

CHAPTER 1

ENVIRONMENTAL MANAGEMENT

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1.1 General Conditions

1.1.1 Topography

The northeastern region is located in the northeastern part of Thailand. The northeastern region can easily be marked off from the rest of the country by the Mekong River as the northern border and by the Phetchabun Mountains as the western border. The NBR is located in the northeastern border of the northeastern region of Thailand. It is roughly divided into three parts in terms of topographical feature, as shown in Figure 1.1.

(1) Phu Phan Mountains

The Phu Phan Mountains involves part of Mukdahan and part of Sakon Nakhon. The Phu Phan Range plays a significant role in the NBR natural environment. Firstly, it divides NBR into two separate hydrologic regions, which are the Chi Basin and the Khong Basin.

The Phu Phan Mountains is also an important place regarding the conservation of water and the habitat of wildlife. Forests in the Phu Phan Mountains can make a great contribution to retaining water in soil and releasing it slowly to control soil erosion caused by deforestation and cultivation.

(2) Khong Basin

The Khong basin consists of part of Sakon Nakhon, part of Mukdahan and part of Nakhon Phanom. The area is almost flat. Except the Mekong River, the Sonkhram River is one of the important rivers in the Khong basin.

(3) Chi Basin

Kalasin is the only area that belongs to the Chi Basin, which is the most seriously affected by drought in Thailand. It has less rainfall and higher evaporation so that water shortage is quite severe in agricultural and residential uses.

1.1.2 Hydrology

(1) Rivers

1) Mekong River

The Mekong, which forms about 850 km of the national border in Northeast Thailand, belongs to the greatest rivers of Asia and is among the ten to fifteen largest rivers of the world.

The hydrological picture of the Northeast is characterized by the fact that this region belongs entirely to the Mekong Watershed and thus exclusively drains its water into this river.

2) Mun/Chi River

Within the region, the Mun River serves as the main collector of water and represents the most important tributary of the Mekong from Thailand. It actually drains, together with its main tributary Chi, 75 per cent of the total territory of the Northeast. The watershed of the Mun and Chi are limited in the north by the Phu Phan Range and in the west by the Phetchabun/Dong Paya Yen Range. The latter contains most of the headwaters.

3) Songkhram River

Whereas the Mun system drains the Chi Basin, the Khong basin in the north discharges its water through many small rivers directly into the Mekong River. The largest river flowing into the Mekong River in the NBR is the Songkhram River. Flood occurs at the river mouth of the Songkhram River

(2) Reservoirs

Among some important natural freshwater lakes in NBR, the largest is the Nong Han Reservoir near Sakon Nakhon. It has an area of 170 km². In addition, there are large reservoirs behind the Nam Un and Lam Pao dams, which were developed for irrigation in the 1960s.

1.1.3 Climate

Climate in the NBR is influenced by two seasonal monsoons and an inter-tropical convergence zone. The monsoons are characterized as the southwest monsoon

and the northeast monsoon and create two typical seasons, rainy and dry seasons, during the year. The Phu Phan Mountain divides the NBR divided into two climatological zones. One is along the Mekong River covering Nakhon Phanom and Mukdahan with annual rainfall over 2,000 mm, which is classified as a high rainfall area. The other zone covers Sakon Nakhon and Kalasin where the annual rainfall is between 1,100 and 1,500 mm and is classified as a moderate rainfall area. Rainfall mainly concentrates between April and September in both zones. Figure 1.2 shows annual rainfall and temperature pattern during the past 30 years in Nakhon Phanom and Sakon Nakhon.

Temperature of the NBR is stable through the year, ranging between from 20 to 30 . Usually, April records the highest temperature and December is the lowest.

In dry season, shortage of water due to little rainfall largely affects cultivation method and yields of crops, although temperature is suitable for crop cultivation. On the other hand, inundation is repeatedly observed in certain areas of NBR in rainy season.

