

Chapter III

METHODS OF STUDY

3.1 General Investigation Methodology

In general, the methodology for environmental geology of the studied area includes the following basic tasks :

(1) Collection, compilation and review of existing information, maps, and reports describing various features of the studied area, along with proposed development plan in the project area as well as adjacent areas.

(2) Conducting field investigations, surveys, samplings as well as laboratory analyses for additional information and data required to describe, identify and quantify the existing conditions of the environmental geology and the socio-economic background of the studied area.

(3) Evaluating the environmental geological conditions as well as the socio-economic settings of the area in terms of the development potential and limitation as related to the proposed development plan.

(4) Providing the recommendations and suggestions for future development programmes on the basis of detailed investigation and evaluation of existing environmental and geological conditions.

It is, however, realized that all of the components of environmental geology covered by the present investigation have received different levels of attention depending on the nature and characteristics of the development programme concerned. Therefore, no attempt has been made to emphasize the development potential and limitation for any particular development programme. But the findings of the present investigation are inevitably useful for further detailed evaluation on any specific purposes.

Detailed method of study of all components concerned will be discussed in this chapter.

3.2 Physiographical Studies

The physiographical parameters covered by the present investigation are climate, drainage, geomorphology and landform, slope, and land-use/land-cover. These parameters are considered to be the basic requirement in the terrain analysis for almost all purposes.

3.2.1 Climate

All data regarding this matter are entirely obtained from the 2 existing meteorological stations at Chon Buri and Sattahip. The information covers 25-year period from 1951 to 1975.

The temperature record in terms of monthly mean, mean maximum, mean minimum as well as the annual average are tabulated and graphically represented. The average monthly and annual rainfall data are presented

in the same manner as temperature data. Besides, the relationships between rainfall and temperature of the studied area are represented as hythergraphs for the neighbourhood of Chon Buri and Sattahip.

The evaporation, which is one of the essential parameters included in the water balance study, has been assessed in terms of average monthly and annual values using class A evaporation pan. Concurrently with the evaporation study, the relative humidity which is mainly related to air masses and the influence of monsoon has been compiled and presented as monthly mean, mean maximum and mean minimum as well as the annual average.

Last, the circulation pattern of wind in Chon Buri and Sattahip is expressed as monthly prevailing wind direction and mean wind speed.

3.2.2 Drainage

The surface runoff of the studied area covered under this headline includes locating the major drainage basins, identifying the drainage pattern as well as indicating average major flow direction of each drainage basin. The map illustrating these features is accordingly prepared.

3.2.3 Geomorphology and Landform

The landform analysis of the studied area is basically concerned with the classification and description including the genesis of various geomorphological units. The standard geomorphological technique is

employed in the study. Besides, an attempt has been made to prepare the slope map using Wentworth's technique (1930), and the slope character is classified according to Crofts (1973). The landform and the slope are summarized as maps.

3.2.4 Land Use and Land Cover

The land use and land cover study is carried out using parts of the existing information from Land Classification Division, Land Development Department (1974, 1979) coupled with the actual investigation using aerial photographs and topographic maps in the scale of 1:50,000 (1953, 1969). Supplementary field investigation programmes have also been undertaken for cross checking purpose. The land use and land cover is classified according to the system modified after Anderson and others (1976). The result of the land use and land cover study is summarized as the map.

3.3 Geological Investigation

The geological investigations of the studied area is concerning with the distribution and description of rocks and surficial materials exposed in the area, geological structures, stratigraphic sequences as well as the geological evolution. Additional field survey programmes including laboratory investigation are undertaken against the existing geological information of the Department of Mineral Resources. As a consequence, the geological map and section, stratigraphic column and the surficial deposit map are prepared.

3.4 Mineral Resources Investigation

The mineral resources investigations in this study embrace not only the deposits located in the studied area, but also other deposits in the adjacent area where the mobilization of these resources is possible. The results are classified according to their potential usages, namely, metallic ores, non-metallic ores, construction materials and fossil fuels. The metallic ores include iron, antimony, copper, gold, manganese, molybdenum, tin, nickel and lead; whereas non-metallic ores include clay, precious and semiprecious stones, silica sand, dickite, feldspar, barite, potash, rock salt and carbonate potentials. The construction materials cover crushed stones, sand and gravel, and laterites/lateritic soils. Besides, the petroleum which is only type of fossil fuels in this region has been included in the study.

