

資料 8. Central Highland Forestry Development Program (1996 - 2000 & 2010)

MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT
DEPARTMENT FOR FORESTRY DEVELOPMENT
FOREST INVENTORY AND PLANNING INSTITUTE
SOUTH AND CENTRAL HIGHLAND FOREST INVENTORY AND PLANNING SUB-INSTITUTE

CENTRAL HIGHLAND FORESTRY DEVELOPMENT PROGRAM
(1996 - 2000 & 2010)

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Central Highland Forestry Development Program
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Foreword

Central Highland (Tay Nguyen) consists of 4 provinces: Kon Tum, Gia lai, Daklak and Lam Dong, very large plateau with great significance of economy, politics, culture, society, environment and security of the Country.

Central Highland has highest forest cover ratio in the country, average forest cover is 56.7% of the area. Logging capacity account for 50% of the whole country. Central Highland has good condition of basalt soil (70% concentrate in the whole country's basalt soil). Therefore, it is very suitable for agriculture and forestry. Now and then Central Highland has been a greatest potential region of agriculture and forestry in the country.

Forest ecosystem of Central Highland is diverse and abundant, there are many species with scientific significance and economical value. Some precious animals and plants of the world still alive here. Forest development and protection of Central Highland has a great significance for bio-diversity protection, genetic conservation of the country and the World. It is Indispensable to strengthen capability of Central Highland's forest for watershed management, environment protection, water supply management, erosion control, climate equability, conservation of natural resources, specially rising up affects of rich basalt soil and forest product supply for the country.

According to carried out researches, Central Highland has many suitable conditions to develop large scale low -material production which can contribute to industrialization and modernization effectively, it is also easy to destroy environment for Central Highland.

After 1975, the country unified, some regions of Central Highland had been expanded production of agriculture and forestry. However, some rest regions still not use up their potentials for developing the country due to many difficulties of transport, electricity, water supply, infrastructure, human resource and investment. Some regions' living standard is still under property, causing negative impact to natural forest.

To avoid using ineffectively natural resources and to meet the domestic demands of wood consumption, pulp material and forest products, strengthening forestry production and using rationally natural resources together with rehabilitation gradually are necessary.

To contribute catching up socio-economic program of Central Highland and To implement Governmental Decision No 656/TTg dated 13 September, 1996, the establishment of Central Highland forestry development program in the period 1996-2010 is urgent. Based on advantages and developing of Central Highland of economy, society, environment and security, identification of action program in forestry sector could make Central Highland industrialization and modernization steadiness in the period.

Content : divided into two parts

Part 1:

Characteristics of nature, economy and society relate to the program of forestry development of Central Highland.

Part 2:

Content of Central Highland forestry development program period 1997-2000 & 2010

Part I
CURRENT STATUS OF NATURE AND SOCIO-ECONOMY
RELATING TO
CENTRAL HIGHLAND FORESTRY DEVELOPMENT PROGRAM.

I. Current status of nature and natural resources.

1. Characteristics of nature condition:

1.1. Geographical location:

Central Highland is area of 5,560,000 ha, account for 16.95% of the total country's area. It is bordered 490 km with Laos(370 km) and Cambodia (120 km). There is located inward, Ma Drak where is 30 km closest to the sea and Quang Truc is 270 km far to the sea.

1.2. Topography:

Central Highland has diverse and complex topography in the mountainous terrain, mountains, plateau and valley .

a. Mountainous distribution: some 41.8% of the natural territory area , distributing to the North, North-East and South of the region is high and sheer terrain, there is relatively rich natural forest with diverse fauna and flora. Population is not crowded, mainly ethnic minority people.

b. Plateau distribution :

Plateau occupies 23.8% of the area. Topographic surface is relatively plain between 400m - 800m. The lowest areas are Pleiku, Kon Ha Nung, Ma Drak, Buon Me Thuot and Dak Nong. Those are suitable for agricultural production. Ancient humus had been destroyed due to shifting cultivation and industrial crop plantation such as Coffee, Rubber .

c. Semi-Plateau distribution :

It occupies 23.7% of the area distributing to the North-West (Dak Lak Province, Easup District). Topography is flat. Sloping ratio is more than 8⁰, suitable to agriculture.

d. Valley Distribution:

It occupies 10.7% of the area, distributing along bank of Sa Thay, Ba, Krong A Na, Krong No, Dak Bla and Dak Po Ko Rivers. Those are suitable to agriculture production. that area has been still main rice and crop producer for Central Highland.