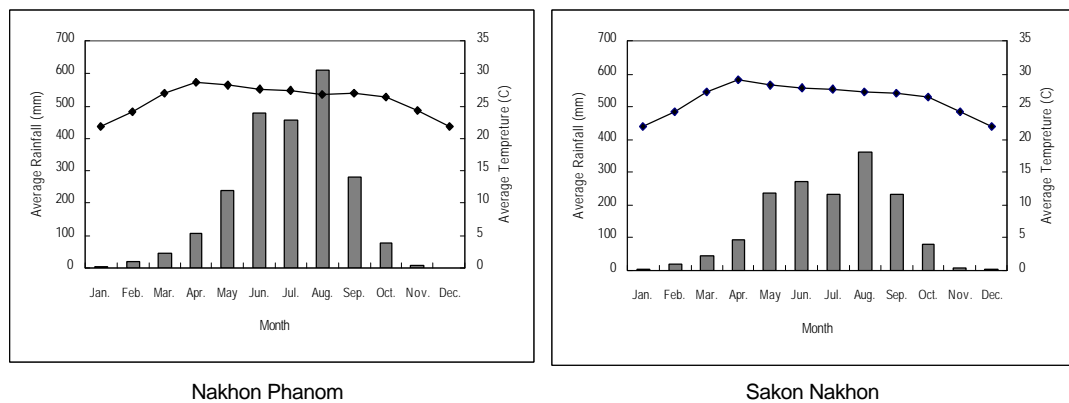
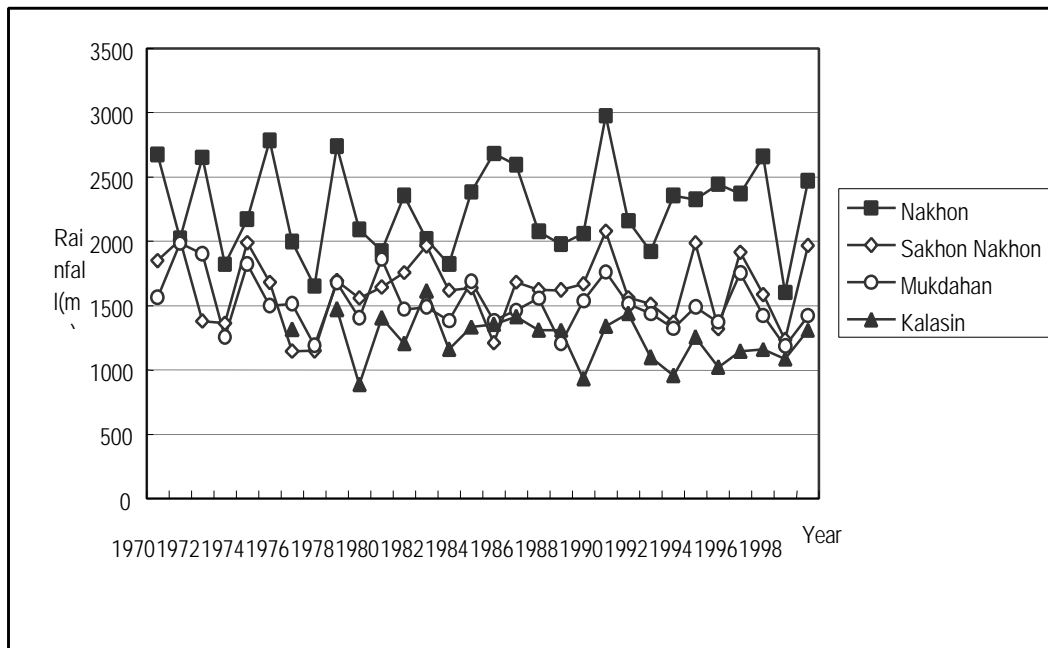


Figure 1.2 Climate of NBR

In the past 30 years, drought and flood have periodically occurred in the NBR as shown in Figure 1.3. Since the NBR largely depends on rain-fed agriculture such as rice and cassava, such unstable annual rainfall strongly affects agricultural production.



Source: Meteorological Department

Figure 1.3 Annual Fluctuation of Rainfall

1.1.4 Soil Conditions

The main landforms of NBR are shown in Figure 1.4(1) composed predominantly of high alluvial terraces, including old alluvial and colluvial fans, forming the features of the plateau proper. Because the soil is principally constituted by sandy soil, and acidity is strong, NBR's soil is poor and not very suitable for growing crops in general. However, the area along the Mekong River has relatively fertile soil suitable for vegetable and fruit cultivation. As shown in Figure 1.4(2), in NBR, Unit 4 and Unit 8 comprise a major part in NBR, as follows:

- Unit 4: Paleaqualfs, Tropaqualfs and Natraqualfs; and
- Unit 8: Loamy siliceous acid families of Paleustults and Haplustults.

