

## CHAPTER III

### METHOD OF STUDY

#### 3.1 General Investigation Method

The procedures used for environmental geological studies of the study area are listed below :

1. Collection, compilation and review of existing informations, maps and reports from various sources which related to the study area.

2. Data interpretation : in these stage, data collected from various sources as well as results obtained from laboratory tests were analyzed according to the objectives describe, identify and quantify the existing conditions and the socio-economic background of the study area.

3. Evaluating the environmental geological conditions and the socio-economic background of the area in term of the development potential and its limitation.

4. Recommend and suggest the proper methods for suitable development of the study area.

Detailed of each step is discussed below :

## 3.2 Data Collection, Compilation and Review of Existing Informations

### 3.2.1 Physiographic Studies

Physiographical parameters are climate, drainage, geomorphology, land use and slope. These parameters are considered to be the basic informations required for terrain analysis.

#### 3.2.1.1 Climate

All data regarding this matter are entirely obtained from existing meteorological station. The information cover 36 years starting from 1951 to 1986. Later graph of average monthly rainfall, average graphs of rainfall rain day, month rainy day, mean monthly temperature and mean monthly evaporation of the study area are constructed.

Other climatic data such as wind velocity, which is relate to seasonal change, is presents interm of average three month direction, average velocity and maximum velocity.

#### 3.2.1.2 Drainage

The surface run-off of the studied area included locating of the major drainage. In this study, the drainage of the area is presented in term of drainage map. This map is derived from the tographic map with a scale of 1:250,000 produced by the Royal Thai Survey Department (RTSD). The RTSD map used in this study is Changwat Phra Nakhon Si Ayutthaya sheet.

### 3.2.1.3 Geomorphology

Geomorphology is basically concerned with the topographic appearance of the area. The classification, description as well as the genesis of various geomorphological units are modified from Takaya and Narong Thiramongkol (1982), Narong Thiramongkol (1983) and Pranom Kaosutha, et al. (1986). Later, the geomorphological map of the study area is drawn.

### 3.2.1.4 Planned agricultural Land Use

The planned agricultural land use is based upon the existing information from Pranom Kaosutha et al. (1986). The results is summarized and presented as the planned agricultural land use map.

### 3.2.1.5 Slope

The slope map of the studied area is constructed from topographic map scale 1:250,000 by directly measured the length between contour line and calculated slope as slope equal contour interval divided by length between contour multiply by 100 to obtained slope in percents. The slope categories proposed by Croft (1973) is used in the present study. The slope interval is considered as 0-2%, 2-5%, 5-10%, 10-20% and more than 20 percents.

### 3.2.1.6 Soil Problems Potential

Soil Problems Potential in the studied area were categoried,

namely, soil erosion and acid soil. Acid soil is the soil which has the brackish origin usually found jarosite (brighth yellow color) deposit near the surface less than 100 centimeters. The area of acid soil is delineated from soil map (Pranom Kaosutha et al., 1986). Another soil problem is soil erosion potential. The soil in the area located near the foot of mountains and upland area which comprised of silty, loamy sediment and slope greater than 10 percents is delineated as proned to soil erosion (Pranom Kaosutha et al., 1986 and JICA, 1990). Later, potential area of soil prone to have problems is delinated and presented in term of map.

### 3.2.2 Geology

The geology of the study area is concerned with the distribution and description of rock and unconsolidated sediments exposed in the area as well as geological structures. Supplementary field survey for cross checking is undertaken against the existing geological information presented by Chaiyan Hintong et al. (1976), Chaiyan Hintong (1981) and Prasong Photong (1982), and also presented as map.

### 3.2.3 Mineral Resources

The mineral resources investigation in the area embrace non-metallic ores and construction materials. The non-metallic ores include pyrophyllite (dickite), marl and carbonate potential. The construction materials crushed stones, sand, laterites/lateritic soils, shale, dimension stone (marble).

Detailed description of each type of mineral resource regarding the locations and types of deposit and special properties are compiled and evaluated. These informations are summarized and presented in table form.

