Project “Afforestation Project in Ha Tinh, Quang Binh and Quang Tri”

Summary of report

BASIS TO IDENTIFY LAND FOR ESTABLISHMENT
OF PROTECTION FOREST IN THE AFFORESTATION PROJECT OF
HA TINH, QUANG BINH, QUANG TRI PROVINCES

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Part I:

SUMMARY OF LAWS, REGULATIONS AND POLICIES RELATED TO PROTECTION FOREST

This part presents a summary of current laws and regulations on protection forests in order to provide basis for solutions toward land use planning for protection forest development under the Ha Tinh, Quang Binh, Quang Tri Reforestation Project.

1. Summary of current laws and policies that related to protection forest

So far, there have been many judicial documents issued by the central and local authorities in forms of law, circular, decision... that related to protection forest. However in this part, only centrally issued documents which are being legitimately valid for implementation are summarised. These documents listed in the table below:

<table>
<thead>
<tr>
<th>No</th>
<th>Name of documents</th>
<th>No/year</th>
<th>Issued Date</th>
<th>Type of document</th>
<th>Issued by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Law on development and protection of forest</td>
<td>1991</td>
<td>19/08/91</td>
<td>Law</td>
<td>National Assembly</td>
</tr>
<tr>
<td>2</td>
<td>Circular on the application of the Law on development and</td>
<td>17/HDBT</td>
<td>17/01/92</td>
<td>Circular</td>
<td>Government</td>
</tr>
</tbody>
</table>
2. Organisation structures and technical procedure for management of protection forest

2.1 Introduction of concepts

Following official concepts and definitions are being used:

- **Forestry land**: Forestry land is one of the six types of land as defined in Article 11 of the Law on Land (1993). They are:
  
  i. Agricultural land; 
  
  ii. Forestry land; 
  
  iii. Land for rural residential areas; 
  
  iv. Urban land; 
  
  v. Specialised land; and 
  
  vi. Unused land.

Forestry land is any land identified primarily for forestry production. This includes land covered by natural forest, land under afforestation and land used for forestry purposes such as afforestation, protection for natural restoration, forest enrichment and research and trial on forestry.

- **Forest**: This consists of natural forest and plantation on forestry land including forest vegetation, animal and the natural features relating to the forest. (Article 1, Law on Forest Protection and Development, 1991).

  Forestry land consists of:
  
  - Land with forest.
  
  - Land without forest planned for afforestation.

- **Protection forest**: is forest and forestry land which are used to limit harmful climate factors in order to protect natural environment and ecological equilibrium. (Regulation on the management of production, protection and special use forests, 1986)
2.2 Purpose, classification and functions of protection forest

a-Purpose: Protection forest is used mainly for conservation of soil and water resources, for anti-soil erosion, for restriction of natural calamities and for regulation of climate in order to contribute to ecological and environmental protection. (Article 26, Law on Forest Protection and Development, 1992)

b-Classification: Protection forest is classified into following categories:

1. Watershed protection forest
2. Wind-break and anti-sand moving forest.
3. Wave-break and anti-sea encroaching forest. And,
4. Ecological environment protection forest.

c-Function: The function of each category of protection forest is stipulated in Article 4 of the Regulations on management of production, protection and special use forests (1986):

- **Watershed protection forest**: To regulate the water flow to limit flooding; to supply water during the dry season; to anti soil erosion for soil conservation, and; to prevent deposition on rivers and lakes.

- **Wind-break and anti-sand moving forest**: To lessen bad effect of the wind blowing and typhoon; to prevent sand moving to safeguard villages, agricultural land and transportation network.

- **Wave-break and anti-sea encroaching forest**: To stop the waves to shelter construction works along the sea coast; to stable the alluvium to create new land...

- **Ecological environment protection forest**: To regulate the climate, to prevent pollution in the populated, urban and industry areas.

2.3 Ranking protection forest

a-Ranking according to its critical levels:

To define the critical levels of the watershed protection forest, it is stipulated in Article 5 of the Technical Regulation for Establishment of Protection Forest in the Watershed Area (1991), that the protected watershed area is ranked into three levels according to their need for protection:

- **Level I**: Very critical. This includes areas close to water source and river banks that are endangered by serious erosion and are highly demanded for water regulation and urgently needed for protection. Such areas must be reserved for establishment of protection forest in order to ensure a vegetation coverage of more than 70%.

- **Level II**: Critical. This includes areas where soil erosion is average and the demand for water regulation is moderate; the conditions for developing agroforestry production are available; the need for soil conservation high. In such areas, production-and-protection combined plantation should be promoted in order to achieve a vegetation coverage of 50% at least.

