GEO-INFORMATICS SERVICES SYSTEM FOR PROVINCIAL DEVELOPMENT PLANNING

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ABSTRACT: According to the Memorandum of Cooperation between the Ministry of Interior and Ministry of Science and Technology to bring science and technology to support provincial administration and to enhance the quality of lives of the people, Geo-Informatics and Space Technology Development Agency (GISTDA) recognizes the importance of provincial development and agrees to bring geospatial technology to optimize the preparation of the provincial development plan. Thus, Lampang Province in the North of Thailand has been selected as a pilot project in utilizing geospatial technology for budget management of the provincial strategic plan because of its potential in budget allocation. Moreover, the existing database of the province is compatible for transferring into GIS system. It has already planned to apply spatial data analysis into its provincial strategic plan.

Under this project, geospatial tool has been developed in order to display information with a suite of spatial data in ArcGIS. The tool is capable of showing the location of the province's different projects which can be classified by types of strategic plan, characteristic of programs and fiscal years, displaying on the up-to-date and accurate high resolution satellite images. This information is also overlaid with various geospatial data. Landmarks, transportation, land use and administrative boundaries of the government are also shown on the system's interface in order to support the development of the province and to meet the provincial administration. The tool which is developed under this project allows government officers to effectively allocate the province's budget as well as to monitor the work progress for each fiscal year.

1. INTRODUCTION

At Present, there are many ways to collect data for planning and decision making support. The Management Information System (MIS) is one among them. The MIS is a collecting, storing and publishing information system for planning and decision making in organization management such as recruitment, budgeting, strategic planning. It is also an effective tool which can monitor and forecast the future results by using the past and present data. Those information is necessary for the executive to make a decision at the proper time. To understand more about the overall information, the spatial information is used. The development of the Geographic Information System (GIS) is to collect, analyze and publish the information with spatial data, which can be a reference with global position. Therefore, the integration of MIS and GIS, which combines the database to the map, will optimize the use of the information system.

In this study, the Geo-Informatics and Space Technology Development Technology Agency (Public Organization): GISTDA, one of Thai agencies responsible for geo-informatics technology, realizes in its importance for the provincial administration. GISTDA collaborates with Lampang Province to develop Geo-Informatics Service System as a prototype to support the Provincial Operation Center effectively.

2. OBJECTIVE

To develop the geographic information system as a tool for planning, verifying, monitoring and evaluating the operation following to the provincial strategic plan

3. STUDY AREA

The study area covers Lampang Province which is located in the northern part of Thailand, 599 kilometers from Bangkok, the capital city of Thailand. It covers the area of approximately 12,534 square kilometers. The topography of the province consists of a basin surrounded by steep mountains which is the important source of lignite, especially in the central part of province, lignite were found and mined. There are abundant natural resources, watershed, and important minerals include kaolin and gypsum. The study area is shown in Figure 1.

Figure 1

4. Data Used

The data used in this study consists of :

4.1 The data of provincial development plan which can be classified by type of strategy, project and budget including to annual budget data etc.

4.2 The Geo-informatics data consists of:

4.2.1 Administrative Boundary data

4.2.2 Land use data

4.2.3 Landmark data

4.2.4 Transportation network

4.2.4 Satellite imagery data such as Landsat, SPOT and THEOS

4.3 The Additional Data used in the projects are basic needs data of the Community Development Department

5. METHODOLOGY

5.1 Study the provincial development plan

This process includes the data for making the provincial development plan, strategy, goal and indicators of development of the province.

5.2 Study and Design for Management Information System (MIS)

The details of provincial development plan that are stored in document form were imported into the Relational Database, the database structure in MIS, which can be analyze and connected to Geographic Information System. Such details including types of plan or project, strategy, budget category, types of product, XY coordinates and basic necessities database.

5.3 Study and Design for Geographic Information System (GIS)

5.3.1 Import the relevant data such as administrative boundary, transportation, land use, satellite images and landmarks; government office, school, religious landmarks, tourist attractions and ceramic industries.

5.3.2 Design and develop functions in ArcGIS software for the preparation of provincial development plan such as spatial data and basic needs data viewing, searching for the project location and create the connection between MIS and GIS data for project planning and monitoring.

5.4 Develop Geo-Informatics Services System

Develop GIS CHANGWAT (Lampang Province) by the integration of MIS and GIS data. This process consists of data overlay, data connection and data analysis for project planning and management in Lampang Province.

The overall methodology in this study is shown in Figure 2.