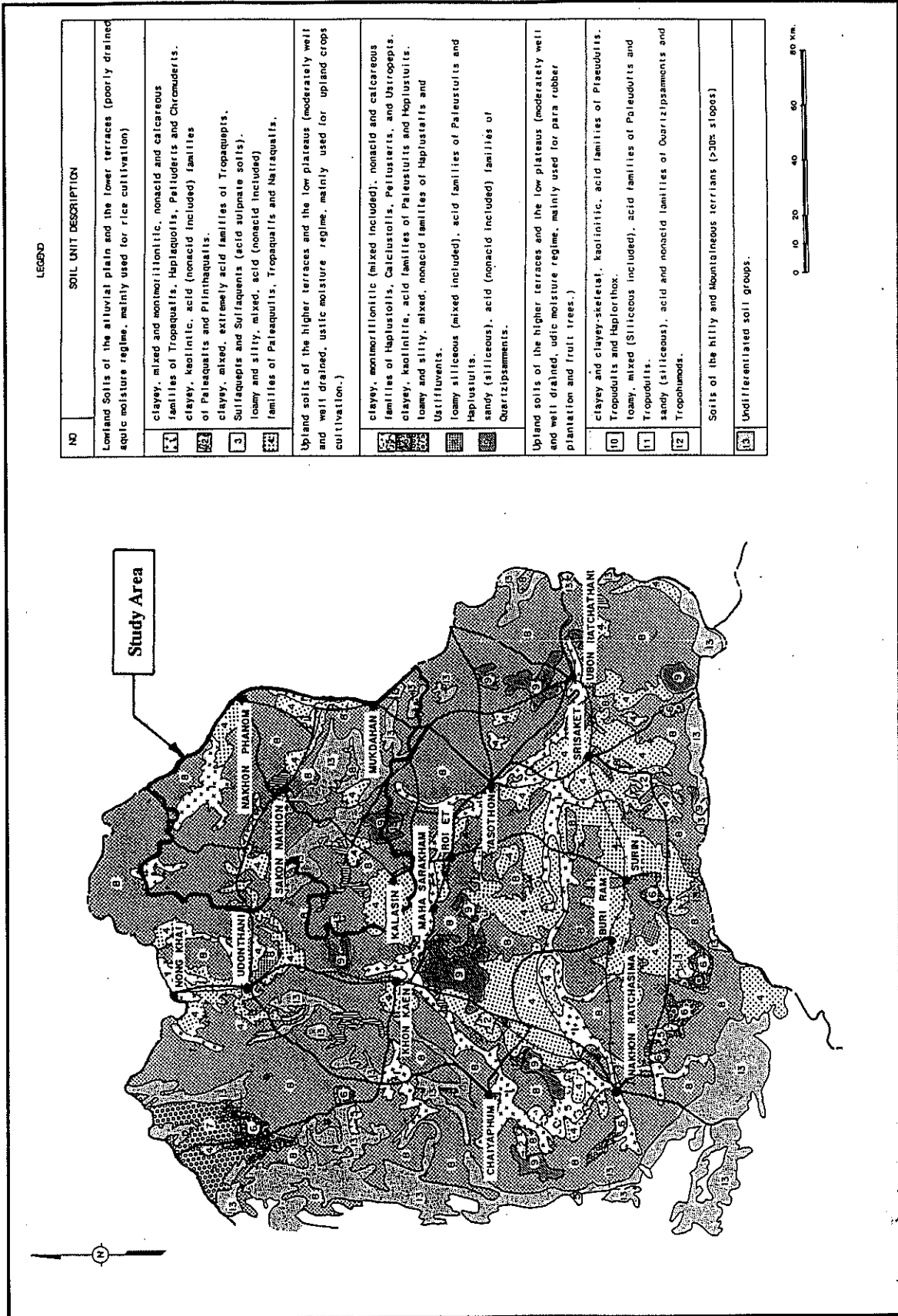


Figure 1.4(2) Soil Units in the NBR