- **Level III**: Less critical. This includes areas where the soil erosion is low; Potential for developing agroforestry production available; There is need for soil conservation and sustainable land management for agroforestry development. It is necessary to establish production-and-protection combined plantations oriented to agroforestry in order to ensure a vegetation coverage of 30% at least.

These levels are corresponding to:

i. Very critical watershed protection area;

ii. Critical watershed protection area and
iii. Less critical watershed protection area.

b-Ranking method

- Selecting factors to be used for ranking watershed protection forest. There are eight factors such as relative altitude, slope, length of slope, distance from the lake or river bank, thickness of the soil layer, soil physical structure, rainfall and raining intensity.

- Each of the above factors are graded into three degrees corresponding to their destructive impact on the protection, i.e. very dangerous, dangerous and less dangerous. These will match the three protection levels: Very critical, critical and less critical.

- Overlapping these component maps as the above described protection levels, a map showing different protection areas according to its critical levels will be achieved.

2.4 Organisation structure for management of protection forest

a-Levels of competence for approving the area of protection forest

The distribution of authority for approving the area of protection forest is stipulated by Article 2 of the Circular No 02/CP on Forestry Land Allocation as follows:

- The Council of Ministers (now called the Government) is authorised to decide upon areas of more than 50,000 ha, or smaller if it is specially significant to the national benefit or encompasses territory of many provinces.

- The Minister of the Ministry of Forestry (now the MARD) to decide upon areas between 10,000 and 50,000 ha and areas within any union of industry and forestry or forest enterprise that belong to the Ministry.

- Chairman of Provincial People's Committee to decide on areas from 5.00 - 10.000 ha or protection forests that encompass territory of many districts.

- Chairman of District People's Committee to decide on area of less than 5.000 ha within the boundary of the district.

b-Organisation and management of protection forest

The organisation of the management board of protection forest is defined as follows:

- For protection forest zone approved by the Government, a management board will be established and placed under the authority of the Ministry.

- For protection forest zone approved by the Minister or provincial chairman, a management station established and placed under the provincial Forestry Department.

- Protection forest areas within union or forest enterprise will be responsible by the corresponding leaders in terms of protection, management and development according to the approved project proposal.

- Protection forest areas within commune boundary will be responsible by the commune chairman in terms of protection, management and development in accordance with technical advice provided by the local district Forest Protection Unit.

c-Allocating forestry land for management of protection forest

Regarding the allocation of forestry land for management of protection forest, it was stipulated by Article 7 of the Circular 02/CP as follows:

- The Management Board instituted by decision made by the Premier (or Chairmen of provinces and
cities directly under the Central Government), are delegated to protect and to develop the area according to the approved designs and plans.

- Regarding forest areas which have been handed over to economical units (forestry, agricultural or armed forces...), leaders of the concerned units are responsible to organise the management, protection and construction of those according to the designs and plans approved by the competent authorities.

- Regarding small forest protection areas within the boundary of a commune or a village, which are not yet designated to any concrete user, the concerned commune chairman is responsible to organise villagers to manage, to protect and to build up them according to technical instruction provided by the State management organisations of forestry in the local area.

- The State allocates afforestation land to organisations, households, or individuals to create protection forest, to enrich or to protect the existing vegetative cover. Besides, the latter are allowed to combine commercial production activities in forestry, agriculture and fishery in the following:
  
  o Less critical watershed protection areas.
  
  o Wind-break and anti-sand moving areas.
  
  o Wave-break and anti-sea encroaching areas where the alluvial soil is stable.
  
  o Ecological environment protection areas.

2.5 Technical structures

In 1986, the Ministry of Forestry issued a Regulation for management of three-type forests. However, until 1991, it enforced a Technical Regulation for establishment of protection forest in the watershed area. For the rest three categories: Wind-break and anti-sand moving forest, Wave-break and anti-sea encroaching forest, Ecological environment protection forest, there is no guidelines for implementation until now (1998).

This Technical Regulation provides general technical guidelines so that other provinces can apply them in their concrete conditions, i.e. to base on it in order to work out technical procedures which are suitable to the management levels as described before.

Therefore, in this report, only technical structures (as in Article 8 of the above mentioned regulation) that seemed to be suitable and relevant to the need of the Afforestation Project of Ha Tinh, Quang Binh and Quang Tri are discussed.

a. For protection forest in the very critical watershed area (Zone I)

- Protection forest in the very critical watershed areas is a ultimate protection forest which is multi-storey and densely structured by many tree species. Its shading coverage is more than 60%. Under the canopy, there is a humus layer and a green vegetation covering the soil. Trees are evenly distributed over the whole area.

