

## A SCHEMATIC DESIGN OF A REGIONAL LAND RESOURCES INFORMATION SYSTEM (LRIS)

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### Abstract

It is a introduction to a Scheme designed for regional land resources information system(LRIS). This paper present the design idea of the system and its functions. the basic functions of the system include data collection, database management, data processing,information query and retrieval, and application subsystem. It has been divided into three parts:Introduction, structures of the system, and the main functions of the system.

### I. Introduction

Land resources are a basic element for human being to live on. Rational use and protection of the land resources and carrying on effective management on them have become a basic policy in China.The world trend in land resources management is to establish LRIS with the assistance of computer, which is also an important direction in this field of China.

GIS technology has now entered widely into application in many fields. In developed countries, thes hi-tech has been witnessed profitable for resources and environmental management and planning,while in China, until recent years, the attention on its application has not been paid by the government sectors, even it has attracted the interesting of the academic circle. In Guangxi Zhuang Autonomous Region, some government agencies, such as the Science & Technology Committee, Bureau of Surveying & Mapping, Bureau of Land Management,have noticed GIS application potential and started some research project on it. With the support by the Science & Technology Committee of Guangxi, a pilot project regarding to GIS application in land resources management and planning is being carried out by us. This paper just discusses the schematic design of the project.

Based on pc ARC/INFO (ESRI), maps on scales of 1:50,000 and 1:100,000 are chosed to build spatial database. C-FOXBASE is used as the database management system for nonspatial data and the two systems are combined as a whole system. And some application models ard developed for the system. For the convenient use for the user from the local government agencies, Chinese character annotation is used for all the

maps.

## II. The System Structures and the Design Scheme

Geographic information system (GIS) is a spatial information system base on computer technique, The land resources information system(LRIS)is a particular form of GIS which chooses a region, where is of significance in region development. According to the Characteristics of regional land resources classification and application of the system,the contents and the architecture of the system include and follows: data collection, data classification and processing, data base and database management, information analysis and application subsystem, and user interface.

The sources of information are mainly from local government agencies statistical data, investigation data, remote sensing images, topographic maps and the matic maps. The data classification and processing are important procedure , depending on the real situation of study area, Nanning region, the data has been divided into current resources and potential resources, so that this system embodies the application characteristics. The geographic database has both digital and analogue forms. Some aeral remote sensing images are used for strngthening the system function. The data processing model as a major program was designed to whole system, it includes building up the regional geographic database and developing the software for database management.

As a subsystem to whole system, the information application subsystem was designed depending on users requirement. Because of the system's users are local government agencies, so the role of the *information application subsystem* must be suited to land resources exploitation and planning decision-making.

The whole design is implement by a series of technique procedure as follows: user requirement analysis, establishment of the classification system and feature code system, preproceccing of the topic information, compiling of the series of the matic maps, data sampling and input, design of database, development of the management software, application analysis, information retrieval, auto-mapping, information updating, and the research of application models.

The design idea of the system can be reflected in figure 1.

As a land resources information system, there are plenty of information contents in the database, and one kind of the resources is a sub-database, so it consist of twelve sub-database has some architecture and function. Figure 2. is a showing of the model architecture of forest resources database. It is one of twelve sub-database.