Detailed description of each type of mineral resources regarding the location and type of deposit, the grade and tonnage, and special properties are compiled and evaluated. This information is summarized as tables and maps.

The approach to the study is essentially based on the results of previous investigations carried out by numerous agencies and individuals supplemented with limited actual field survey programme under the present study.

3.5 Water Resources Evaluation

The water resources evaluation within the studied area include both surface water and groundwater. The emphases have been given to their quantities and qualities for various usages, namely, public water supply, irrigation, industry, etc.

The water resource potential analysis is almost entirely based on the existing information and data carried out by previous investigations. However, additional field trips to various localities concerning this matter have been made. Finally, the description of existing water resources condition as well as their development potential are presented and summarized as tables and maps.

3.6 Marine Geology Study

Due to the fact that the studied area is bounded on the western and southern parts by the marine environment. Therefore, an attempt has been made to study the marine geological condition adjacent to the studied area. These include the coastline morphology and its stability, bathymetry, temperature and salinity, tides and currents, winds and waves, bottom sediments and sediment transportation, marine geochemistry, and marine pollutions. The study is entirely based on the compilation and evaluation of existing data carried out by numerous previous investigations.

The results of the present assessment study are presented in terms of descriptions, tables and maps.

3.7 Socio-Economic Background Study

In order to fulfill the concept of environmental geology earlier stated, it is, therefore, essentially required to be carried out the existing socio-economic condition of the studied area. This background study embraces 4 main aspects, namely, population, economic conditions, social conditions, and the development prospects.

The population study includes the distribution, density as well as the rate of population growth. The economic condition within the studied area covers the producing sector, processing sector, trade, and services; whereas the existing social condition covers institutions, education, public health, occupation and life style as well as the infrastructures. Besides, the development prospects of the area has been assessed using the Fifth Five-Year National Development Plan (1982-1987) formulated by the NESDB.

The approach to the background study is entirely based on the compilation and analysis of existing information and data from numerous sources. The results are presented in terms of the description, tables and maps.

3.8 Recreation and Aesthetic Resources Evaluation

It is considered that the scenic beauty, cultural heritage and other aesthetics are as important as other resources for future development. To ascertain the balance of any proposed development programmes, it is essentially important to consider the problem of

quality of life in terms of recreation, tourism and aesthetic aspects concurrently. Therefore, an attempt has been made in this study to identify, describe and locate all existing and potential recreation and aesthetic resources within the studied area. They include beach resorts, island resorts, archaeological sites, ancient Royal palace, private parks (and lodging), golf course, wild-life management area, waterfalls, boy-scout camp, water-related sport clubs, marine aquariums and souvenir commercial area.

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

3.9 Terrain Evaluation Techniques

While study of individual aspects of natural environment are useful, it is often necessary to consider several aspects simultaneously in the preparation of land use plans and implementation. Any particular area which is suitable for a certain land use based on one factor may be unsuitable based on another factor. Therefore, it is necessary to relate all these factors, particularly geological factors as far as the environmental geology is concerned, to other socio-economic and cultural factors. This requirement has led to development of techniques that allow the handling and processing of a variety of data in a systematic manner with high degree of flexibility.

An attempt has been made in this study to utilize the aforementioned techniques in the terrain evaluation emphasizing on the

development potential and limitation using various factors covered in the study. Modified weight rating system of Mc Harg (1969) and adapted site selection of Mckeever (1968) are employed in the present study. The development potential map will be prepared to summarize and integration of various aspects covered by the study

3.10 Study Programme.

The present study has been intermittently undertaken over the period of approximately 3 ½ years starting from 1979-1982. The study programme includes the data acquisition, field surveys and sampling, laboratory analysis, data analysis and evaluation, and the report preparation in sequential phases.