

Satellite Remote Sensing in Malaysia

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Abstract. The usage of computer has been a major focus for many countries, especially in developing countries. Land management using a computer is a very useful technology in Malaysia, particularly in the management of the country's natural resources. Selangor State Government has taken such an important step in land management by developing a landscape using Geographical Information System (GIS). The Government is concerned with the use of GIS through the ongoing program of the Seventh Malaysia Plan (RMK7) related to the management of natural resources, especially forests. Centre for Remote Sensing (MACRES) and Department of Environment (DOE) are responsible for managing the land through soil mapping high risk areas such as Cameron Highlands, Fraser's Hill, Genting Highlands and the administrative center of Putrajaya.

Introduction

Satellite imagery can be used to estimate important characteristics of forest structure and composition across large areas of the Malaysia. These estimates can be done at high resolution (areas of 30 yards on a side or about 0.2 acre). Plantation maps derived from remote sensing can be used to estimate wildfile habitat especially bird.

Satellite-based flora maps of watersheds are useful in predicting habitat conditions for fishes and to locate watersheds with high or low habitat potential for conservation and monitoring efforts at landscape and regional scales.

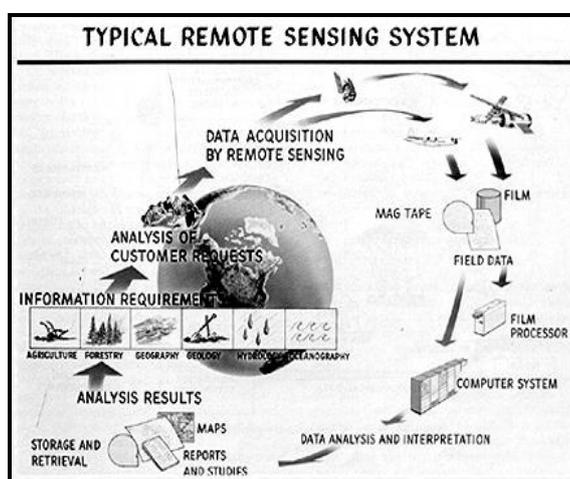


Figure 1: Typical Satellite Remote Sensing System.

Figure 1 shows a simple typical Satellite Remote Sensing System. The starting and ending points are the set of table that is labeled Information Requirements. Various disciplines concerned with Earth observations and resources are represented. Data that can be gathered using Satellite Remote Sensing System are agro-cultural, forestry, geography, geology, hydrography, oceanography and meteorology. Information requirements based on user and customer demands. The satellite remote sensing system approach is one of most responsive to these demands.

By now there have been full awareness among the society that Earth-observing data from satellites is one of the best method used in correlating and interleaving data as it also essential inputs in decision making and application models.

Objectives

The use of satellite technology in developing natural resources has become a major focus to many countries. In developing the landscape for land management, satellite technology has been used in Taipei to determine the preservation and conservation of natural resources, the development of agriculture, rural and urban. Taipei government has utilized satellite technology to determine and to control the development of their land, water resources and infrastructure in the city in order to control environmental pollution and thus to increase the quality of their people life. The use of satellite technology is also needed because it has the ability to predict the development of the environment and the land that can be developed by a country.

Now, the focus in developing global landscape is by manipulating the use of satellites in preserving the natural resources in a continuous ways. Among the planned program is to develop of a structured tree planting. In Western Australia, the landscape master plan is the key requirement to preserve and conserve the nature especially for places like watersheds and it is also to determine the guaranteed national production like agricultural products.

Satellite Remote Sensing Applications

Agriculture and Soil. Precision agriculture, crop acreage and production estimation. Soil and Land Degradation Mapping.

Engineering and Geology. Mineral potential mapping, groundwater potential zoning and infrastructure planning.

Marine and Oceanography. Potential fishing zone (pfz), coastal zone mapping, marine resources and physical oceanography.

Forest, Biodiversity and Environment. Forest cover and type mapping, biodiversity characterisation, environmental impact studies monitoring of environmental sensitive area and monitoring the wetland areas forest fire and risk mapping.

