

CHAPTER III

METHOD OF INVESTIGATION

3.1 The Approach

The approach adopted in this study is based on the concept of integrated resource management for sustainable development (Buriram Provincial Office, 2545, in Thai). This approach seeks to examine in detail the two groups of resources utilized in the development process, namely; natural resources, human resources. Priority was given on the assessment of information on these resources in order to demonstrate their availability, potential, quality, limitations and constraints both in space and time. Evaluation of natural resources was made through in depth investigation of primary source for agricultures, domestics' water supply and health.

Main emphasis was given to water resources; namely, rainfall and evaporation, surface flow and runoff, and groundwater. An important resource for agricultural production is the soil, so soil profiles and their properties in relation to crops (paddy, upland crops, horticulture and forestry) were investigated. Full investigation was made on the human resources through assessment of population profiles, age health, education and health (Figure 3.1)

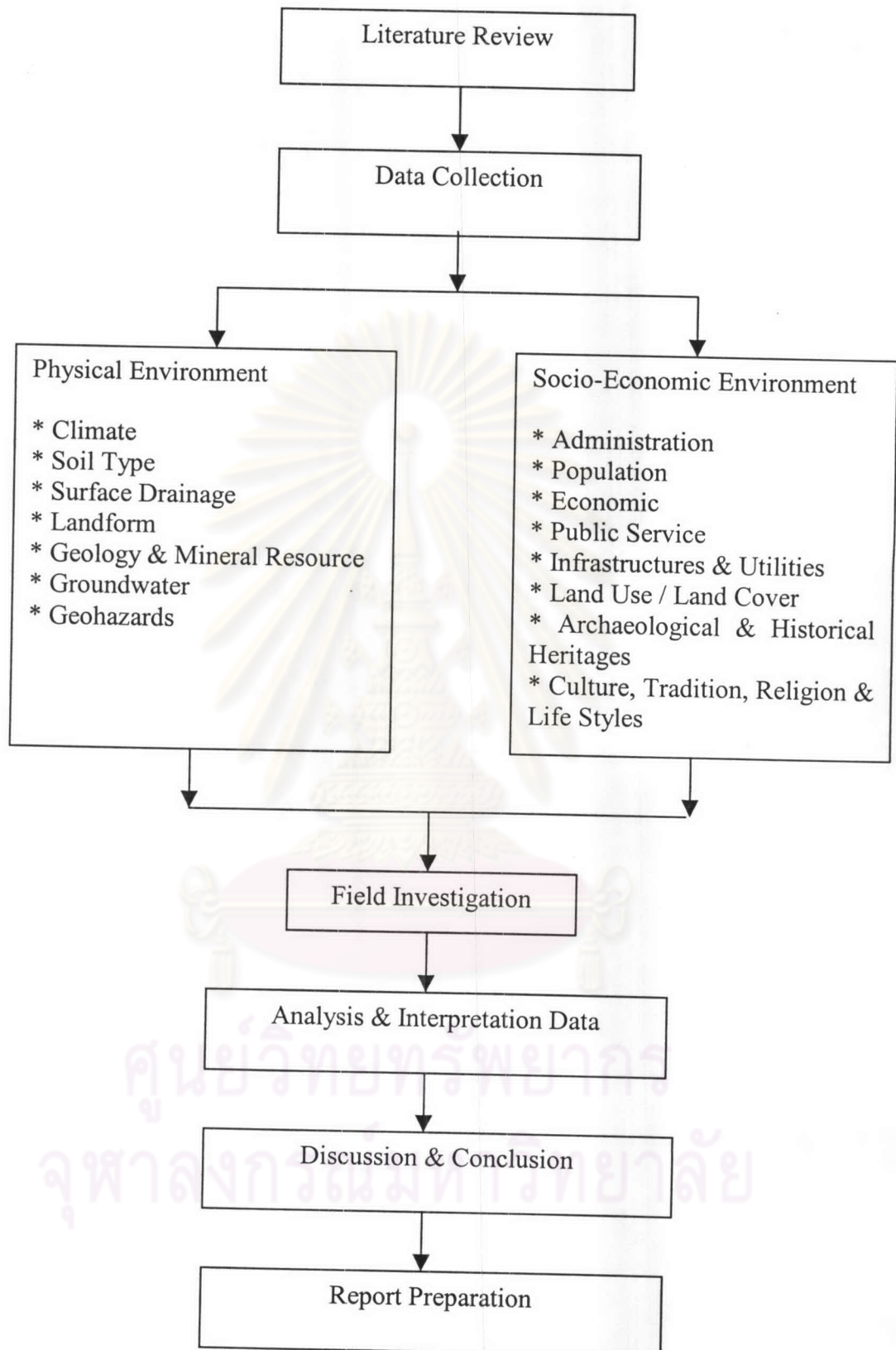


Figure 3.1 Diagram showing the approach and methodology used in this research.