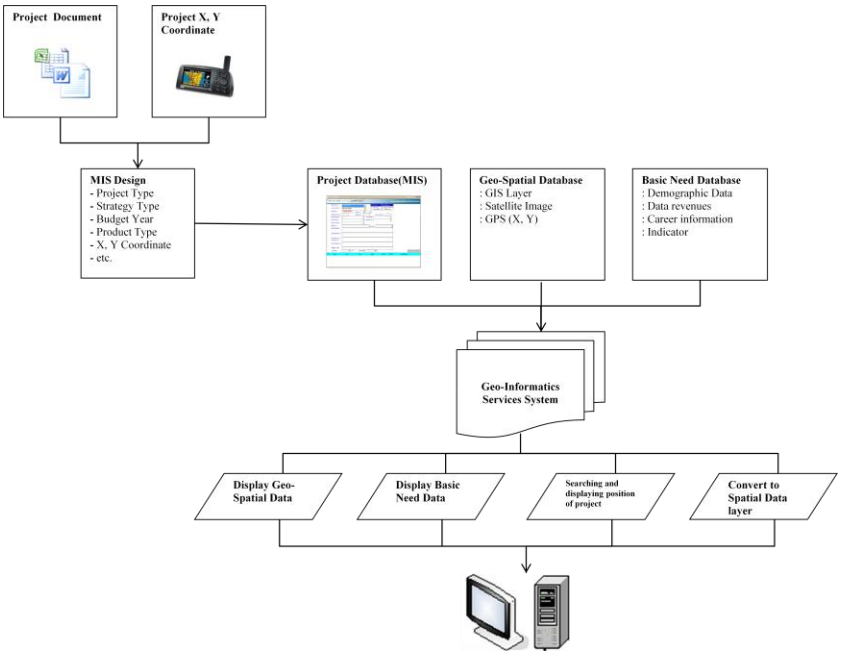

Figure 2

6. RESULT

6.1 Data Input System for provincial development plan

The Data Input System for provincial development plan can record annual provincial development project which can be classified as strategy, type of product, type of budget, type of project and project location. The system was done by creating a database in MIS to be displayed on maps or satellite imagery in GIS system (Figure 3).

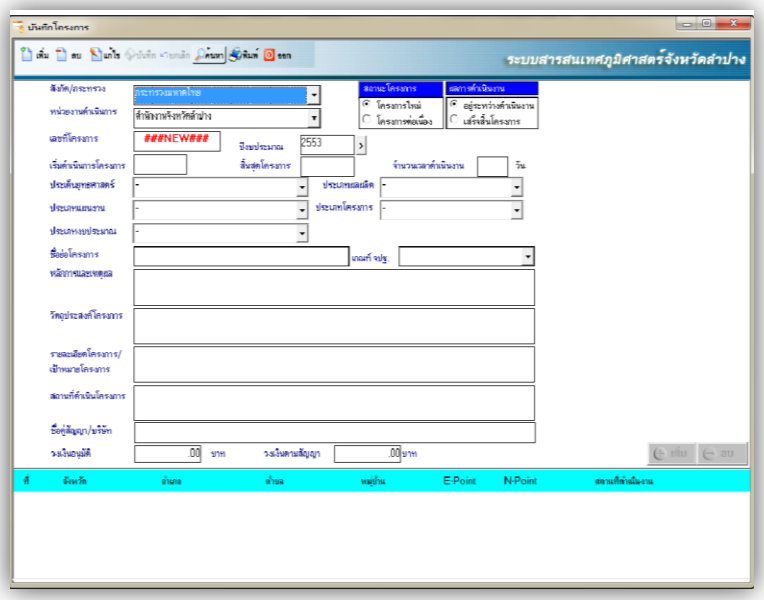

Figure 3

6.2 Geo-Informatics Services System

According to the MIS system that can be recorded data such as the project that has been allocated and relevant data. These data can be analyzed and reported in accordance with province's requirement. However, MIS does not show the location of the project, but record only the coordinates of the project. To display the project location, it is necessary to connect MIS with GIS. The project location will be display on map and satellite image of Lampang Province. The display functions are as follow:

6.2.1 Display Geo-Spatial Data

A designed command function displays data in form of data layers. There are 5 layers to utilize which are Administrative Boundary, Land use, Landmark, Transportation and satellite imagery.