- Protecting for natural regeneration in order to restore the status of natural vegetation from class Ib (area covered by small bushes and few trees) to class IV (unharvested mature forest and bamboo forest).

- Planting trees on areas of Ia (bare hills, grassland...) Where possible, it is permissible to plant trees on lb area. The selected tree species must be site matching. Planting indigenous tree species, thick crown species, long commercial rotation species in combination with fast growing, soil improved and special product species is encouraged. Trees must be planted in a mixture and along the contours.

- For the ecologically matured natural forest, harvesting is permissible but this has to be carried out in accordance with the harvesting designs approved by the competent authority. An insurance for possibly natural regeneration after harvesting is a must.

- For plantation. After the whole planned area is afforested, it is permissible to harvest on the whole
planted area in accordance with the plan. It is also allowed to cut trees by strips in the matured plantation according to the approved harvesting design. Replanting right after harvesting is a must.

b-For protection forest in the critical watershed area (Zone II)

- Protection forest in the critical watershed area is a system of protection forest combined with production. The structure of this must consist of tree species possessing both protective and economical values. Its shading coverage is at least 50% and equally distributed over the whole watershed area.

- Protecting for natural regeneration to restore the status of natural vegetation from class Ic (area with trees scatteredly distributed; the shading coverage is less than 30%; or there are more than 1,000 potentially regenerated trees on one ha) to class IV (unharvested mature forest and bamboo forest) in regions where natural and socio-economical conditions are less possible.

- Tending and enriching forest in regions where natural and socio-economical conditions are less possible. Technical solution for tending and enrichment are: Clear the climbing plants; do not clear the green bushes; do not reduce the shading canopy to less than 60%; in areas where trees are unevenly distributed, artificial enrichment should be applied along strips; do not burn the cut vegetation.

- Planting trees on areas of Ia and Ib (bare hills, grassland... area with trees scatteredly distributed...) Technical solution must include selecting site-matching species. Due attention must be paid to selecting species which possess both protective and economical values.

- Utilisation of forest products: It is permissible to utilise thinning material and other forest products but do not destroy the canopy structure; try to conserve green vegetation to promote regeneration for protection and production purpose.

- It is permissible to selectively harvest main forest products in matured stands. For planted forest, clear cutting is applied along strips. Replanting is a must right after harvesting.

d-For protection forest in the less critical watershed area (Zone III)

- Protection forest in the less critical watershed area is a system of production forest combined with protection. Its structure consists of tree species planted mainly for economical value and with some protection function; The shading canopy must be at least 30% and equally distributed over the whole area.

- For all operations such as protection, enrichment, harvesting and replanting, the technical solutions for production forest are applied.

3. Practical application of policies

- At the provincial level, there are no concentrated zones of very critical and critical protection that have been established. The boundaries of the three-type forests are not accurately planned. They are designed only in the overall plan and have not been identified in the field. Thus, there are not enough guidelines for every district and commune in the province to base on in order to decide very critical, critical and less critical protection areas for development.

- When discussing with the project management boards in three provinces, it was agreed that the national criteria can not be used to classify protection forest within the provinces. Neither can be the criteria set by the Forest Inventory and Planning Institute for 327 planning.

- When doing the feasibility study of the Afforestation Project in three provinces, this matter was not considered. Therefore, it is now not possible to make village and commune plans while this should have been carried at the same time with land use planning for every commune.

- It was suggested by all three provinces that the Project should, as soon as possible, carry out research to define criteria suitable with the concrete conditions in the project area so that land use planning for
protection purpose could be made for every commune and village or for a small watershed area of some hundred hectares.

- Protection forests established in provinces do not meet standard requirements. There is no reasonable tree species composition for planting as regulated in the Ministry's guidelines.

- Technical regulations for management of production forest that was issued by the Ministry in the past, are only suitable for the outmoded State Forest Enterprise System, not for establishing protection forest. So it is observed that until now, within the Forestry Sector, there is no regulation for establishment of protection forest, with satisfactory tree species. Thus, it is not possible to decide appropriate amount of investment for creating protection forest. The investment today is just based on an *estimation* and used as an average norm in the whole country. This is the reason why every province always chooses the most easy species to plant on the easy sites first. Therefore, the need to create mixed plantation in the very critical and critical protection areas is not met.

- Plantations so far are not concentrated in the critical areas. This means that area of plantation in more sloping land is limited. Moreover, suitable tree species and suitable management methodology are not existing.