3.2 Methodology

The study may be divided into four consecutive steps, as follows:

1. Collection and collation of all existing information in all sectors
2. Field investigation
3. Data analysis
4. Design of development alternatives and pilot projects
5. Design of Database Management System

3.2.1 Data Collection

The method used in data collection has been adopted from the following:

1. Data identification, its sources and data holding
2. Existing data formats
3. Type of data (primary, secondary)

Data, which were available from data holder in government offices in Bangkok, were first collected. Those data included maps, air photos, hydrology, population profiles, agriculture, health and remote sensing (SPOT). Most were secondary data, which had been collected and collated in respective RTG offices. For example, maps and air photos were collected from the Army Mapping Department, while remote sensing data (images and thematic maps) were collected from the Office of the National Research Council of Thailand (NRCT). Data on rainfall were

collected from both the Department of Meteorology (DMET) and the Royal Irrigation Department (RID), while data on groundwater were gathered from the Department of Mineral Resources (DMR) and the Office of Accelerated Rural Development (ARD). The primary source of data on soil classification was the Department of Land Development (DLD), while most of the data on agriculture were obtained from the Ministry of Agriculture and Cooperatives (MOAC). Pulation profiles were first obtained from the National Committee for Rural Development (NCRD). Since there are several formats of data published by the different agencies, those data had to be re-organized into the same format so that they can be used in the computerized data base.

All secondary data was organized in the Dbase III format with full identification for editing, storage and retrieval.

All primary data and secondary data collected from existing data sources give the general characteristics of the study area including information on the resource base, its utilization and past project implementation.

Water Resources

- Static water level
- Water quality (Fe, TDS, TH, Cl)

Soils and agriculture

Waste disposal potential area

Socio-economic

- Population
- Age, education, occupation
- Health
- Water supply
- Energy
- Infrastructures
- Income, expense

3.2.2 Data Processing and Analysis

Manual tabulation of all data was done. It was found that many differences in the variable occurred across the study area.

3.2.2.1 Natural Resources

Analysis of data pertaining to water resources development was carried out as follows:

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3.2.2.1.1 Water Resources

Water well analysis as major water resource was found to be available in shallow and deep aquifer (in this study cannot be divided groundwater in terms of shallow and deep aquifer because of lack of soil profile data), providing relatively promising potential for development. Analysis was carried out to determine potential of deep well production from this deep-seated aquifer. In the first place aquifer type, thickness and deep were identified using data from well logging. Aquifer yield was evaluated from well records using bail tests and pumping tests previously performed by the DMR. Record of piezometric level was used to determine the area distribution of water level available in the aquifer and the major flow direction. Distribution of water quality was obtained from results of water sample analysis using Standard Method.

3.2.2.1.2 Soils and Agriculture

Data analysis on soils and agriculture was conducted as follows:

Characteristics of Soil for crop production. Data obtained from soil profiles, i.e. physical properties, chemical properties and mineral property, were used to determine the land suitability for different types of crops. In particular the principal physical property, in this case grain size distribution, was used in differentiating the type of root and depth. On the other hand, water retention capability and its duration were used for selection of suitable types of crops.

3.2.2.2 Human Resources

Analysis of human resources was carried out as follows:

- a) **Human settlement.** The settlement pattern of the area was determined in terms of numbers of households.
- b) **Population.** Analysis was made on age group, occupation and manpower. Emphasis was placed on migration of people of working age to other areas.
- c) **Education.** Analysis was made on the literacy rate and the number of people who studying after the compulsory level.
- d) **Sanitary and public health.** Analysis was made on the quality and quantity of drinking water and domestic water, water supply, waste disposal, land holding and economy, infrastructure and energy.

3.2.3 Design of Development Alternatives and Pilot Project

Results obtained from the analysis of the inter-relationships of all activities were used to determine the possible directions of development. Then, some alternative plans in that direction was evaluated to further select the best plan. The best plan selected was again evaluated on how the development direction might be modified or reoriented. Then the plan was worked out in detail. The detailed plan was a combination of small plans for the development of natural resources as well as socio-economic and environmental management. All activities leading to verify and improve this plan and make it a practicable plan, a few villages and small plots were

selected for pilot project. Intensive survey was conducted at these areas and a pilot project was designed covering all activities in each area.

3.2.4 Data Management System

Since quite a large volume of data has been collected in this study and it is expected that more data will be collected from monitoring of the project, both during the pilot project phase and project implementation, a workable database system is therefore necessary to manage these data. The acquisition and evaluation of data and information including existing development plans will be carried out and presented using the methodology of geographic information system (GIS) on the personal computer (PC) and the software of Arc/View, Arc/Info, and Surfer.

It should remark here that the techniques used in data analysis of this project were adopted from standard methods applicable and suitable for rural areas with limited sources of data.

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