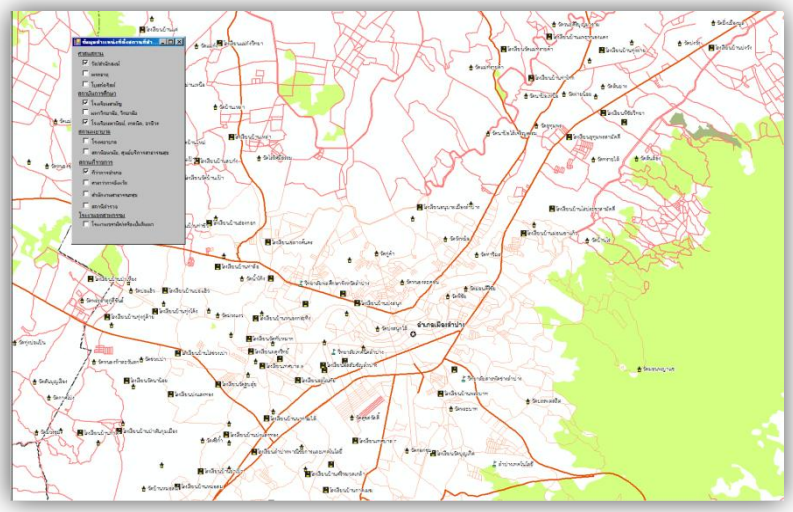

Figure 4

6.2.2 Searching and displaying position of project

A finding command function is capable to display at given conditions depending on user's requirement. The result will show a project location on map including details of project from database record and even comparison chart of numbers of project, budget, and strategic plan of each area.

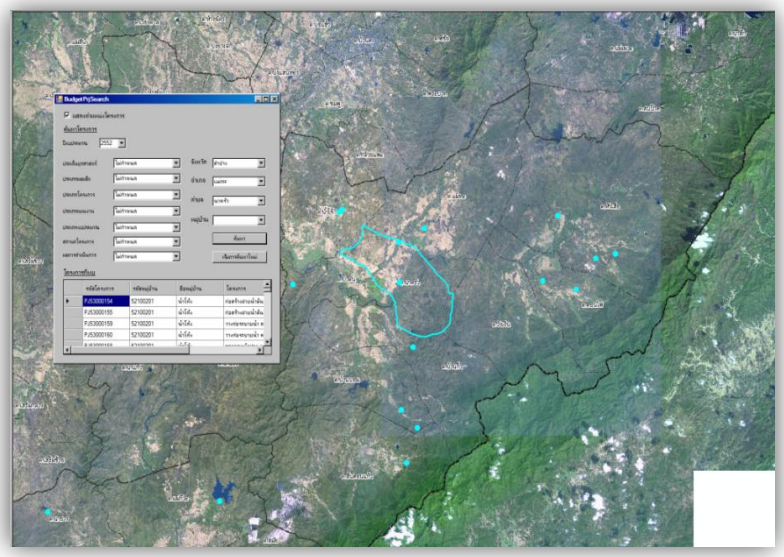

Figure 6

6.2.3 Display basic needs data

The basic needs data which link to village location data. The information can display in several group:

- Demographic data.

- Data revenues.

- Career information.

The village location is displayed on the map with a different symbol for each group in the village when the command was called as a sample on the map shows the total population of the village.

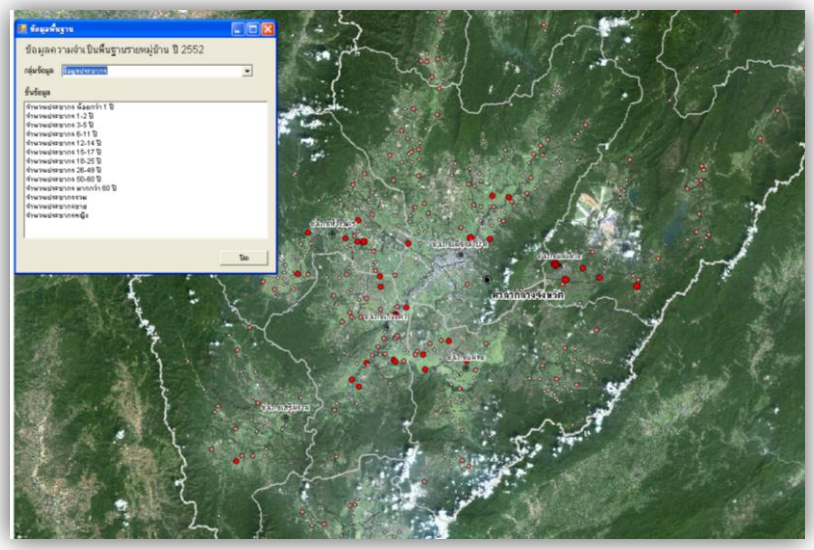

Figure 7

It can also display information based on the indicators of the 6 categories

- Section 1 : healthy.

- Section 2 : home residents.

- Section 3 : pro-education.

- Section 4 : has progressed.

- Section 5 : instill values in Thailand.

- Section 6 : Social development.

The above indicators display the indicators of each village by showing a village location including a qualifying rate whether qualify, under-qualify or no data. In this position, the village is represented by a symbol that the village is over, do not pass and no data.

