GIS for Agricultural Project and Program Evaluation

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Abstract

Project monitoring and evaluation is very important, as it can be used to indicate progress and success, including problems and impact of the project. It can also be used for improving project plan, administration, and management. GIS is the visualization method that is extremely helpful in decision making and planning. So GIS is an appropriate tool for agricultural project and program monitoring and evaluation. There are three ways of using GIS in project undertakings i.e. GIS for feasibility studies, GIS for project and program monitoring, and GIS for project and program evaluation.

Introduction

Royal Thai Government has over the past few years been involved in restructuring its Ministries, improving the implementation system, streamlining budget allocation, and upgrading personnel development .One of the objectives under government policy guidelines is to improve efficiency and effectiveness of the administration of government agencies. So project monitoring and evaluation is very important because its results can indicate progress and success, including problems and impact of the project. These results can be used for improving project plan, administration, and management.

Government officials, who are responsible to monitor and evaluate projects, must have excellent knowledge in monitoring and evaluation techniques and methodologies and can efficiently and precisely present the results to decision-makers.

GIS is the visualization method that makes an outcome easy to understand. GIS can also correct mistakes found in data collected by other means. It can add new data, merge, improve, and retrieve data. GIS is divided into 4 steps: data capture, data retrieval, data analysis, and data display. GIS is different from other data systems because GIS data are Geo-referenced data. GIS has both spatial data and non-spatial data. So, GIS is very practical for planning and decision making.

The Office of Agricultural Economics(OAE), an agency under the Ministry of Agriculture and Cooperatives (MOAC), has the responsibilities to monitor and evaluate MOAC projects and programs, present monitoring and evaluation results, and submit recommendations to the administrators, the National Agricultural Development Plan and Policy Committee, other committees, and involved agencies. The OAE has recently realised that GIS can be a useful tool in its applications to project and program monitoring and evaluation. Thus we would like to present in this paper the concept in using GIS for project and program monitoring and evaluation.

Objective

To present a conceptual frame work for the use of GIS in project and program monitoring and evaluation.

Methodology

Data were collected from secondary sources. They are GIS documents, monitoring and evaluation documents, map data from various agencies, etc. After that, data were compounded and analysed for the purpose of project and program monitoring and evaluation. The results are presented below.

Results of the Study

From studying the relevant documents, GIS was used for project and program monitoring and evaluation into 2 ways. They are GIS for project and program monitoring, and GIS for project and program evaluation. GIS was also used in conducting project feasibility studies.

GIS for Feasibility Studies

GIS may be employed to analyse projects for government investment in agriculture. It shows how and how much such investment will change the economic, social, and environmental conditions by comparing between with and without projects. This process provides powerful indications to the decision-makers in the approval process.

Data Capture

Data used for feasibility study consist of 2 sets of data. They are data with project and data without project. Each set of data is as follows:

(1) Spatial data : Aerial photographs, transportation routes, administrative boundaries, geographical map, irrigated area, land use map, and etc.

(2) Non-spatial data: Land price, construction cost, land development cost, agricultural production expenditure, population, production, value of production, agricultural income, and etc.

Data Analysis

We analysed these spatial and non-spatial data by overlaying spatial data maps and integrating non-spatial data into these maps.

Data Display

The data display from using GIS are maps, graphics, and tables which are showed in computer or printed. It has 2 sets of data: current data without project and future expected data with project. We can determine the pre-project and post-project situations by analysing these 2 sets of data. That can be used for making decision whether to invest for agricultural project, or not.

GIS for Project and Program Monitoring

Any progress during project implementation can be illustrated and analysed by the use of GIS. That is when additional inputs such as capital, other resources, and technologies are applied under the project. Project monitoring take place when actual inputs, activities, and outputs are compared with target and expected results. The objectives of this process are to monitor progress, to identify problems including obstacles, and to provide recommendations to overcome these drawbacks in a timely manner.

Data Capture

Data used in project and program monitoring are drawn from project implementation. Project and program monitoring may be conducted in regular intervals, e.g. every 2 or 3 months to see progress. The data that are captured are as follows:

(1) Spatial data: Aerial photographs, transportation routes, administrative boundaries, geographical map, irrigated area, land use map, and etc.