1.3. Climate:

Central Highland has typical tropical monsoon climate. There are two season in the one year: rainy season (May - October) and dry season (November - April).

a. Temperature:

Temperature is influenced by location and height :

- The areas that are lower than 500m has average temperature is 24⁰C annually
- The areas that are at height from 500m to 800m have average temperature is 21⁰C annually.
- The areas that are at height from 800m to 1,500m have average temperature is 19.5⁰C annually.
- The areas that are higher than 1,500m have average temperature is less than 18⁰C.

The temperature differential is between hottest month (April) and coldest month

(January) is only 3°C - 6°C , in the plains of Truong Son Mountain's side. Meanwhile, temperature frequency of day and night is 10°C - 11°C average (January - March). The temperature figure is completely suitable for agriculture and forestry plants growing.

b. Rainfall:

Rainfall in Central Highland is different by the area location. The area that has the biggest rainfall is twice and triple more than the area that has the least rainfall rate. The high mountainous area has 2,500 - 3,000 mm rainfall/one year (Chu Yang Sin, Ngoc Linh). Valley and flat areas have 1,000 - 1,200 mm rainfall.

Rainfall is changed up to the seasons. In rainy season (May - October), rainfall occupies 75% of total annual rainfall or up to 95% in the West (West of Gia Lai and Kon Tum Provinces). In dry season (November - April), rainfall occupies less than 25% of total annual rainfall. Especially, in January and February, there are only one or two rainy days. Then in dry season, water supply is shortage. In the dry season, underground water source become water supply source for people and vegetation. So, balance of ecology is significant to Central Highland. Domestic and foreign studies report that : Only natural forest eco-system with layers structure between upperground and underground is the most efficient for conservation of underground water resource for water supply in dry season.

So, vegetation is important.

c. Humidity:

Relatively Average humidity is 80% - 85%. The highest humidity degree is 85% - 90% in Ngoc Linh mountain area. The lowest humidity degree is 70% - 80% in Easup and Cheo Reo area.

Humidity degree is changed in the seasons, the highest in rainy season and the lowest in dry season. The highest humidity months are August and September (88% - 92% average). The driest months are February and March (70% - 72% average). The lowest humidity degree in dry season is only 20% or even 10% in Ba river's valley and semi-valley of Ea-sup, it causes low tree growing and forest fire.

d. Windy frequency:

In Central Highland, wind direction is changed sharply by seasons. In winter, there is North-East monsoon wind. In summer, there is South-west monsoon wind. The average windy speed is 4m - 6m/s. In mountainous and plateau areas, wind speed is stronger. In the dry season, there have been strongest windy speed make evaporation process faster and shortage of water for vegetation. It is not convenient for agriculture.

1.4. Hydrography:

a. Available water source:

Central Highland has 3 main river systems (Ba river, Se San river and Serepok river) and upstream of Dong Nai and Con rivers. The total annually water capacity is 40 billion m^3 . Then, Hydroelectricity capacity of Central Highland is abundant. According to the research results of Central Highland program No II, the whole region could provide 17 billion kW electricity. Central Highland is upstream of 3 main rivers impacting to important economic regions in the downstream such as South-east, Mekong Delta and Central Coast. So, the rational and sustainable management of forest resource of Central Highland to protect soil and

water resources of basins of Central Highland is important.

Disadvantages : The rainfall in rainy season and dry season is uneven. In rainy season, over-rainfall river causes floods. In dry season, dry river causes drought. The both impacts is bad for the production and also living standard of local people.

b. Underground water source:

Due to giant rainy water sources together with absorbed water capacity of some soil components, underground water source of Central Highland plays very important role of supply of water. Especially, underground water filtered from basalt soil is good quality and quantity suited the demand of socio-economic development of the region. According to statistics of Central Highland program No II :

- Pleiku plateau : 1,422,000 m³/day and night
- Buon Ma Thuot Plateau : 2,028,000 m³/day and night.

The underground water source of some plateau, semi-plain's areas is very deep (50m-100m depth). Water source used for living and production of the whole region is only 10 % of the total existing water source capacity.

Diverse distribution of water source make a big problem for production. So ecology balance and sustainable environment management are very important for agriculture and forestry production. If ecology lost balance, crop production become impossible. According to report of Dak Lak Province, existing coffee land area (130,000 ha), and about 30,000 ha within total area can not be cultivated due to lack of irrigation water in dry season.

If forest vegetation cover is decreased, surface soil moisture is reduced relatively. Central Highland's erosion become more serious. So that, forest conservation is an important in the master plan of Central Highland's socio-economic development.

