

Figure 2.15 Suitability Area for Para-Rubber

## **2.6 Land Use Plan**

### **2.6.1 Land Use Concept**

#### **(1) General**

Agricultural diversification and crop conversion are the essential policy for agricultural development in the NBR. It is of great importance to increase farm income as well as to mitigate a fluctuation of farm income. In this sense, on a per area basis, cassava is the lowest income generating among the agricultural products. Demand for cassava has been recently limited and it is difficult to foresee a higher demand in the future. Accordingly, the areas cultivating cassava and sugarcane are the target areas for the agricultural diversification and conversion.

It is also essential that the farmers continue cultivating rice in order to satisfy a basic need for them to be self-sufficient in food. On the other hand, forested areas should not be reduced in order to maintain the eco-system of the NBR as mentioned above. The agricultural diversification and conversion, accordingly, should be achieved by changing the current land use.

Accordingly, future land use should indicate the following land use zoning in the plan:

- Land use zoning for environmental conservation; and
- Land use zoning for agricultural restructuring.

#### **(2) Land Use Zoning for Environmental Conservation**

To maintain an environmental system of the NBR, the following areas should be conserved or utilized under well-controlled measures:

- Forest conservation area;
- Conservation of flood-prone area;
- Buffer zone for conserving national parks and forest reserve; and
- Community forest for prevention of over-utilization of land in saltation potential areas.

Figure 2.16 shows proposed natural conservation areas and the areas utilized under well-controlled measures.

**1) Forest Conservation**

To keep the existing forests from further damage, national parks, wildlife sanctuaries and forest reserves should be conserved.

**2) Conservation of Flood-prone Areas**

Flood occurs occasionally at the river mouth of Songkhram River. This problem happens for the better part of a year. Development should be prohibited in this area to prevent damages from flood.

**3) Buffer Zone Areas**

To conserve national forests, wildlife sanctuaries and forest reserves, it is necessary to establish buffer zone areas where the villagers utilize forests properly instead of engaging in logging activities in those areas. It is also important to provide more living space for wildlife because the present national parks, wildlife sanctuaries and forest reserves are designated separately.

**4) Community Forest for Prevention of Over-utilization of Land in Saltation Potential Areas**

Since the remaining forests in the hilly areas play a significant role in the prevention of saltation, it is necessary to maintain these forests. To prevent over-utilization by agricultural development, community forests program should be promoted in the forested, hilly areas.