### Part II:

**BASE TO IDENTIFY LAND FOR ESTABLISHMENT OF PROTECTION FOREST IN THE PROJECT AREA OF HA TINH, QUANG BINH AND QUANG TRI**

1. **Project activities related to establishment of protection forest**

1.1 **Initial project implementation results**

According to the Project report on project implementation in the second half of 1997 (from 01.07 to 31.12.1997), following activities have been carried out:

- Providing training and study tour on land use planning and land allocation at micro level for the field staff and on financial management for the provincial and district management staff.

- Afforestation: Experimental plantation is established on 115 ha (with *acacia auriculiformis*, *pinus merkussii* and *cassia sp.*) according to the Project management methodology. (Ha Tinh: 55,3 ha; Quang Binh: 30,0 ha; Quang Tri: 30,6 ha.

- Land-use planning at village level: Until 20/5/1998, land-use planning at commune level have been carried out in all 10 communes within the project area. Area planned for afforestation with project support is also identified. However, the land-use plans have been appraised and approved just by the commune and district authorities, but not yet submitted to the Project management boards at the provincial and the Central levels for approval. The consultant group (from 15-25/5/1998) has got land-use planning figures as in the following table.

<table>
<thead>
<tr>
<th>Province</th>
<th>District</th>
<th>Commune</th>
<th>Existing area of vacant land (ha)</th>
<th>Area planned for afforestation (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ha Tinh</td>
<td>Ki Anh</td>
<td>Ki Trinh</td>
<td>1.063</td>
<td>311</td>
</tr>
<tr>
<td></td>
<td>Huong Son</td>
<td>Son Mai</td>
<td>426</td>
<td>327</td>
</tr>
<tr>
<td></td>
<td>Duc Tho</td>
<td>Duc Lien</td>
<td>1.563</td>
<td>505</td>
</tr>
<tr>
<td>Quang Binh</td>
<td>Quang Trach</td>
<td>Quang Lien</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bo Trach</td>
<td>Bac Trach</td>
<td>386</td>
<td>317</td>
</tr>
<tr>
<td></td>
<td>Le Thuy</td>
<td>Thai Thuy</td>
<td>2.777</td>
<td>700</td>
</tr>
</tbody>
</table>
1.2 Aspects for consideration

When judging the method for land-use planning at commune level and the figures in the above table, following observations are attained:

- Land-use planning at commune level is the first main activity of the Project. It aims to select farmers to participate afforestation and, more important, to plan land within the commune for different uses in future. When planning the use of forestry land, it is necessary to identify area with forest, area without forest as well as regions for developing different types of forest i.e. protection, production and special use. For the Project, it is very important to clearly define areas for afforestation of both protection and production forests.

- However, when comparing the results of the recent land-use planning with what is demanded by the Project, although this demand is simple but very essential, it is for sure that the demand is not met. As matter of fact, the land-use planning was carried out just because they want to timely meet the planning requirement. i.e. to form a basis for next activities such as land allocation, credit and extension ... Therefore, areas for establishing protection forest and production forest are not yet identified. When discussing this matter with commune and district technical staff, they all said that they can not do this because they have received no instruction from the Central level.

- As there may be different reasons in land-use planning methodology, no comment or assessment should be made here. But one can clearly see that there is no criteria for classification of protection and production forests within the project area while this is a must in the land-use planning process in order to form basis for selecting suitable tree species for either protection purpose or production one.

2. Summary of natural and production conditions related to land use planning for establishment of protection forest

2.1 Natural conditions

The project is implemented in a geographical area within the 16°12'-18°46' North latitudes and 30 km from the coastal eastward. Following distinct characteristics of the natural conditions should be considered for they will produce direct impacts on the protection issue in the project area.

2.1.1 Topography

There are two main topographical patterns in the project area.

- The moving and stable sandy coastal area: The average altitude of this area is 10-30 m. This type of topography is mainly concentrated in Quang Binh, Quang Tri, especially in Vinh Linh district (Quang Tri) and Do Linh (Quang Tri). The sandy field has become an obstacle for the lives and production of the local people. There is a great need for anti-sand movement in this coastal area.

- The low hilly area: This covers the most project area. The average altitude of this area is 30-400 m. The topography becomes higher and more sloppy eastward. This is the watershed area of many rivers in the project area like Quang Trach, Bo Trach (Quang Binh) and Huong Son, Duc Tho (Ha Tinh). Hence, new afforestation and protection of remaining natural forest in order to conserve soil and to supply water to rivers and lakes have become extremely important.
2.1.2 Soil

- Soil in the project area is diversified. There are many different types of soil in the project area. But the dominated type of soil is the yellow soil developed on sandy rock. This soil contains the least nutrients. The proportion of sand grains in this soil is very high, therefore, it is very easily eroded and becomes exhausted. Large forestry area consisting of this type of soil is having no forest cover.