The study is essentially based on the results of previous investigations carried out by Chaiyan Hintong (1981), Chumpon Kuentag (1979) Vivat Paijitprapaporn and Veeravat Thitisawan (1984), Department of Highways (1990), Somwang Changsuwan and Anupan Kaedkaew (1991) and individual supplemented with limited actual field survey under the present study.

#### 3.2.4 Water Resource Evaluation



The water resources evaluation within this study include both surface water and groundwater.

##### 3.2.4.1 Surface Water

The surface water resources included irrigation projects and the potential of water yielding in Pasak catchment area. Data obtained from the Royal Irrigation Department and some information derived from topographic map scale 1:250,000 of RTSD as well as field investigation are compiled. The results of surface water evaluation are present as map.

#### 3.2.4.2 Ground Water

The ground water resources potential is almost entirely based upon the existing information from Charoen Piancharoen, et al. (1978) Groundwater Division, Department of Mineral Resources and presented and summarized as tables and maps.

#### 3.2.4.3 Flood Prone Area

The information about flood extent in the studied area were obtained from 4 sources. The flood frequency analysis is based upon 62 years annual flood records and the calculation is based upon Gumbel's method (Veerapol Taesombat, 1988). Historical records based on interviews of residents in the area, low-lying characteristics of flood-prone area and the proximity to the river are also considered. After combining these data, flood prone area is delineated.

#### 3.2.5 Socio-Economic Background Study

These studies comprise 4 main aspects, namely, population, economic condition, social conditions, and the development prospects.

The population study includes distribution and density. The economic condition within the studied area covers the agriculture produces, non-agriculture production trade whereas the existing social condition cover institutions, education, public health, occupation and life style as well as infrastructures. Furthermore, the development prospects of the area come from many sources of development program.

The study of socio-economic background is entirely based on the compilation and analysis of existing information and data from numerous sources. The results are presented in terms of the tables and maps.

### 3.2.6 Recreation and Aesthetic Resources

In this study recreation area and degree of interesting are compiled. Information is obtained from Tourist Authority of Thailand (1990). Results are present as map.

Both man-made and natural recreation as well as aesthetic resources are summarized and presented as tables and map.

### 3.3 Evaluating the Environmental Geologic Condition

In the present study, an attempt has been formulated to produced the land capability for the area which suitable for industrial and waste disposal.

McHarg (1969) proposed the map overlay technique for multiple factors that inference relevant to land use planning. The map of each factor is rank due to the suitability of land for planning purposed in transparency map. Given the darkest tone to the most suitable and the lighter to the less suitable. After that multiple factors would be overlaying on the others to form the composite map, which show the darkest tone is most suitable and less constrains.

The map overlaying technique is technical difficulties in distinguishing the varying shades of gray and it presumes that it is proper to add factors even though they are represented by nominal types that have different physical units. Hopkins (1977) points out that making overlays of individual maps prepared in varying shades of gray is equivalent to performing addition using a graphical procedure. The solution is to weigh the factor scores before any addition is performed.

The factors concerned to the suitability for industrial development should be considered the physiographic, socio-economic and legal restriction. The physiographic factors include slope, water supply, flood inundated and soil erosion. The socio-economic factor concerned with the area of town and municipal, military area the accessibility to road and railways. The legal restriction concerned with the primary forest national park (Mc Harg, 1969, Carroll, 1975, JICA, 1990, Busakorn Singkaratana, 1990 and Sunya Sarapirome, 1982).

The factors concerned to the suitability for waste disposal area are the physiographic, the socio-economic and legal restriction. The physiographic factors include geology, ground water level, flood inundated, water supply, soil erosion and slope. The socio-economic factors concerned with the area of town and municipal, military area, hauling distant. The legal restriction concerned with the forest area ( Chaiyan Hintong, 1992, Evans and Myers, 1992, Howard and Remson, 1978 , Keller, 1979 , Siebenhuner and Silitonga, 1992 ).



After processed, the land capability map of the area which were suitable for each land used type was recommended.

#### 3.4 Study Program

The present study has been intermittently undertaken over the period of 2 years starting from 1990-1992. The study program included the data acquisition, field survey for cross checking, data analysis and evaluation, and the report preparation in sequential phases.