To increase underground water source, it is necessary in the one hand to establish appropriate forest logging models and the other hand to protect and regenerate forest vegetation and construct water-tank with terraced cultivate technique and terraced-field area identification for improving and maintaining underground water source.

1.5. Land and minerals:

a. Land and current land use of Central Highland:

* Land of Central Highland:

Investigated results shows that Central Highland has 130 land types. Base on height, topography, location and others, there are 9 typical types as follows:

No	Land group	area (1,000 ha)	Percentage
1	Humus soil developed on marma acid, clay-stone ground	66.7	1.2
2	Red-yellow and gray-yellow humus feralit developed on marma-acid, clay stone decayed ground, marma-alkaline ground (red-bazantic soil) and sandy stones	639.4	11.5
3	Red-yellow feralit developed on marma-acid ground.	1,973.7	35.5

4	Red-gray feralit developed on alkaline marma ground (basaltic soil)	1,656.8	29.8
5	Red-yellow feralit developed on clay-stone decayed ground	695.0	12.5
6	Slight-yellow and dark-yellow feralit developed on sandy-stone mixture	289.1	5.2
7	Gray-yellow feralit developed on primary sediment	61.2	1.1
8	Black soil developed on eruption-effected ground and alkaline marma (basaltic soil)	22.3	0.4
9	Sediment along rivers and streams	155.7	2.8

In short: compared with other regions in the country, Central Highland has rich potentials of soil. With the area of 1.4 million ha of basalt soil with thick layer, fertility and flat-site distribution means convenient for agriculture and forestry production.

Nearly total basalt land of Central Highland is distributed on slightly sloppy land less than 15° (63 % of the total land area). Soil, medium and thick layers occupy 88%. The above-mentioned factors make Central Highland characteristic in compare with other regions in the country. Central Highland has great potential of development for large-scale production mainly agriculture and forestry items.

*** Current land use of Central Highland :**

- The land use of some areas and some cases in Central Highland is not suitable with their own natural conditions and sustainable land use. In 1970s and 1980s, the whole country's foodstuff was not enough for demand. At the same time, some forestry areas were clear cut for cultivation. As the results, thousands of hectares of forest were destroyed, that benefit was smaller than loss.

- Authority identification for managing natural resources was not written clearly and rationally on legally informed documents as well as on the field sites. Forestry Enterprises and farms managed land for enclosing as their own estate. Land for community, commune, people committee and households had not been distributed clearly. So that, local people tried illegal land use, it caused forest destruction.

- On the beginning of economic development program of Central Highland, economists, authorities and some sectors intended to establish industrialization for large-scale production due to high potentials of the Central Highland, it caused irrational space distribution, destroying ecology balance and unsustainable land use.

- People shifting was not based on sustainable natural resources use, especially in free migration caused forest decrease. Some forest areas were burn for agriculture cultivation and change to be bare land after erosion. Now, there are approximately 200,000 ha of bare land without cultivation capacity.

b. Minerals:

According to the statistics of Geology Union No V, Central Highland has giant natural mineral resources such as :

Boxit: capacity is 6.85 billion tons (Gia Nghia District)

Gold: capacity is 43 billion tons
Tin : capacity is 20,000 - 30,000 tons
Steel: capacity is 447 million tons
Fenphate: capacity is 0.7 million tons
Laterit: capacity is 100 million tons
Bentonite: capacity is 34.5 million tons
Ditonite: capacity is 15.5 million tons
Others: brown coal, peat,...