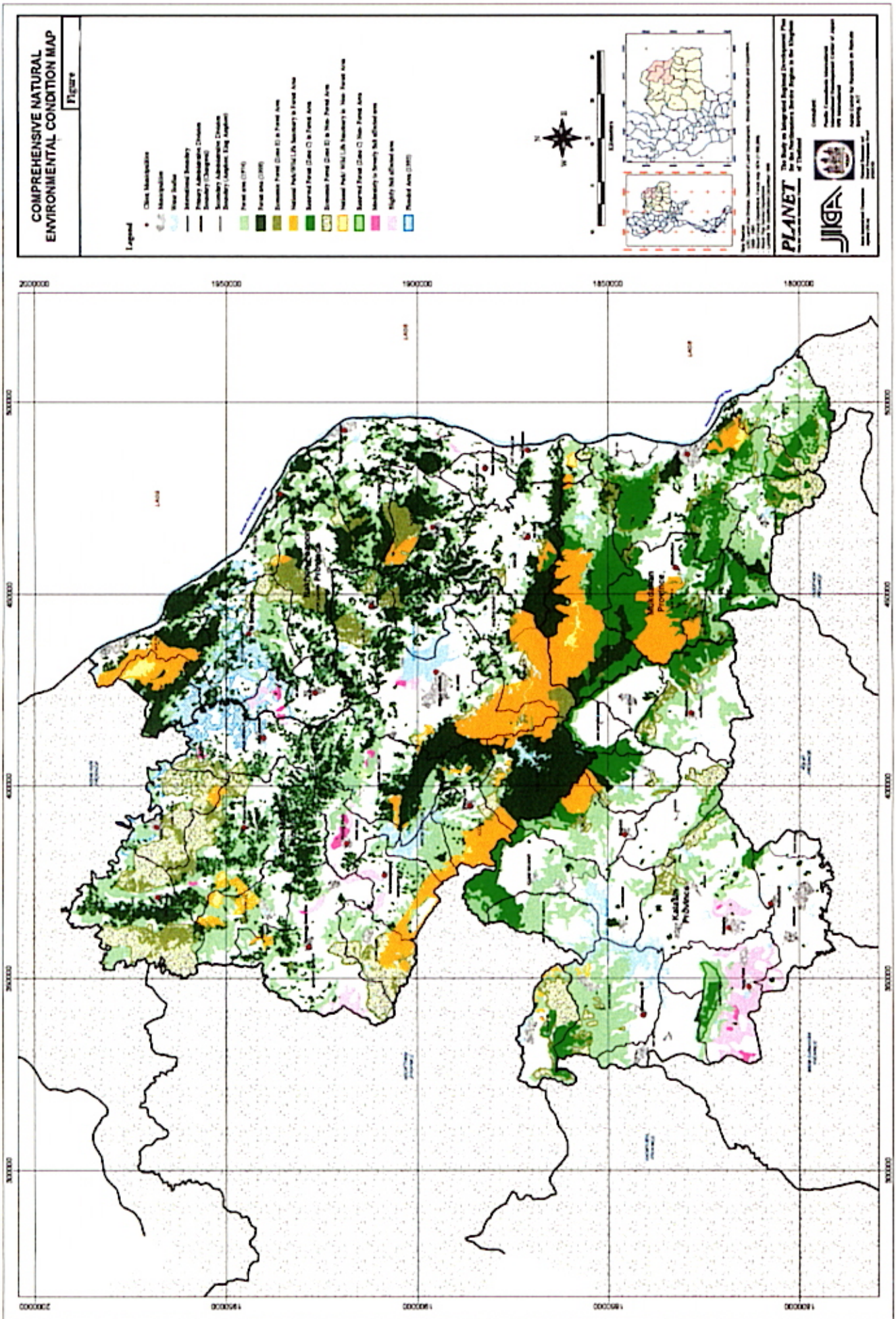


Figure 2.16 Comprehensive Environmental Evaluation

### **(3) Land Use Zoning for Agricultural Restructuring**

The NBR is not homogeneous but varies by area in terms of potential for agricultural development. The farmlands can be classified into five zones mainly from the availability of water, rainfall, and topography such as:

Zone 1: Large-scale irrigation areas;

Zone 2: Rain-fed paddy areas;

Zone 3: Rain-fed upland crop areas;

Zone 4: Phu Phan Mountain and hilly areas; and

Zone 5: Mekong River-side fertile area.

#### **1) Zone 1: Large-scale Irrigation Areas**

This zone is located in Kalasin and Sakon Nakhon and has a moderate level of rainfall. The soil is in general suitable for paddy and upland crop. The most salient characteristics of the zone are defined by its higher productivity with large-scale irrigation facilities. Sufficient water provided by the large-scale irrigation facilities throughout the year has promoted agricultural diversification; however, the lands are not yet effectively utilized in the dry season due mainly to the lack of adequate labor force.

This zone should be maintained as agricultural lands and, in the dry season, crop diversification and conversion should be performed to improve its production efficiency.

#### **2) Zone 2: Rain-fed Paddy Areas**

This zone is located mainly in Nakhon Phanom and Sakon Nakhon and has a moderate level of rainfall. The soil is in general suitable for paddy cultivation. Farm income in this zone is limited due to concentration of rice production in the dry season and no cultivation in the dry season.

To improve and stabilize farm income in this zone, there are two directions, namely, introduction of mixed farming system in the rainy season cultivation and promotion of cultivation in the dry season by small irrigation and deep well development.

#### **3) Zone 3: Rain-fed Upland Crop Areas**

This zone is located mainly in Kalasin and Mukdahan and has a moderate level of rainfall in the rainy season and limited water in the dry season. The soil is in general poor but suitable for upland crop including para-rubber, vegetables and fruits. Due to

limited water and soil fertility, mono-cultured cultivation such as sugar cane and cassava is dominant. Since such crops are relatively lower priced, it is necessary to convert to other crops to improve farm income. Also important is the promotion of para-rubber, vegetables and fruits with small irrigation and deep well development.

#### 4) Zone 4: Phu Phan Mountain and Hilly Areas

This zone covers Phu Phan Mountain and hilly areas with forests. Phu Phan Mountain is designated as National Park, wildlife sanctuary and forest reserve, and the surrounding areas are utilized as fruit and cassava fields, resulting in soil erosion and deforestation. Since this zone is essentially the core of eco-system of the NBR, conservation of forests should be the key direction of land use together with establishment of buffer zone and introduction of community forest programs as described above.

#### 5) Zone 5: Mekong Riverside Fertile Areas

This zone is located along the Mekong River and has relatively sufficient water throughout the year by utilizing rain water and river water. The soil is in general fertile with river alluvium. Based on these preferable conditions, agriculture has been diversified with the higher value added products such as fruits, vegetables and flowers.

Current land use of agricultural zoning is shown in Table 2.17 and agricultural zoning is conceptually shown in Figure 2.17. The attributes of each zone are summarized as shown in Table 2.18.

**Table 2.17 Current Land Use by Agricultural Zone**

Agricultural Zoning	Land Use in 2000		
1 Large Scale Irrigation Area	Paddy etc	1,154	4.4%
2 Rain-fed Paddy Area	Paddy	9,470	36.3%
3 Rain-fed Upland Area		4,670	17.9%
	Field crops	3,560	13.6%
	Uncultivated land	1,110	4.3%
4 Phu Phan Mountains and Hilly Area		8,615	33.0%
	Forest	6,894	26.4%
	Grass land	1,721	6.6%
5 Mekong River-side Fertile Area		560	2.1%
Built-up Area (urban and roads)		849	3.3%
Water		768	2.9%
Total		26,086	100.0%