- The thickness of soil layer in most of the project area is very limited. Only 30% of the project area covered by a soil layer with the thickness of more than 50 cm. This is also a problem for reforestation.

- Within the coastal area, there are two types of soil, namely the moving sandy area and the stable sandy area. Nearer the sea, it is newly established sandy area, therefore the soil humidity is high and very suitable for planting phi lao (*casuarina*). The further the eastward, the poorer and drier the soil. There are even places where the soil contain just sand.

2.1.3 Vegetation

- Almost land in the project area is vacant (without forest). There are two main types of vegetation, corresponding to the two main topographical patterns as mentioned.

- The vegetation on the sandy area is mainly grasses and small bushes. These vegetation cannot stop sand moving. Therefore, it is necessary to create forest on this land for anti-sand moving.

- On the hilly area, the topography is diversified. In Gio Linh, Cam Lo and Hai Lang (Quang Tri), the land is rather flat and covered by bushes. In Bo Trach, Quang Trach (Quang Binh), the land is steep and had been uncultivated long before. It is very degraded. In Ki Anh (Ki Lac), especially Huong Son, Duc Tho (Ha Tinh), the soil is fertile because it was recently claimed for production 10 years now. The hill tops and sides are covered by secondary forest. The foots of these hills were planted with fruit trees by the local people. In this area, there are favourable conditions for planting indigenous broad leave tree species. Where soil was developed from basal rock, it is more fertile and very suitable for agro-forestry production.

2.1.4 River and water reservoir systems

Due to the topographical characteristic in the Coastal Centre, most rivers originated from the Truong Son Range (Long Range of Mountains). They are short and narrow. The rivers consist of many falls. In the project area, the river density is high, (two km per kilometre square). In Quang Tri province, there are 12 rivers which belong to 3 main river systems.

- The Ben Hai river system

- The Thach Han river system, and

- The My Chanh river system.

All rivers flow to the East Sea at two openings: Cua Tung and Cua Viet.

The total area of the watersheds of these three river systems is 3.600 km$^2$ of which, the largest watershed area is Thach Han, 2.470 km$^2$.

In the project area, there are many natural and artificial water reservoirs. During the recent years, with the Government investment, in the three provinces, many large irrigation works have been constructed such as South Thach Han, Kinh Mon, Ha Thuong and La Nga.

2.2 Socio-economic conditions

- In the project area, beside those special natural conditions that require reforestation to serve both protection and production purposes, there are other social and economic characteristics that have the same requirements. Local people make their living mainly by planting water rice. Therefore, to maintain the water source for rivers and reservoirs to irrigate paddy fields is very important. Thus, it is necessary
to carry out land use planning for establishing protection forest.

- Another urgent need is to supply clean water to the local population. To solve this problem, forest stands near the villages should be protected and at the same time, more plantations should be created.

In short, all these natural and socio-economic conditions have objectively proved that it is necessary to create protection forests in the watershed areas for anti-soil erosion and for maintaining water supply to rivers, reservoirs and irrigation works, to provide clean water for the local people and to improve the ecological environment in the region.

3. Views on land identification for establishment of protection forest

3.1 This Afforestation Project is aimed at to create both protection and production forests on degraded hills and bare land (around 20,000 ha) which were planned as forestry land in three provinces in order to restore and protect ecological environment, to manage and use the newly created forest resource in a sustainable way and to improve the living conditions of the local people.

These objectives are appropriate with the natural and social needs, especially the aspiration of the local people. This also means out of that 20,000 ha of new plantation, certain area of protection forest have to be established. The question here are where are lands for establishing protection forest? What criteria for selecting these land on the map as well as in the field. Therefore, to draw up methodology and criteria for identifying land to create protection forest is a very urgent task that has to be carried out immediately. This work should have been done in early 1998 when the land use planning at commune level was carried out.

3.2 Due to the natural conditions such as topography, soil, slope, river and dam systems and the production activity in the project area, there is an objective need to establish both protection and production forests. The question here is that when doing land use planning, what type of protection forest (out of the four as stipulated in Article 4 of the Regulation on management of three types of forest: i) Watershed protection forest; ii) Wind-break and anti-sand moving forest; iii) Wave-break and anti-sea encroaching forest and; iv) Ecological environment protection forest) should be focused?

