CHAPTER I

INTRODUCTION

1.1 Introduction

Land management is a general term, for this study means to the processes of analysis and evaluation of landuse suitability for land planning and policy making. It is necessary to rely on multi disciplinary information needed in compilation and analysis in order to identify a limitation or potential of a particular area, being anticipated for the highest sustainable benefit uses and be acceptable to the surroundings which can be effected to physical and ecological environments.

Geological Informations has the subject covering physical environment of land and water area. It is the basic informations needed for land management. The information includes different geological data such as lithology and structure of bedrock, surface materials, topography and landform, geological processes, geohydrology, mineral and fuel resources, and geological hazards. These data are critical factors in landuse determinations in various activities such as, in building and expansion of community and industrial park; agriculture; mining; civil engineering works; construction of infrastructures; natural conservation; and tourism and recreation area development.

The term "Geological Information for Land Management" is used in this study with the reason to cover all presentation of geological topics required in the field of land management. Recently, the investigation of geological information for land management are entitled in various names such as Town Geology, Urban Geology or Environmental Geology etc.. These terms are sometime accepted to the subdiscipline of geological sciences study. Geological information are always presented in the form of map being used in particular fields. They are termed with various names such as, "Environmental Geology Map", "Earthscience Information Map", "Applied Earthscience Map", and "Engineering Geologic Map". In this study, all various names of geological information related to geologic conditions and properties of land being used in the field of land management shall be termed as "Geological Information for Land Management" (GILM).

The recent status of GILM is diversified both in visions of systemization, and in method used in constructing of informations. They are depending on subdiciplines in geology and also the objectives for which the data are prepared. The traditional geologic map is the end product compiled from more than one nature of data. Thus made it too difficult to understand for non geologist users. The structure of information illustrated in geologic map is complex and causes difficulty both in changing of information and updating of data when necessary.

Besides that each of them are prepared to serve a particular topics leading to that particular ultimate aims,

master plan or final recommendation. The same information may be suitable for a particular objective, but fails in serving works of different objectives. So that a new set of information need to be prepared to suit a new objective, it cause more time and monetary in preparation of new set of information and is often can not meet time schedule. In some cases, geological information are prepared for specific uses. The same set of information are directly applied for evaluation in land management by user who has no sufficient knowledge in that particular field. Thus cause errors in evaluation of land management. The cause of error may due to misuse of scale of information, or using subjects which are not appropriate with the problems being under consideration. The more information becomes misused, the more errors are created in the processes of evaluation for landuse management.

The nature of information used in evaluation for land management are presented in map form. The subject are recorded relating to position, being known as "spatial data". Up to this date, a new world technology, computer and remote sensing become an efficient tools in handling information for landuse management. They are known as Geographic Information System (GIS)- ระบบสารสนเทศภูมิศาสตร์, and will become a traditional tool with unavoidable. Thailand in this day, GIS are increasingly used. And geological information become part of information for land management. So that Geological Information for Land Management (GILM) is considered to be one of the basic information which should be prepared for general uses. Data and information structures must be systematically designed to facilitate and to increase capability in

surveying, recording, retrieving, analysis and presenting of data and information.

The system of geological information and structures of its data, although they are treated with GIS, they are designed only for that specific uses without reconstructing the structure of data and information to serve general uses. In order to systemize geological information for land management those previous works should be surveyed and studied.

Geological information shown in those previous works were observed and determined. They are used in constructing framework concepts and to design the GILM system. The result of study are applied to the area at Changwat Prachuap Khiri Khan for a case study.

1.2 Objective

1. To systemize Geological Information for Land Management.

2. To investigate geological information in regional level of Changwat Prachuap Khiri Khan as case study.

1.3 Method and Scope of the Investigation

The study in systemization of geological information for land management has its nature as being an intellectual novelty (การศึกษาประเภทเชิงความคิดและทฤษฎี). Previous methods and procedure used in management of GILM are surveyed by basing

on literatures. Problem and limitation in managing of information through its processvare investigated: starting from collecting of data; processing of data; and retrieving of data. The results of study are concluded and demonstrated by using charts and tables. Basing on the result of study, a systemization in managing of GILM is constructed in order to solve the problems and limitation being observed. The new designed structures of GILM will be applied for a case study. The result of study for case study is demonstrated with series of maps showing information according to the system designed.

