work items:

Unit: Billion Dong

No.	Items	Total	1996-2000	2001-2010
	Total	5,637	1,707	3,930
1	Protection forest	1,852	560	1,292
2	Special-use forest	549	166	383
3	Production forest	2,985	904	2,081
4	Others	251	77	174

c. Investment capital identified by sources:

Unit: Billion Dong

No.	Capital source	Investment
	Total	5,637
1	State budget distribution	3,094
2	loan	1,340
3	Investment by joint ventures	790
4	Private investment	413

d. Investment capital for each area:

Unit: Billion Dong

No.	Provinces of Central Highland	Investment capital
	Total	5,637
1	Kon Tum	1,197
2	Gia Lai	1,537
3	Daklak	1,586
4	Lam Dong	1,317

### 3. Effects of the program:

#### 3.1. Environment:

protected and developed forests mean to environment - unprice property of the country.

- Forest cover will be increased 73.4% from 56.7%. If forest cover includes the green cover of industrial crops (coffee, rubber) reach at 80%. At that time, green-cover of the whole region would be increased 90% from 65%. Surface stratum erosion would reduce at 963 tons/km<sup>2</sup>/year.

- Create sustainable eco-system to balance water source for hydro-power and irrigation projects. It will make possible sustainable development, improvement production and living standard in the region and nearby areas.

- Conserve gene resources of plants and animals in the region.

- Protect bio-diversity of tropical forest creating attractive environment for tourists and visitors and scientific study.

#### 3.2. Economy:

- Increase grossed forestry product to 10.5% from 6.5% in comparison with GDP and contributing its duty to State budget.

- Together with agriculture sector to increase grossed productivity to 18,500 billion Dong in 2010 from 3,000 billion Dong in 1995.

#### 3.3. Society:

- Migrate settlement of 40,000 households from shifting cultivation with low living standard.

- Employ 200,000 labors to forestry production, 200,000 households settle and stop shifting cultivation.

- Culture standard of ethnic minority people improved as average standard in the region.

- Balance population density with the whole country's, to improve natural resources of the region developing Central Highland wealthy.

3.4. Suggestion of some projects in the region: There are three giant programs for the whole region.

#### a. Program of assistant projects:

- Project on commune planning and inventory for production sector, forest owners and implementation of forestry development program .

- Project on basic investigation, material area planning.

- Project on consolidation of organization system of forestry enterprises in the region.
- Research project on species for material forest plantation.
- Project on forest restoration through natural regeneration.
- Project on forest rehabilitation and forest eco-system development

b. Program on protection and special use forest establishment invested by State budget, it is a national program, 327:

- Protect existing forests.
- Establish new forests through natural regeneration and new forest plantation through land allocation to households.
- Special-use forest projects: are national parks, nature reserves and culture conservation.
- Protection forest projects:

Base on Decision No 556 dated 12 September 1995 on checking all on-going projects on protection forest, investment to large-scale protection forest projects in the region as follows:

- + Watershed forest of Ya Ly hydro-power plant.
- + Watershed forest of Da Nhím hydro-power plant.
- + Watershed forest of Tri an hydro-power plant.
- + Watershed forest of Vinh Son hydro-power plant.
- + Watershed forest of A Zun Ha irrigation project.
- + Watershed forest of Dong Nai river.
- + Watershed forest of Se Re Pok river.
- + Watershed forest of Ba river.
- + Watershed forest of Thach Nham irrigation project.
- + Others in flooding areas.

c. Program on establishment of production forest:

- Project on consolidation of forest product processing system of Central Highland.
- Projects on industrial material forest development:
  - + Material forest of plywood, chip, artificial wood.
  - + Forest of paper pulp.
  - + Project on forest products : rattan, cinamomum, medicine trees, Ngoc Linh ginseng.

V. Policy system for the program:

1. Forest land allocation:

- It is necessary to follow principles of current documents of the State for stable and long-term forest land allocation under Governmental Decision No 02/CP dated 05 January 1994 by the Government.

For Forest Enterprises, implementation is under Governmental Decision No 01/CP dated 04 January 1995 of the Government.

- For some provinces of Central Highland, some supplement are needed as follows:
  - + Forestry Land for allocation to households includes agro-forestry land,

forest planting land, industrial tree planting land, fruit tree planting land, food-stuff tree planting land, land for livestock, land for garden economy with the objectives of creating good condition to settle local people and joining into forestry plantation and forest protection activities.

- + Implement land allocation of bare land to attract investment capital on forest plantation.

- + Lend people credit with low interest rate to run business of supplement forest products in the forest.

- + The State should boost the buying power, processes and consumes products made from people and make stable price satisfying people working in production development.

- + Non-taxation for the first cycle for the people who contracted land allocation.

- + Ensure social policies for ethnic minority people.

- + Identify the benefit from forestry land when harvesting.

## 2. Identification of the role on forest management and protection of the authorities.

Coming from the fact demand of forest management and protection activities as well as limitation of these activities in the past years, forest resource establishment must be together with duty of the authorities. If the authorities do their best duty, it is necessary to have appropriate policies.

- Announce the area, site, boundary of forest and forest land on the map and field sites for Districts and communes to help the authorities taking part effectively into forest management and protection activities.

- Establish forest checking activities ten years once to assess exactly natural resources changes finding out effective solutions for forest rehabilitation promptly.

- Establish the role of forest management of commune authority with the concrete contents, right and duty appropriate combination.

## 3. Establishment of the policy on the role of forest owner:

To develop forestry in Central Highland, identification of the role of forest owner on the concrete areas must put on the first priority.

- For households : it is necessary to clear boundary, bare land area for forest plantation as well as the forest area allocation for management and protection.

- Forest area and allocated forest land for communities is to solve the demand of furniture and firewood.