The result of the analysis of the natural circumstances in three provinces shows that two types of protection forests should be prioritized i.e. the anti-sand moving protection forest and the watershed protection forest.

- Along the coast of Quang Binh province and partly of Quang Tri (Cam Chanh commune), anti-sand moving protection forest should be established. But in these areas, there is an IFAD project that aimed at the same goal. When this project is ended, the question in the coast of Quang Binh will be basically solved. However, the afforestation area of the Vietnamese-German project is set beyond the sandy coastal area. Therefore, afforestation in the sandy coastal area is out of the Vietnamese-German project. And it is not necessary to research criteria for identifying protection forest in the sandy coastal area. Never-the-less, when doing land use planning for those communes belong to the Project but situated in the coastal area, technical criteria of the IFAD project should be considered.

- For protection forest in the watershed area: This type of protection land is distributed all over the project area. This will be a very important content of the whole afforestation activity during the coming years.

3.3 When it is confirmed that protection forest in the watershed area should be prioritized, a question is raised: Which critical level is of the project protection forest? National or local? This will be related to the management system and the benefit that people can earn from the forest created by them. It is also connected to the main harvesting techniques or the medium harvesting ones.

According to Article 2 in the Circular 02/CP, national protection areas must be larger than 50,000 ha, or smaller if it is very important to the national security and benefit or it covers several provinces. Such large protection areas must be approved by the Council of Ministers (the Government). For areas from 10,000 to 50,000 ha, approval of the Ministry of Forestry (or the Ministry of Agriculture and Rural Development) will be needed. And areas from 5,000 to 10,000 ha, the provincial People Committee will do.

At national level even it is approved by the Government or the province, the protection level is considered as very critical. Until now, 23 Management Boards who are responsible to manage 2,000,000 ha have been
established over the whole country. Investment for protection and tree planting in such protection areas will be funded by the Government. It is worth noted that in three provinces belong to the Project, there are no protection areas that falls into that national level.

If the protection area is smaller than 5,000 ha and is situated in a district not ranked into national protection level, it is considered as less critical (Article 2, Circular 02/CP), and will be approved by the chairman of the district People's Committee. According to Article 7 of the same Circular, for small protection areas within a commune or a village, the State will allocate land to household to plant protection forest and they are allowed to develop agroforestry on the allocated land.

Comparing to the Government regulation on grading the protection levels, the project area does not fall into national protection level. It is less critical or in other words, called local protection level.

The local protection forest has following functions:

- To regulate and supply water to rivers, lakes and dams in order to serve agricultural production and living condition of the people.
- To conserve soil for anti-soil erosion.
- To maintain water supply to irrigation and power generation works.

3.4 As it is already decided that within the project area, there is no national protection but local one, it is no more possible to use the grading criteria as stipulated in the Technical Regulation on Establishment of Protection Forest in the Watershed Area for identifying land to plant protection forest in the local watersheds at district and commune levels. On the other hand, it is neither possible to use FIPI method that was recommended for the 327 program. Therefore, it is necessary to find out another method that could be practically applicable in the project area.

This method must meet following requirements:

- Simple, easy to apply and suitable with the knowledge and skill of commune and district field staff.
- Utilise all appropriate points of other methods in order to ensure the practical and scientific demands.
- Utilise all available document, maps and information in order to ensure cost/effective.

4. Methodology to identify land for establishment of protection forest

4.1 Operational procedures

To apply the above mentioned viewpoints, land for establishing protection forest within the project area should be identified according to the following three main steps:

Step 1: Defining protection area within the commune boundary.

Demarcate on the topographic map following types of land that should be protected:

- Land in the river watershed area limited by the water flowing dividing lines.
- Land within the perimeter 300-400 meters from the bank of any lake, dam or irrigation work.

Step 2: Defining the area of land within the demarcated zones that need to be protected

Practically, within the watershed area, there are small plots of land which can be used for planting production forest because they do not need to be protected. The method to identify such plots of land is as follow:

Basing on the degrees of danger of the three factors participating in the classification of the protection levels
in order to identify on the topographic map the very critical, critical and less critical protection zones. It is noted that these protection levels must go in line with the criteria of the local protection requirements, not that of the national protection ones. So, protection forest will be established on the very critical and critical zones and production forest on the less critical.

(For detail instruction, see paragraph 4.2)

Step 3: Draw areas of these two types of land for protection and production forests on the map. Then, record all figures on the table.

Complete the official map and then, write report to describe the planning work.