1.4 Thesis' Investigation Procedure

To accomplish the aims of this study, the study procedure is carried out through steps as illustrated with flowchart shown in figure 1.1. The study procedure consists of 5 stages in consequently.

Firstly, to plan and prepare objective, methodology, and scope of investigation which were discussed in the past sections; Secondly, to systemize GILM, the GILM works in the past are surveyed and studied to make the framework concept of systemization which shall be discussed in chapter 2, and formulation of GILM system shall be discussed in chapter 3; Thirdly, the structure of system known from the second stage is applied for a case study area after select appropriate study area and determine appropriate scope of GILM mapping, which shall be discussed in chapter 4; and Forthly, the conclusion and discussion for thesis investigation shall be discussed in chapter 5.

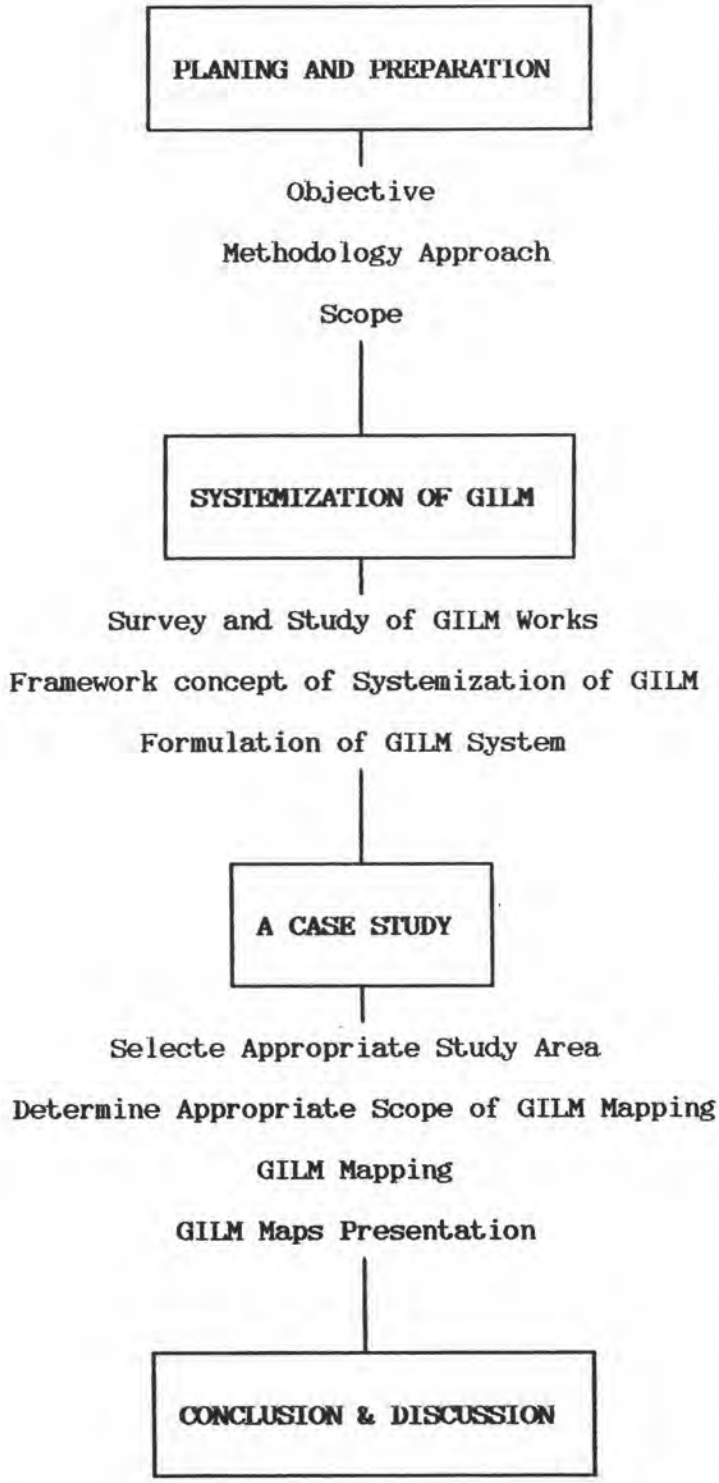

Figure 1.1 Flowchart of the thesis's procedure

1.5 A case study

In a case study, the area of Changwat Prachuap Khiri Khan, the coastal province, is selected to demonstrate the application of GILM system designed. The reason in choosing Changwat Prachuap Khiri Khan as the case study is due to the area covers variations of geographical features, geological information, and landuses. Out of this, the area has potential to be developed due to its geographic location being situated in the upper peninsular and having its border joining with the Union of Myanmar, where trans-peninsular route joining the Andaman sea and the Gulf of Thailand can be expected. With this reasons, GILM prepared for the area Changwat Prachuap Khiri Khan shall benefit not only for academic purpose in this study but also for practical uses in the future. The location map of Changwat Prachuap Khiri Khan is shown in figure 1.2.