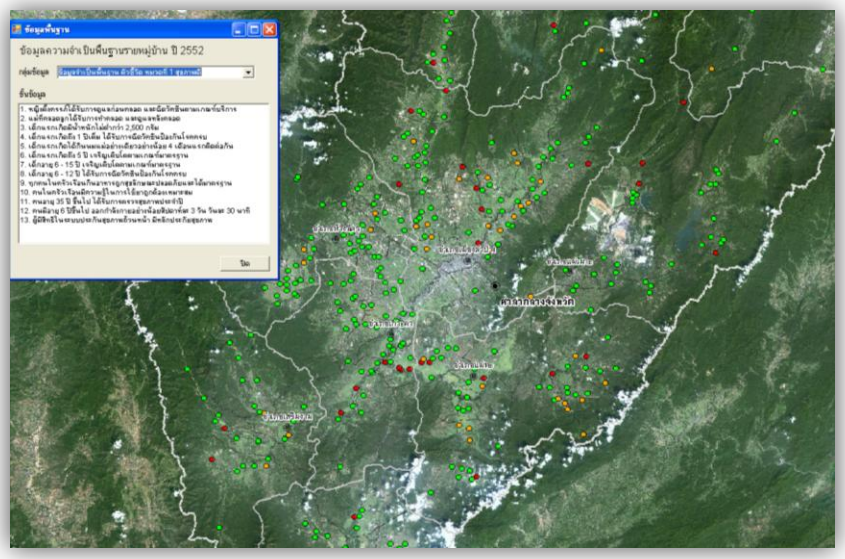

Figure 9

6.2.4 Converting data to GIS spatial data layer

Tools function was also created in order to convert the coordinates of the position and location of the ceramics / pottery factory from the MIS database to a GIS spatial data layers to show the spatial location on map.

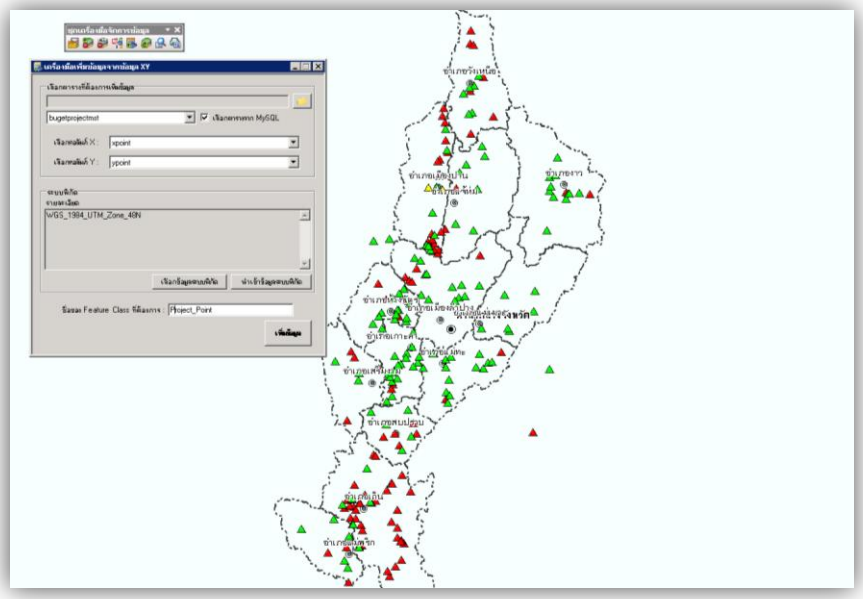

Figure 10

7. CONCLUSION

7.1 The preparation process for the development plan for the Lampang province, the adoption of the map data was processed by means of overlay technique with using joins spatial data with context for analysis and the management plan for the area. The result of the strategic analysis about the village was the basis needs. The distribution of development projects and the status of the village will be processed in accordance.

7.2 Supporting GIS spatial data at regional level covering the whole country. It was systematic developed and improved to get the up-to-date data. It helps government to promote good governance.

7.3 Promoting the widely use of THEOS satellite data and supporting the development of the country on the basis of knowledge of Geographic Information System.

8. SUGGESTION

In order to prepare the plan and efficiently monitor the implementation. The online application for GIS services for the preparation of development plans in the province should be developed and installed online at the district level and local agencies. This package will allow users to continually retrieve information and monitor changes in the area of satellite data.

9. REFERENCE

Department of Provincial Administration (2010). **Administration Boundary.** Bangkok: Ministry of Interior.

Community Development Department (2009). **Basic Needs Data.** Bangkok: Ministry of Interior.

Land Development Department (2009). **Landuse of Lampang Province.** Bangkok: Ministry Agriculture and Cooperatives.

Royal Thai Survey Department (1999). **Spatial Database.** Bangkok: Ministry of Defence.

Department of Strategic Development Plan of Lampang province (2009 - 2011). **Development Plan of Lampang Province.** Lampang Province: Official of Lampang Province.