4.2 Identifying land areas for establishment of production and protection forests

4.2.1 Classification of protection levels according to its critical

a-Defining factors used to classify protection levels in the watershed area

This is a key step in the whole planning process. Factors which give impact on the levels of critical can be used to classify the protection levels within the watershed area. These can be identified by grading the hazard of the relative altitude, the hazard of the slope, the risk of soil erosion because following reasons:

Following three factors are selected to be used for protection classification:

- The hazard of the slope,
- The hazard of the relative altitude, and
- The risk of soil erosion

b-Grading the hazardous levels of the selected factors

- **Grading the hazardous impact of the relative altitudes.**

This has to base on the highest altitude and the lowest altitude of the commune (the altitude of the highest peak and that of the bed of the main river or stream in the commune) to classify them into three hazardous levels:

<table>
<thead>
<tr>
<th>Relative altitude</th>
<th>Sign</th>
<th>Hazardous level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/3 on the high end</td>
<td>C1</td>
<td>Very hazardous</td>
</tr>
<tr>
<td>1/3 in the medium</td>
<td>C2</td>
<td>Hazardous</td>
</tr>
<tr>
<td>1/3 on the low end</td>
<td>C3</td>
<td>Less hazardous</td>
</tr>
</tbody>
</table>

- **Grading the hazardous impact of the slopes.**

<table>
<thead>
<tr>
<th>Slope</th>
<th>Sign</th>
<th>Hazardous level</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 35°</td>
<td>a 1</td>
<td>Very hazardous</td>
</tr>
<tr>
<td>26 - 35°</td>
<td>a 2</td>
<td>Hazardous</td>
</tr>
<tr>
<td>≤ 25°</td>
<td>a 3</td>
<td>Less hazardous</td>
</tr>
</tbody>
</table>

To define the slope, a topographic map will have to be used. The distance (mm) between the two contour lines will be based on in order to define the corresponding slope. To facilitate this work, a ready-calculated table is made,
e.g. For topographic map 1/25.000

<table>
<thead>
<tr>
<th>Slope</th>
<th>L (h=10 m)</th>
<th>L (h=20 m)</th>
<th>L (h=40 m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td>2.85</td>
<td>5.7</td>
<td>11.4</td>
</tr>
<tr>
<td>9 - 15°</td>
<td>2.53 - 1.49</td>
<td>5.06 - 2.99</td>
<td>10.12 - 5.98</td>
</tr>
<tr>
<td>16 - 25°</td>
<td>1.39 - 0.85</td>
<td>2.79 - 1.71</td>
<td>5.58 - 3.42</td>
</tr>
<tr>
<td>26 - 35°</td>
<td>0.82 - 0.57</td>
<td>1.64 - 1.14</td>
<td>3.28 - 2.28</td>
</tr>
</tbody>
</table>

Where:

a : Slope  
L : Distance between two contour lines  
h : Height between two contour lines

- Grading the hazardous impact of soil erosion.

Soil character, especially its physical structure produce a decisive influence to its erosion possibility. Therefore, it is necessary to classify its physical structure into three groups, i.e. course sandy soil, light loamy soil and clay soil. These will be equivalent to the three hazardous levels

<table>
<thead>
<tr>
<th>Soil erosion</th>
<th>Sign</th>
<th>Hazard level</th>
<th>Protection level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy soil</td>
<td>D1</td>
<td>Very hazardous</td>
<td>Very critical</td>
</tr>
<tr>
<td>Light loamy soil</td>
<td>D2</td>
<td>Hazardous</td>
<td>Critical</td>
</tr>
<tr>
<td>Clay soil</td>
<td>D3</td>
<td>Less hazardous</td>
<td>Less critical</td>
</tr>
</tbody>
</table>

4.2.3 Mapping the hazardous levels of the selected factors

- Mapping the hazardous levels of the relative altitude

From the commune topographic map, the hazardous levels corresponding to the altitudes as grouped before (C1, C2, C3) will marked.

- Mapping the hazardous levels of the slopes

From the distance between the two basic contour lines on the commune topographic map, the slope will be defined. Basing on the slopes, the areas of a1, a2 and a3 will be marked.

- Mapping the hazardous levels of soil erosion

From the described soil textures, areas of D1, D2 and D3 will be defined. This map will show the soil erosion hazard. In commune where a soil map is not available, the name of the soil and its corresponding physical structures can be used to define D1, D2 and D3.