2. Forest resources

2.1. Area of forests

Unit: 1,000 Ha

	Total	Kon Tum	Gia Lai	Dak Lak	Lam Dong
Total area	5,559.9	1,000.0	1,664.9	1,877.7	1,017.3
A. Forest area	3,155.2	611.1	792.9	1,175.5	575.7
I. Natural forest area	3,108.9	607.0	782.5	1,150.1	569.3
1. <i>Evergreen broad-leaved forest</i>	1,720.4	377.1	461.7	663.2	218.4
- Rich forest	194.6	67.6	60.0	44.3	22.7
- Fair forest	513.9	113.2	95.8	233.7	71.2
- Poor forest	464.3	37.0	107.3	256.6	63.4
- Rehabilitation forest	547.6	159.3	198.6	128.6	61.1
2. <i>Deciduous broad-leaved forest</i>	694.8	0.3	316.9	352.4	25.2
- Rich forest	8.9		1.0	7.6	0.3
- Fair forest	108.3		33.9	69.7	4.7
- Poor forest	388.9		148.0	235.1	5.8
- Rehabilitation forest	188.7	0.3	134.0	40.0	14.4
3. <i>Pine forest</i>	146.7	12.4	0.1	1.5	132.7
4. <i>Woody and bamboo mixed forest</i>	227.4	75.7	1.0	52.5	98.2
- Wood + bamboo	157.9	65.2	0.7	51.6	40.4
- Broad leaf and coniferous trees	69.5	10.5	0.3	0.9	57.8
5. <i>Bamboo forest</i>	319.6	141.5	2.8	80.5	94.8
II. Forest plantation	46.3	4.1	10.4	25.4	6.4
B. Non-forest land	1,523.1	313.6	574.5	411.8	223.2
C. Agriculture land	579.5	56.1	237.8	199.2	86.4
D. Others	302.1	19.2	59.7	91.2	132.0

2.2. Volume of forests:

Unit : wood : $1,000\text{m}^3$
Bamboo : 10^6 tree

	Total	Kon Tum	Gia Lai	Dak Lak	Lam Dong
Total capacity	282,943.2	59,517.7	82,516.2	90,477.4	50,431.9
Natural forest	2,212.8	949.1	13.1	706.2	544.4
1. Evergreen broad-leaved forest	198,785.7	48,402.0	60,521.0	64,805.8	25,056.9
- Rich forest	42,906.6	14,520.0	14,953.0	8,724.6	4,709.0
- Fair forest	81,199.7	17,342.3	17,832.0	35,165.1	10,860.3
- Poor forest	35,070.6	2,981.2	10,809.4	15,844.9	5,435.1
- Rehabilitation forest	39,608.8	13,558.5	16,926.6	5,071.2	4,052.5
2. Deciduous broad-leaved forest	44,312.7	14.1	21,858.6	21,035.1	1,404.9
- Rich forest	1,095.3		155.5	909.7	30.1
- Fair forest	10,952.9		3,782.4	6,737.5	433.0
- Poor forest	21,051.5		9,054.5	11,737.0	260.0
- Rehabilitation forest	11,212.0	14.1	8,866.2	1,650.9	681.8
3. Pine forest	18,886.7	3,082.4	9.8	692.6	15,101.9
4. Woody and bamboo mixed forest	20,958.1	8,019.2	126.8	3,943.9	8,868.2
	915.4	621.1	6.0	153.2	135.1
- Wood + bamboo	12,664.3	6,504.6	75.6	3,839.4	2,245.7
	915.4	621.1	6.0	153.2	135.1
- Broad leaf and coniferous trees	8,293.8	1,514.6	52.2	104.5	6,622.5
5. Bamboo forest	1,297.4	328.0	7.1	553.0	409.3

- Total existing forest area : 3,155,200 ha occupying 30% of total national forest.
- Total current forest volume: $282,943,200\text{ m}^3$ of wood and 2,212 million bamboo trees
- Forest cover ratio : 56.7% (28% for the whole country)
- Mature forest : 600,000 ha
- Average capacity of forests of Central Highland is highest in the country: $102\text{ m}^3/\text{ha}$

Rehabilitation forest occupies 30% of existing timber forest. So, it is convenient for protection and regeneration.

2.3. Forest plant:

a. Flora:

- Malayxia-Indonesian plant current represented by *Dipterocarpus* sp.
- Indian - Myanmar plant current with
- Himalaya-Chinese plant current represented by *Pinus* species.
- Northern Vietnam native species represented by *Cinamomum* and *Castanopsis*.

b. Forest plant value

* Genetic conservation, natural conservation

* Environment protection

* Economic value :

+ Rare and precious timber for furniture and woody fine art : 15 species (occupying 30% of some rare and precious timber in Vietnam) such as : *Dalbergia Conchinchinensis*, *Turpinia Montana* *Dalbergia Bariaensis*, *Podocarpus Fleuryi*, *Cassia Siamea* Lamarck, *Pterocarpus Pedatus*, *Glyptostrobus Pensilis*, *Fokenia*, *Chukrasia Tabularis*, *Ducampopinus Krempfii*, etc...

+ Timber for ship, bridge and train line: *Aglaia Gigantea* Pellegrin, *Anisoptera Costata* Korth, *Dysoxylum Loureirii* Pierre, *Hopea Pierrei* Hance, *Hopea Odorata* Roxb. etc...