1.6 Previous Reading

1.6.1 Works Concerning Systemization of GILM

There are several previous works concern with GILM. Although the method and procedure are similar, but vary in details according to their specific aims of applications. There are for examples environmental geology; geology for land planning; engineering geology and etc.. To fulfill the study of this parts the following previous works are grouped for observation and investigation as above mentioned. They are as the followings:

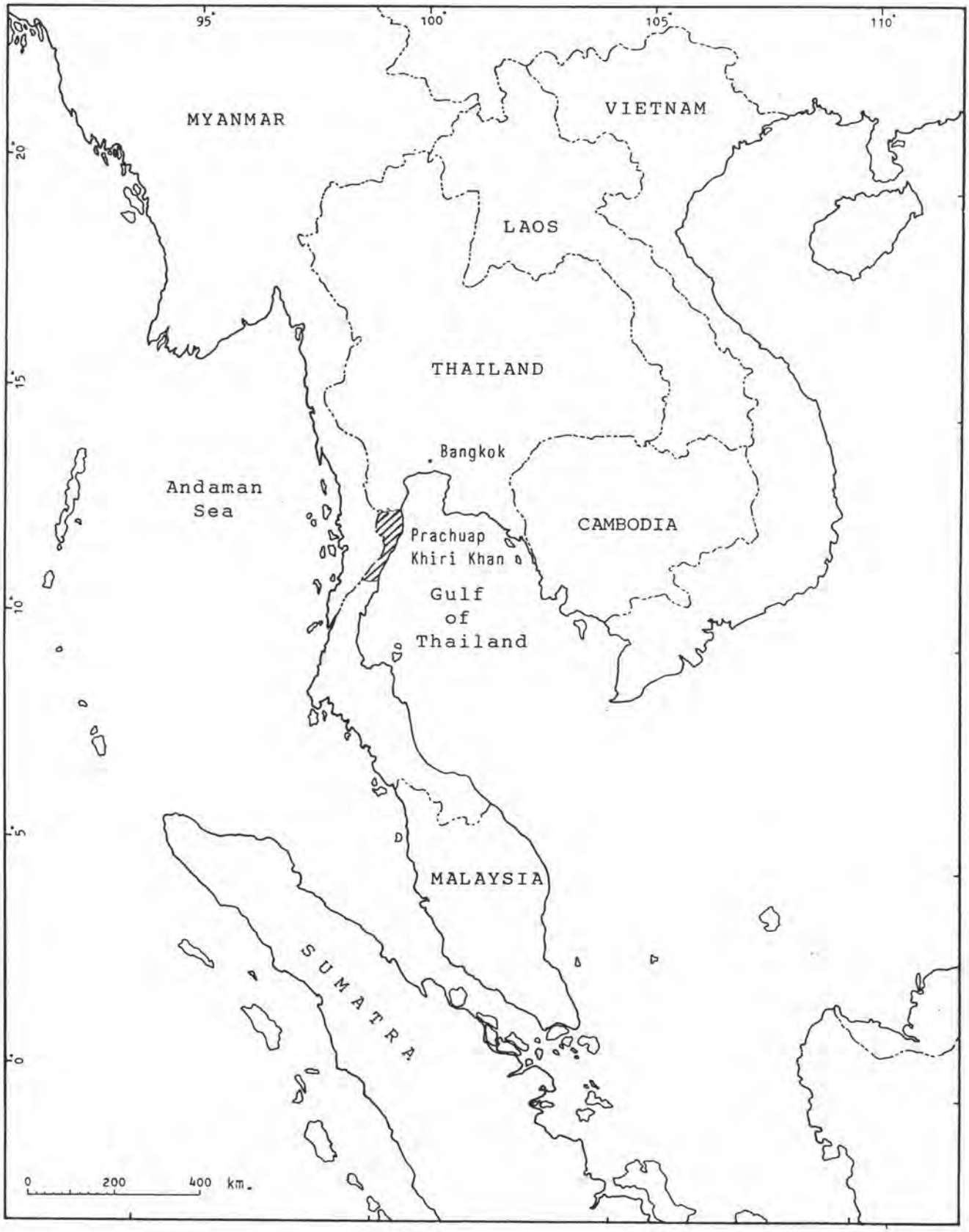

Figure 1.2 The location map of Changwat Prachuap Khiri Khan : A case study area

1) Environmental geology and related subjects, they are Mckenzie and Utgard (1972); Tank (1973); Legget (1973); Fagan (1974); Coat (1974); Cook and Doornkamp (1974); Frederick (1975); Watgin (1975); Keller(1976);Cargo and Mollory (1977); Griggs and Gildrist (1977); Howord and Remson (1977); Dume and Leo-pold (1978); Utgard, Mckenzie and Foley (1978); Coat (1981); Costa and Baker (1981); Coat (1985); Toy and Hadey (1987); Valdiya (1987); and Montgomery (1988).

2) Geological Hazard Planning and relate subjects, they are Foster (1980); and El-Sabh and Murty (1988).

3) Resource and Terrain evaluation and relate subjects, they are Mitchell (1973); Goodall and Kirby (1978); Davidson (1986); and Mitchell (1991).

4) Terrain or Environmental analysis, planning and mapping and relate subjects, they are McHarg (1969); Way (1973); Ortolano (1974); Marsh (1978); Van Zuidam (1985); and McCall and Marker (1989).

Next, the research investigation is carried on to survey and study those practical works being applied in strategic land planning and management. These has utilized the texts and other data sources such from journal and proceeding. The useful publications are Frederick (1975); Utgard, Mekenzie, and Foley (1978); Prinya Nutalaya et al. (1982); Doornkamp (1988); Marker and McCall (1989). Some works demonstrate a concise systematic of data gathering and presentation of geological informations in a broadview of land management. They are the perceptions of Montgomery (1969); McHarg (1969); Mekenzie and Utgard (1975); Adam (1978); Nickless et al. (1982); Floyd et al. (1982); Gostelow and Browne (1986);