- The area, boundary of protection and special-use forest allocate for project management boards.

- The State-own forest enterprise will be given forest resources from the State for running business.

- The forest area and boundary that allocated for other organizations.

All that allocated forest land have their own rights and duties and responsibility legally of natural forest resources of theirs.

#### 4. Investment policy:

Investment to Forestry through funds for protection and special-use forests and establishment of

infrastructure in economic zone.

- Investment capital:

+ Propose the State investing completely for rural people working shifting cultivation to settle for forest planting and forest garden establishment.

+ Propose the State, all existing forest areas need to be protected continuously.

- Low-interest rate loan:

Credit loan No. 264 needs easier formalities with low-interest rate and longer time for payment in compare with the loan of other sectors (loan expiration is as long as forest plantation business cycle).

The organizations control currency directly for people.

- Supplementary capital:

Using the some funds collected from the tax on water resources to invest forest planting activities on watershed areas.

#### 5. Tax policy:

- The State should have non-tax policy or tax reduction on land and income for remote areas to attract individual investment to forest planting progress and creating new forests.

- Expensing a small sum of the State budget to subsidize for peoples planted on slope land.

#### 6. Policy on employment labor force taking part into forestry silviculture.

Central Highland is one of the poorest areas in the country., due to some difficulties on topography, Central Highland also impacted seriously from the war: bombing, malaria, toxic chemical substantial ...

Without enough economic development and human source, Central Highland has not enough budget and labors (especially technical labors).

To attract investment and labor force to forestry silviculture, propose the State have a policies on establishment and development of socio-economy in the region as follows:

- Former soldiers who now stay in Central Highland get permission of taking their families to Central Highland living under migrate plan for some new economic zones contributing border area strength and balancing population density.

- Retire age should be delay compared with common regulation issued by the State.

- It is necessary to have support for voluntary staffs working in Central Highland.

#### 7. Social organization of forestry silviculture in the region:

For ethnic minority people, it is not easy to change from their custom of shifting cultivation with self-supply economy to developing forest and new production economy. So it is necessary to change step by step, in which social forestry development together with settle cultivation and settlement and divided into 3 groups as follows:



- Shifting cultivation and living people
- Living settlement and shifting cultivation people
- Cultivation and living settlement people.

For each group, the progress economic shifting, to forestry silviculture must be changed step by step, to create good condition for household's economic development from settling cultivation to diversifying production activities without forest damage, promoting rural market (commune, district), regional market and domestic and international market with processing industry development base on advanced industry.

## VI. Solution and implementation:

### 1. Investment capital solution:

The establishment and development of forestry in Central Highland will be dissolved without complex development program of socio-economy in the region. So, the invested capital on establishment and development of forestry is a part of invested capital for socio-economic complex development program. This forestry program will be inserted into another concern programs : Establishment of new economic zones for development for Central Highland and balance of population; program on cultivation and living settlement; program on eliminating hunger and poverty; program on strengthening arm force in border line...

Although, forestry sector in particularly has typical functions : production and environment protection. Then, investment capital solution also has typical features as follows:

#### a. Special-use forest and protection forest:

Investment capital will be provided by the State budget base on feasibility study or project approved by concern authorities. Besides, households that contracted allocation forest land (special-use forest and protection forest) can lent loan without interest to produce agro-forestry on allocated land.

Supplementary products occur on the progress of protection and protection forest planting, people can receive up to 70% of the benefit.

#### b. Production forest:

Protection forests are invested by some sources. According the Decision No 656/TTg dated 13 September 1996 on socio-economic development of Central Highland the period 1996-2010

: - Credit source to invest economic forest plantation under policies on the Decision No 246-CT dated 22 July 1996; the loan interest is 30% - 70% reduced loan interest annually.

- Encourage people signing the contract of forest land allocation under plan; households are exempt the first cycle to mobilize human-source for forest rehabilitation in short time on bare land.

- Clear administrative formalities and land tax for each area to encourage foreign investment or joint ventures on industrial plantation as well as upgrading, and constructing forest product processing Centers.

- The enterprises that use material from industrial plantation must have responsibilities

of creating capital with low-interest for enterprises in charge of planting activities to meet the material demands in the future.

## 2. Science and technology solutions:

- Basic investigation for classification of 3 forest types on the map and on the field sites is to settle land source under planned objectives, to satisfy demand of economy and environment. Professional units and authorities together implement land use planning to identify appropriate land use solutions, appropriate tree planting group with high productivity improving land fertility.

- Solve tree planting species with high quality and productivity through advanced biotechnology such as tissue culture for seedlings for material forest plantation in Central Highland.

- Reorganize forest product processing sector to save material and to make high value products meeting the domestic and export demands.

## 3. Implementing organization:

### a. Identification of important projects:

- Protection forest:

Under outline of Decision No 556 dated 12 September 1995 on checking and supplementing on-going protection forest projects (above mentioned).

- Production forest:

As the above mentioned projects, other small projects on material forest plantation with scope: 15,000 ha - 30,000 ha will be planned under these projects. The material forest must be concentrated relatively with appropriate distance to processing center. The small projects must be identified scale and appropriate planted tree group.

### b. Implementation:

After the approval of the program, Ministry of Agriculture and Rural Development will coordinate-ordinate with People's Committee of 4 provinces to organize implementation.

Vietnam forest product cooperation is in charge of main connecting point of attracting foreign and domestic investment capital to establish material forests and to perfect forest product processing system.

The forest enterprises and the protection forest and special-use forest management boards are in charge of managing and establishing forest sources, using natural forest resources and other responsibilities under the State principles.

Forest Inventory and Planning Institute  
Forest Inventory and Planning Sub-institute of the South  
and Central Highland