+ Wood for construction and appliances : *Aglaia Gigantea* Pellegrin,

The above mentioned rare and specious plants of Central Highland were logged rampant and illegally. It was also a big shortcoming of natural resources use for socio-economic development of the region.

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The above mentioned rare and specious plants of Central Highland were illigaly logged. It causes a big shortcoming of natural resources for socio-economic development of the region.

* Characteristics of Central Highland's forests :

- Forest regeneration :

Compared with Central-South Coastal area and North West, Central Highland's Forest regeneration is good of quality and quantity.

No	Forest types	Regeneration density (Plant/ha)	Regenerated species (Species/ha)
1	Tropical close evergreen forest of medium-height mountain	11,000 - 32,000	25 - 40
2	Tropical close evergreen forest of low mountain	4,000 - 20,000	20 - 40
3	Semi-deciduous close forest of low mountain	550 - 7,000	15 - 20
4	Deciduous broad-leaved forest	1,500 - 3,000	<15
5	Open coniferous forest	5,000 - 8,000	10 - 20
6	Bare land and denuded hill forest (IB; IC status)	700 - 10,000	5 - 25

Forest regeneration within all forest status of Central Highland get by demanded condition. Especially, on bare land and denuded hills, the regeneration possibility of IB and IC status would become true if forest protection management is effective.

- Characteristics of forest growth:

Central Highland's forests have been growing and regenerating steadily. Biological characteristics of each species make different growths. So, using rationally natural forest resources is to avoid squandering materials and to create products for the society. It is important part of Central Highland forestry program.

2.4. Forest fauna :

- Central Highland has the most redundant fauna in compare with other 5 fauna areas. According to statistics, there are 535 species of spine animal within 4 classes : mammals, birds, reptiles and amphibian

Class	Species	Family	Branch	Total species of the country
Mammals	126	28	10	275
Birds	322	45	16	773
Reptiles	59	17	3	180
Amphibian	28	5	1	80
Total	535	95	30	1,308

Central Highland's fauna occupies 42% of total species of the country.

Of the above mentioned species, Central Highland has 78 species of rare and precious animals listed on Vietnam red book :

- Mammals : 40 species
- Birds : 21 species
- Reptiles: 14 species
- Amphibian: 3 species

(Some species listed on the world red book).

As some research results, so far, some rare and precious animals as well as plants of Central Highland have been reducing rapidly due to some following main reasons :

- Forest loss and illegal migration
- Rampant hunt
- Imbalance management activities
- Non-suitable investment

3. Current environment situation of Central Highland.

a. Environment movement in the years

* Movement of Natural forests by years

Items	1976	1980	1985	1990	1995
Total areas of natural forests (10^3 ha)	3,720.9	3,538.0	3,416.2	3,294.5	3,155.2
Natural forest cover ratio (%)	66.9	63.6	61.4	59.2	56.7
Natural forest loss (ha/year)	45,725	24,360	24,340	27,860	

Annually average natural forest loss is 29,800 ha. But, the areas of forest plantation, industrial crop plantation (rubber, coffee) and fruit tree gardens increase a little bit. The forest areas were changed due to the following main reasons:

- Fire for shifting cultivation of local people
- Population increase
- Change of Management mechanism
- Illegal logging
- Forest fire

In Cu Jut District, Daklak Province, natural forest was clear up against protection and reforestation.

* Atmosphere frequency:

Due to increasing non-forest cover land caused water source imbalance. In dry season, due to strong wind caused erosion increasing dust into atmosphere. In Buon Me Thuot, ratio of dust in atmosphere is 5,57 gram/ $1m^3$ atmosphere, meanwhile, 0,133 gram/ $1m^3$ acceptable standard.

* Underground water:

- The water level of wells of households is reduced annually.
- Lack of water for irrigation for coffee.

* Land:

Due to reducing forest area and high rainfall ratio caused degraded land, surface soil layer lost strength of reservoir for river and lake, reducing the using time of irrigation and hydro power Projects and impacting to living water quality. So far, Central Highland has about 200,000 ha of land could not cultivate.

* Other aspects of environment:

The weather hazard occurs with high frequently in Central Highland and the nearby areas. Central Highland itself, flood and drought happen every year.

b. Sustainable development in Central Highland:

To control environment degradation, economic development should be suitable with natural rules, sustainable development and environment need to be improved. The sustainable development should follow the following basis:

- Distribution of production, protection, special-use forests and cultivation land should be suitable with both scope and space.
- Forest cover is under regulated standard for controlling erosion in order to improve soil quality.
- Sources and advantages of Central Highland should be made the most of their capacities creating strong potentials for proper economic development of the whole region.
- Sustainable development of Central Highland should ensure consolidation of environment, society and security.