Radbruch-Hall (1987); Valdiya (1988); Marker and McCall (1989).The concepts and methodology can be applied to the formulation of GILM system.

Furthermore, the works concern with GILM in Thailand are also surveyed. They are the works of Sunya Sarapirom (1982, 1992); Tanapipat, Ramingwong and Lerdthusnee (1982); Chaiyudh Khantaprab and Niwat Boonop (1988); Zaw Zaw Aye (1989); Somsak Tachrichitpisan (1990); Noppadon Kornsilapa (1991); Nikorn Mungkung (1992); Luksmee Jeawetchasin (1992); Montri Chuwong (1992); Surachai Sompadung (1992); Ekkapol Siribhornprasarn (1993); Vorawut Tantiwanich (1994); Tinnakorn Ta-thong (1994); and Tanawat Jarupongsakul (1995).

1.6.2 Works Concerning the Case Study

There are geological information of already exists for area of Changwat Prachuap Khiri Khan. They are investigated and being used as source of data, and also being used as reference in supporting interpretation of remote sensing acquired in constructing series of GILM.

They are organized into 5 groups of information, 1) Geological map, they consist of Geological map of Thailand, published by Geological Surveys Division, Department of Mineral Resources (DMR.) of the scale 1:250,000, explanation for sheet Amphoe Hua Hin (1976); sheet Changwat Prachuap Khiri Khan (1977); sheet Changwat Chumphon and Amphoe Kra Buri (1977). And scale 1:500,000, Explanation for sheet Western Thailand (1983). 2) Hydrogeologic map, this are

Hydrogeological map of Western, Lower central and Eastern Thailand, Hydrogeological map of Southern Thailand in scale 1:500.000. Published by Groundwater Division of DMR. (1976). 3) Mineral resource map, this are Mineral and Natural Fuel Resources map of Thailand, illustrating potential areas for minerals, coal, and petroleum in scale 1:500,000. Published by Mineral Resource Development Project of DMR. (1992). 4) Soil map is the Soil map of Changwat Prachuap Khiri Khan in scale 1:100,000. Published by Soil Survey Division, Department of Land Development (1976). 5) Other reports and maps are being used for supporting data are listed in references.