<table>
<thead>
<tr>
<th>Name of soil</th>
<th>Physical structure</th>
<th>Sign</th>
<th>Hazardous level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe yellow-brown soil</td>
<td>Course sand-light loamy</td>
<td>D1</td>
<td>Very hazardous</td>
</tr>
<tr>
<td>Fe red-yellow or black soil on lime rock</td>
<td>Loamy to light clay</td>
<td>D2</td>
<td>Hazardous</td>
</tr>
<tr>
<td>Basal or light-grey soil</td>
<td>Heavy loamy to clay</td>
<td>D3</td>
<td>Less hazardous</td>
</tr>
</tbody>
</table>

4.2.3 Overlapping the above maps
Overlapping these maps in order to define the boundary of the protection areas which are corresponding to the critical levels.

To do this, one should step by step transfer the results of the three maps (C1, C2, C3; a1, a2, a3; D1, D2, D3) onto to a base map.

Then match all the boundary lines to get the final result. That is the map showing protection areas equivalent to three levels: Very critical, critical and less critical as expected.

4.2.4 Identifying land for establishment of protection forest

- Areas which are classified as very critical and critical should be planned for establishing protection forest.
- Areas which are classified as less critical should be planned for creating production forest combined with some protection function.

5. Advantages and challenges

5.1 Advantages

When applying the above described methodology in order to identify land for establishing protection forest at the commune level, following advantages are expected:

- Project staff at district and commune levels are able to easily carry out this work. There is no need to hire technicians from any institute, college or the province.
- This work will be carried out by local staff. As they know the local conditions and they can use their local experience, their work is more feasible. The local villagers will also support them and be willingly to implement the project activity.
- As this is a simple method, it does not need sensitive tools. On the other hand, available maps and document (topographic map, soil map, current land use map...) can be used, the implementation will be faster, less time consuming and very cost/effective.
- This work will be carried out simultaneously with the land use planning. The areas of land for planting protection and production forests area shown on the same land use planning map. This will make the monitoring and evaluation more possible.

5.2 Difficulties

Following are obstacles which should be removed when applying this methodology:

- To insure the accuracy of the method, at least, 1/25.000 scaled topographic map must be used and enlarged into 1/10.000. This work should be assisted by the Central or provincial technicians.
- According to this method, soil erosion is defined by the soil physical structure. To do this, the soil map of the region must be used. This requires action from the Central level so that soil map will be available for participated communes.
- Time will be needed to organise training on this methodology for district and commune staff.

Part III:
CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions

1. The existing regulations and circulars on protection forest as well as their active impacts and limitations on the management of remaining plantation and natural forest etc. are summarised in Part I of this report. These are important basis for the project to consider and to apply in its implementation, especially for activities related to land use planning for establishing protection and production forests in order to insure that all project activities will go in-line with the Vietnamese policy and meet the aspirations of the local people. This also help the project realise its objectives and avoid mistakes which were made by the previous programs.

2. All explanations and comments on the current management structure, technical system for protection forest are important basis for suggesting criteria to select land to establish protection forest in the project area.

3. The project afforestation area of more than 2000 ha is not planned within the system of protection forest at the national level. Therefore, within these three provinces, there are only small scale protection areas that belong to local protection level. Within the project area, priority should be given to protection of watershed areas. Other types of protection such as anti-sand moving, wave-break or ecological environment protection forests should be considered as combining elements. Technical solutions to select criteria for land use planning are simple and easy to apply by commune and district field staff. This method is not only technically sound but also suitable with the conditions in the project area.

4. At present, people in the participated provinces still have wrong concept on the management of protection forest and local protection forest. They consider that protection forest must be always managed by the State and not allocated to local people (only contracting). In fact, Article 7 of Circular 02 said that for small protection areas within commune and district, the State allocates these to households (with red certificate) for planting trees and for long term use. This suites the project requirement, i.e. to supply money for afforestation only to families who have been allocated land (with red book certificate).

From these viewpoints, after planning land in participated communes for establishing protection forest and having the plans approved by the competent authority, the Project should pay attention to find out a management system that will suite the current regulations, insure the people's benefits and meet the project requirements.

2. Recommendations

1. The proposed methodology to identify land for establishing protection forest in the project area should be carried out at the same time with land use planning in all participated communes. For the 10 communes whose land use plans were already made in the beginning of 1998, land areas for planting protection forest should be defined and put into the original plans.

2. Basing on the proposed methodology, a detail practical guide book should be elaborated and followed by training courses on how to carry out the work for commune and district field staff.

3. There should be an agreement from the Central down to the grassroot level on a management system in which, benefits for the tree planters are clearly defined. It is proposed that this question should be discussed in the project coming workshop (July, 1998).