II. Current status of population, economy and society:

1. Population and labor:

1.1. Population:

In the year of 1994, total population of central highland area was 3,098,800 (579,900 households) account of 4.2% of the total population of the country (meanwhile, total area of Central Highland account of 16.95% of the total area of the whole country). The percentage of Ethnic minorities people is 34.2%. Average population density was 55.7 persons/km², but population density between urban and rural areas was imbalance. Population density of the provinces was follows:

- Kon Tum:	25 Ps/km ²
- Gia Lai:	47 Ps/km ²
- Daklak:	63 Ps/km ²
- Lam Dong:	80 Ps/km ²

The Highest population density was 2,200 Ps/km² (Pleiku town - Gia lai Province). The lowest population density was 8 Ps/km² (Ea Soup District - Daklak Province).

Population growth rate is 3.4%.

In comparison with other provinces, the population density of Central Highlands is lowest (54 Ps/km² in North-West). But in the near future, Central Highland's population will be increased. Because of population migration to Central Highland is increasing, especially in Daklak. In the current years, under statistics of General Department for Statistics, population growth rate of Daklak is 4%/year in which nearly 1.6% is natural growth.

According to open statistics, until the end of 1994, there were 89,500 freely immigrated households (419,000 people) of which 300,000 ethnic minorities people came from bordered North provinces. In additions, labors came for forestry enterprises and farms contributing population increasing.

1.2. Labor:

a. Labor source:

Total is 1,275,000 labors account for 41% of the population, in which:

- Agricultural labors :	1,040,000	81,5%
- Forestry labors:	45,000	3.5%
- Industrial labors:	42,000	3.2%
- Construction labors:	40,000	3.1%
- Service labors:	108,000	8.7%

The forest area of Central Highland is relatively large, forestry production is still put on the first priority in national economy. But, investment for forestry labors is now not enough. So, forestry production could not be full operated.

b. Labor professional:

- University and higher level :	1.8%
- College level:	6.2%
- Technical workers:	10.3%
- Workers:	81.7%

2. Religion:

Now, Central Highland has 37 religions:

- Kinh	: 1,121,393 people (65.8%)
- Gia Rai	: 315,464 (10.5%)
- Su Dang	: 283,226 (2.9%)
- Ba Na	: 257,897 (5.3%)
- E De	: 124,343 (7.8%)
- M Nong	: 71,382 (2.2%)
- Others	: 128,940 (5.5%)

Religion features:

Residence of each religion is different. In short, religion of Central Highland has complicated structure, different development levels, imbalance of socio-economic development, many kinds of minortie's languages, societies, customs, religious, culture and fine arts.

In majority, ethnic minorities people make a living with shifting cultivation, cutting forest trees, hunting, and superstition, economy and many difficulties in living condition. Central Highland has 50% of people living and producing in the forests and nearby forest areas.

Ethnic minorities people of Central Highland live together in each village, big family. They know well hunting and forest products for their living, but their knowledge of forestry management is limited.

Due to the above mentioned religion characteristics, forestry should be payed for social forestry. Forestry enterprises should identify objectives and duties of management and protection of existing forests and together with social and community forestry. So, existing resources could be used rationally and sustainably.

3. Infrastructure:

3.1 Transportation:

The national roads 14,19,26,40,24,25,27,28 are main transport linkage of Central Highland, connecting some Provinces: Binh Dinh, Quang Ngai, Phu Yen, Khanh Hoa and Dong Nai.

The whole region has 16,660 km of road of which:

- National road: 1,520 km
- Provincial road: 1,782 km
- District road: 4,507 km
- Commune road: 8,851 km

Average road density of the whole region is 0.14 km/km^2 (including district road).

Now, ten communes have no road and 420 km of road should be constructed for those communes.

3.2. Irrigation:

Since 1975 victory, Central Highland has been constructing some irrigation projects with different classes contributing foodstuff and industrial trees production improvement. There were 158 basic construction projects including 59 container tank, 69 reserver and 28 water pumping station irrigating 29,700 ha of spring-winter rice crop and 8,800 ha of autumn rice crop. However, those projects have not satisfied the irrigation demands of agriculture and industrial tree production.

3.3. Energy:

Central Highland has great potentials of 57 billion kW/h of hydro-power, 17 billion kW/h economic capacity. But until now, it is not made its the most of its capacity for production and living. Hydro-power per capita is only 37 Kwh, in some areas of districts, there is not enough electricity for local people.