## III. The Main Function of the System

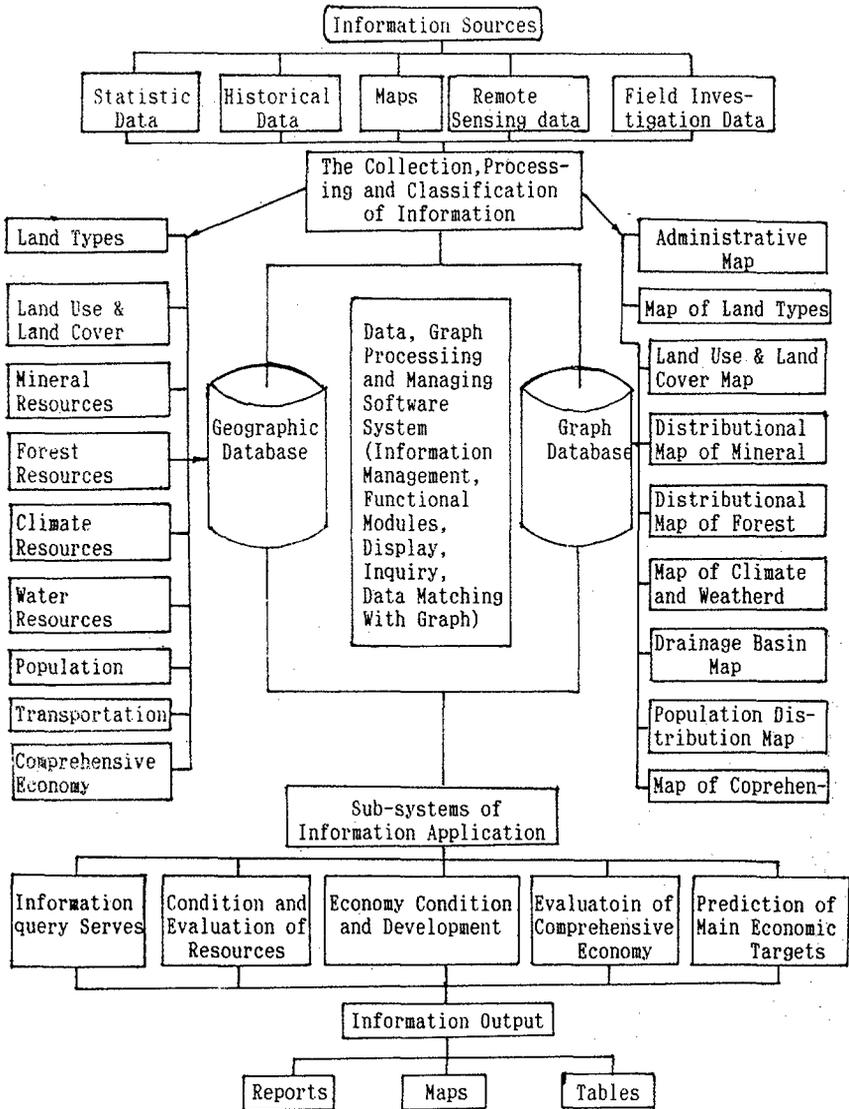


Figure. Outline of the System Model

This system has a complex capability for land resources data administration and planing decision-making. These functions can be realized by the function modules base on computer skill. The main functions of the system as follows.

1. Information input. This function model can be used for preprocessing different types of data and digitizing. It includes data collection, storage, and organization of data.

2. Graph compiling. The function of the graph compiling is reflected on the maps retrieval and modification, polygon and line recompiling, maps management and application in order to the requirement of the users, the function of the graphic application should satisfy the following capabilities.

1) It can be able to create varied scale maps to satisfy the differrent needs of users.

2) Different geographic elements can be chosen to express on the map for spercial need of users.

3) The base-map as a background, overlays with varied thematic information to form different types thematic maps.

3. Graph operating. It is a key function model in the system. The contents of the model should include map editing, map-format makeup, map-format overlay, polygon combinaton, polygon choice, map copy, graph deletc, auto- create polygon, area measurement, etc.

4. Resources analysis and evaluation. These functions are based on the information application subsystem, they are as follows: Varied resources statistics and analysis, synthetical evaluation of the resources, the trend prediction of resources using, the potential of resources exploitation, etc. These are provided to local government agencies for planning decision-making.

5. Information query and retrieval. It is common function of GIS, but there are some special query functions in this system.

1) From map to map query.

2) From digital data to map query.

3) From map to digital data query.

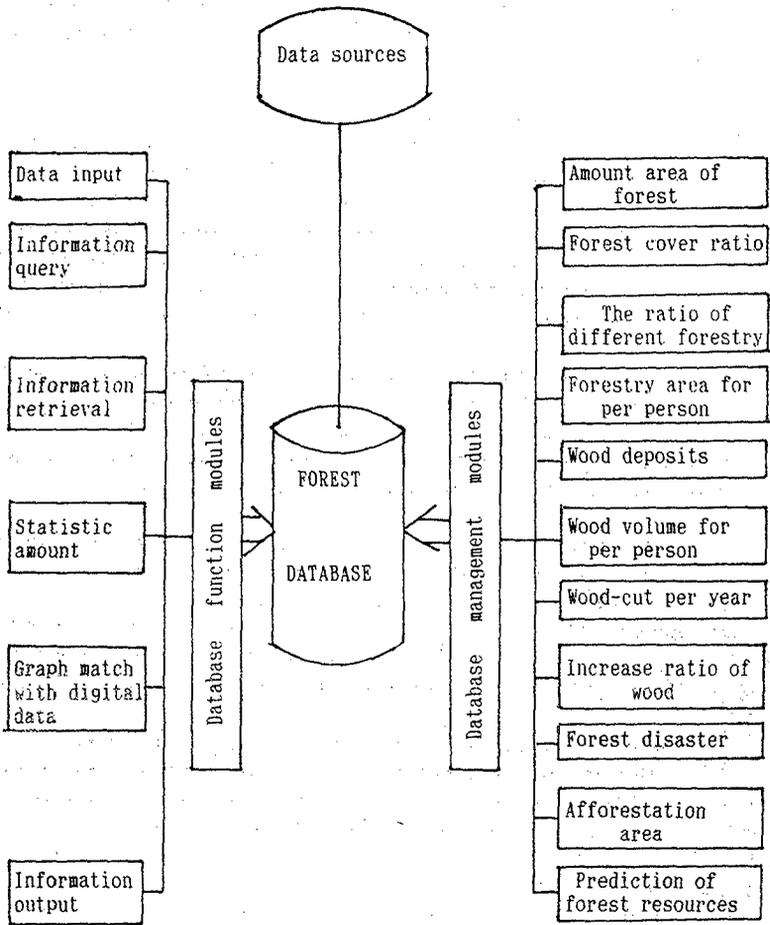


Figure. Forest database structure

6. Information output. There is a comparative capability in the system. outputting several types of maps, such as topo-basemap, thematic map, digital map, statistical graph, chart and table, etc.

### Conclusion

This scheme designed is a experiment, and the establishment of the system is being put into effect. But it is one of the first attempt in Guangxi, to set up a system for land resources administration and evaluation base on computer technique. It is also the first time to use ARC/INFO with software developed by ourselves. The results of this system reflected that it is possible to establish a practical regional land resources information system base on the personal computer.

The graph processing and varied types information overlay with geo-base map to create thematic maps automatically are major characteristics in the system. A great quantity of thematic map matching with the land resources data can be output for users. In addition, the Chinese character annotation is used for all maps, so it is very useful and easy to operate for local government agencies.

Establishing regional land resources system will be carried out widely in near future in China, In order to make a powerful and consummate LRIS, there are many problems need to be further research and resolved such as the forecast capability and dynamic analysis.

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