(2) Non-spatial data: Land price, construction cost, land development cost, population, production, construction progress, and etc.

Data Analysis

Again data can be analysed by overlaying different spatial maps and integrating spatial and non-spatial information.

Data Display

The data may be displayed through the use of GIS by using maps, graphic illustrations, and statistical tables as showed in computer screens or printed on papers. Through data display, we can see project developments at differing points of time of project implementation. If realised outputs are below the level of the planned targets, then the project has encountered problems. It is necessary to solve these problems as soon as possible, if project targets are to be achieved.

GIS for Project and Program Evaluation

GIS can be used to determine project efficiency and effectiveness after its termination. It can help provide an insight into the way in which projects have been managed and executed. In addition, with GIS we can analyse the impacts of projects which will be used further as a lesson to set future policies and plans under which better projects and programs can be designed. In fact, GIS can be an effective tool in conducting on-going evaluation, terminal evaluation, and ex-post evaluation.

Data Capture

Data used for project and program evaluation consist of 2 sets of data. They are data before project and data after project (data for on-going evaluation, terminal evaluation, and ex-post evaluation). Each set of data is as follows:

(1) Spatial data: Aerial photographs, transportation routes, administrative boundaries, geographical map, irrigated area, land use map, and etc.

(2) Non-spatial data: Land price, construction cost, land development cost, agricultural production expenditure, population, production, value of production, agricultural income, and etc.

Data Analysis

We analysed these spatial and non-spatial data by overlaying spatial data maps and integrating non-spatial data into these maps.

Data Display

The data display from using GIS is maps, graphics, and tables which are showed in computer or printed. It has 2 sets of data: data before project and data after project. They show the changing of data by analysing these 2 sets of data. They can analyse the process of activities operating, quality, standardize of outcome. In addition, GIS can be used to analyse the impact of project which will be used further as a lesson to set the policies and plan for the next project.

Case Study: Oil Palm in Chonburi Province

Oil Palm Planted Area in Chonburi Province

In 2001, Office of Agricultural Economics has conducted a study on oil palm planted area in Chonburi Province some 100 kms east of Bangkok by using Geo-informatics including Geographic Information System-

GIS, Remote Sensing-RS, and Global Positioning System-GPS.

Objective

To identify oil palm planted area in Chonburi Province.

Methodology

(1) Data Preparation
The essential data were satellite data, geographical maps, contour maps, administrative boundaries, and oil palm production data collected through a field survey.
(2) Data Analysis
Data in (1) were analysed to identify oil palm planted area. The result was a map of oil palm planted area.

Result of the Study

In 2001, the total planted area for oil palm in Chonburi Province was 26,002 rai[1] and total production was 52,785 tons.

Agro-Economic Zoning for Oil Palm in Chonburi Province

In 2002, Office of Agricultural Economics was involved in studying appropriate agro-economic areas for oil palm in Chonburi Province by using a new technology, called Geo-informatics including GIS, RS, and GPS.

Objective

(1) To determine potential agro-economic zoning in Chonburi Province, and
(2) To increase efficiencies of production, processing, and marketing of oil palm and its products.

Methodology

(1) To study oil palm production system such as production source, production volume, market demand in both domestic and external markets, future trend, and future production target suitable for oil palm.
(2) To prepare important physical characteristics which are necessary for efficient oil palm production. They are watershed, soil series, rainfall, irrigation zone, land use, administrative boundary, transportation route, forest boundary, and contour. All data are in the form of maps.
(3) To analyse spatial data maps in (2) to determine the level of suitability for oil palm production in various areas of Chonburi Province.
(4) To analyse the potential level of oil palm by integrating the map of suitable area for oil palm with important economic factors effecting to production system. They were commodity demand and supply, production target, production source, production cost, gateway price, production capability, and plant location. The result was a illustrated map which indicated potential level for agricultural commodity production of oil palm.

Result of Study

The agro-economic zoning for oil palm in Chonburi

[1] 1 rai = 0.16 hectare = 0.395 acre, 1 hectare = 6.25 rai, 1 acre = 2.5 rai

Province was undertaken based on production target. In 2002, the total area defined as the appropriate agro – economic zone for oil palm was 84,357 rai.

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