4. Society infrastructure:

Information networks of culture, education and training are insufficient with poor facilities and activities. The local people's education level is still low especially in remote areas. The illiteracy rate couples 30% (ages between 15-35), some school aged children, who do not go to the class, is over 20%.

Diseases infection (malaria, goitre, epilepsy and epidemic) remain high percentage (70% malaria, 30-60% epilepsy). In the war, Central Highland had been chemical bombed causing serious decease for people and animals. Deformed rate is high. To solve those problems, forestry sector should promote eco-environment improvement and also State should carry out some effective programs.

Due to Northern people move to Central Highland, it causes some positive and negative factors in society.

5. Culture and society:

Central Highland is home legion of ethnic minority people. They have their own languages, customs and lives in different places.

Some ethnic minority people are left backward and poor living condition and it make population decreasing, for instance, Brau religion, only 231 survivals and Rnam religion, only 227 survivals in Kon Tum Province. Each ethnic minorities in Central Highland have their own ancestors but they have some common points as follows:

- Poor acknowledges, backward customs, religious,...
- Diverse Community activities.
- Out - of - date cultivation method together with shifting cultivation.

The State already invested some remarkable amount to reduce shifting cultivation activities, but 40,000 households still live on shifting cultivation. They are one of the main reasons natural forest deforestation. Under statistics of causes of natural forest loss as follows:

- Slash and Burn (61%)
- Shifting to another industrial crops such as coffee and rubber (35%).
- Forest fire and others (residence, road extension) (4%).

6. Central Highland's economic construction and development: in last 20 years

After the liberty day of the South of Vietnam, Central Highland people have done their best to economic development with GDP: 9%-12%. But some disadvantages effected on the way of industrialization and modernization. Central Highland's economic development programm planned through policies of the Vietnamese State and Communist Party as follows:

- Policy on new economy and migration to Central Highland created potential strengthening for Central Highland to develop production area in large scale. Central Highland changed positively to meet a demand of goods production based on its advantages. So, agriculture cultivation and industrial tree planting areas increased. Foodstuff productivity is improving continuously and until now, satisfying needs of Central Highland themselves.

- Shifting cultivation policy step by step contributes to socialization, stabilising and improving living standard for local people. for policies decreasing shifting cultivation, some more new rice fields made and contributed foodstuff productivity improvement for food demands there and construction of some new villages.

- Wood export policy:

On the first stages of economic development of Central Highland, wood was an important goods for export to get income for developing other economic sectors. The basic policy is based on forests was to develop Central Highland's economy through increasing annual logging. However, the policy restricted Central Highland's forestry development and natural forest areas lost fast. Foreign currency beng gotten from wood export was not enough with big expenditure on logging.

- 327 program:

Forest land allocation created jobs for labor force living in forests and nearby areas. Forest protection and management activities changed positively.

All dicicions and policies of the State contributed Central Highland's economic changes.

7. Forestry activities in Central Highland:

7.1. Forestry and Forest protection activities:

Forest management and protection activities depend on social and economic conditions and all operations of authorities, organizations and local people. Communist Party and State had concerned and invested to those activities as well as forestry sector itself. So there were some positive results. However, in the past years, the areas of forest reduced within 25,000 ha due to some reasons as follows:

- Forest fire for shifting cultivation of the local people .
- Cut trees down of the immigration people.
- Weakness of forest protection station.
- Forest harvest without rehabilitation activities later.

7.2. Forest planting activities:

Forest plantation of Central Highland has not been investigated and assessed exactly. Having the data of forest plantation areas were collection from statistics' data of the local authorities and Enterprises. Until 1994, Central Highland had about 46,000 ha of forest plantation. So the planting progress was so slow. Under supervision, forest establishment rate of forest plantation was 40%-50%. Planted tree species were not diverse.

Some current years, the State has strengthened investment under 327 program. Central Highland got some prosperous results. Some value tree species have been planted with higher survival rate such as Litsea, Michelia, Canarium, Cassia Siamea Lamarck, Hopea, Teak,...

7.3. Forest enrichment and regeneration activities:

According to statistics, until 1994, there were 200,000 ha of forest restored and enriched. Forest restoration activity was more popular than forest enrichment 's . Some Forest Enterprises (Kon Ha Nung, Ea Soup and Gia Nghia) tried forest enrichment experiment. Some species planted for forest enrichment were Michelia, Canarium, Choerospondias Axillaris, Dipterocarpus Alatus, Teak,... They could grow well with relatively high survival rate.

7.4. Forest land allocation activities:

Until 1994, some 763,200 ha of forest land allocated to 39,800 households. Forest land allocation activities carried out slowly. Some areas had no clear field borders, appropriate production plan. Forestry extension activities have not met the demand yet. So its effects were limited.

7.5. Forest product logging:

From 1976 to 1994, in Central Highland, Production of Timber was logged 300,000m³ annually. Net logging figure for many kinds demands was up 1.5 million m³/year. Besides, the other forest products such as bamboo, rattan, pine resin,... were also produced with big quantity.

Forest product logging activity was settled. It should be under following regulations:

- Implementation under outlines and directions of concerned authorities.
- Implementation logging with silviculture operation before or after logging
- Making the utilization capacity of wood efficient (within 50% as usual).

7.6. Wood processing:

Wood processing activity in Central Highland focuses mainly on timber and raw materials. Processing capacity is still low. There are about 200,000 m³ per one year. Processing technology is out of date. Production with high quality is low late. Wood processing companies located separately with different consumption markets under low- level

management.

7.7. Conclusions of Central Highland's forestry:

a. Achievements of Central Highland's forestry after 20 years of development:

- State budget contribution:

Together with other sectors, forestry contributes 26% of Central Highland's grossed production for economic development.

- Contribution of infrastructure construction for production and living standard:

By running business, some Forestry Enterprises constructed new roads and also upgraded roads of thousands kilometers for production and living condition. So far, almost communes of Central Highland have motor ways. Besides, forestry sector also contributed some infrastructure construction projects such as station, clinic, school for local community.

- Social contribution:

Forestry has contributed to stabilised life of rural people, created jobs, hired labors to forestry production, established agro-forestry models and made many good products. As the results, it has contributed to balance population density and to establish mountainous towns.

- Contribution of security safety and politics of the country bordered area.

- Contribution of sustainable environment protection:

It has contributed to reduce forest area loss, to control forest fire and to increase forest planting areas.

The above mentioned contributions were still small but forestry sector's basic infrastructure establishment in Central Highland was very important. However, Central Highland's forestry sector has some problems needed to solve as follows:

- Central Highland's natural resources decrease continuously due to some pressures.

- Organization system has not been stable and consolidated. That caused some difficulties in forest management and protection.

- Forest Enterprises can not done well silviculture activities to rehabilitate and enrich existing natural forests.

- Forest plantation progress is still slow and low effect. Industrial forest planting strategy is not concrete causing bad quality forest products.

- The number of organization engaging in wood log is so much. Out of date logging equipment could use up available materials. Products treatment is primitive. But, grossed products worth of 26% of regional economic structure.

- Private Enterprises shared big proportion of consumption of timber volume causing business competition and illegal logging. The Control of private enterprises's activities is difficult. To make efficiency forestry sector's advantages, it is necessary to renew product system such as scale, processing ,... as well as private enterprise system.

- Basic matters of silviculture such as seedling supply, nursery, material supply areas are not paid attention. Responsibility of authorities for forest management is not clear.

8. Economic development prediction until the year 2010:

Economic development goals of Central Highland the period 1996-2010

Items	1995	2000	2010	Growth rete (%)		
				1996- 2000	2001- 2010	1996 - 2010
1. Population	3,098.4	4,120	5,520	5.8	2.9	3.6
1. GDP (dong value in 1994)	5,703	14,132	50,780	19.9	13.6	15.6
- Industry	669	2,261	11,679	27.0	17.8	19.5
- Construction	679	2,332	10,156	28.0	15.8	18.4
- Agriculture & Forestry	2,762	5,088	12,695	12.9	9.5	10.0
- Service	1,593	4,451	16,250	22.8	13.8	16.7
3. Sector typed economic structure						
- Industry	11.7	16	23			
- Construction	11.9	16/5	10			
- Agriculture & Forestry	48.4	36	25.0			
- Service	28.0	31.5	35.0			
4. GDP per capita (USD)	166	343	920	14.5	10.3	11.9
5. Export value (10 ⁶ USD)	154	950	2,150	43.1	8.5	20.4
6. Investment capital (billion VN Dong)		21,072	91,620		14.3	
7. National budget collection (billion VN Dong)	568.0	2,826	14,218	27.8	16.7	20.7
<i>National budget collection ratio/GDP %</i>	<i>9.9</i>	<i>20.0</i>	<i>28.0</i>			