Regional/ Land Development. Town and Country Planning, land alienation and solid Waste Disposal.

Land Use Monitoring. Land use/ land cover mapping, wasteland mapping, topography and geographic positioning, urban development and Geology.

Discussion

Among the most important focuses in using the satellite technology are to set the pattern of land development, land planning strategies, land use conflicts, the quality of agricultural land and eliminate systematic land development, especially in rural areas. Planning agricultural or landscape master plan that closely have significant control efforts may result in a negative impact on land development planning process of a country.

In Malaysia and other developing countries, getting access to the forest area is often difficult. Remote sensing in forest has become important due to its function to collect data from

large areas and its capability to generate data. In other words, remote sensing technology offers reliable information useful for forest management and inventory. Based on data analysis, six classes of land cover are classified as Primary Forest, Logged-Over Forest, Degraded Forest/Plantation, Shrub, Barren Land / Cloud and Water Bodies/ Shadow. By using a forest canopy density technique, three volume intensity categories can be mapped out such as High Density, Medium Density and Low Density with an overall accuracy assessment of about 97 percent.

By using satellite Remote Sensing, Malaysian loggers can now utilize these maps to estimate timber volume in the concession areas without really "flying over" the inaccessible sites. Thus, concession fees can be imposed to the loggers if they trespassing any inaccessible sites.

Under Satellite Remote Sensing Malaysia Programme, the satellites will be used to help fishermen to spot fishing zones, enable them to maximise their catch each time they go out to sea. Remote Sensing Malaysia has conducted various programmes using remote sensing techniques for the management of natural resources, environment, disasters and strategic planning. The project is fully funded by the Government, and in its pilot stage in the states of Kelantan, Terengganu and Pahang. If everything goes according to plan, the fish forecasting programme will be expanded nationwide. Apart from Satellite Remote Sensing Malaysia, other agencies involved in the project include the Fisheries Department, Fisheries Development Board (LKIM), National Fishermen's Association (Nekmat) and Malaysian Institute of Microelectronic Systems (Mimos Bhd).

Satellite Remote Sensing Malaysia also has plan to seek expertise in of fish forecasting methods. The fish forecasting programme under Satellite Remote Sensing Malaysia uses satellites to capture a wide variety of information that can be used to detect fish indirectly. The satellite programme has become the fishermen's new eyes and ears, allowing them to see beyond what is possible with human senses.

The planktons are disturbed by fish, they emit light from their bodies. This is an indicator that folk of fishes are nearby. Orbiting satellites capture the folk of fishes and direct fishing vessels towards the area. Another indirect method of tracking fish is done by observing changes in the sea surface. For example, an increase in plankton population causes the colour of the ocean to change from blue to green. This is due to chlorophyll that being release by the phytoplankton. Satellite imagery can precisely record these changes in ocean color over a wide area.

Distribution of different species of fish can be acknowledged through measuring water temperature. Temperature mapping through satellites can identify differences between cold and warm waters where some species of fishes stay.

Apart from the detection of fishes, remote sensing can be used for long term monitoring of marine and coastal environments such as sediment types, marine plants, waves, currents and freshwater and saltwater mixing. Researches done to these phenomena can provide analysts with better understanding on how physical environments support and affect marine life. Information receive from the satellite will be integrated with data collected on the ground like from observer's onboard commercial fishing vessels that measure total catch by fishermen.

Satellite images captured are sent to the ground station in Temerloh, and these together with ground information are processed and analysed for any connection. The data would then be used to create a computerised fish forecasting model, complete with location maps of fishing areas. Timeliness is important for the fishing industry due to the constantly changing nature of marine life and sea conditions. In this case, information that being collected is distributed to fishermen as often as possible through various means available such as telephone, text message, email, or even a hard copy. This way, fishermen will always being updated and be able to fish at the right place and at the right time.

The benefits of fish forecasting using satellites are numerous, and are especially beneficial to Malaysia's fishing community of 90,000 fishermen, where the majority of the country's less fortunate people comes from.

One thing that should also be addressed at present is that the use of satellites in earth landscape of research and development that are likely to be able to review land development and effective.

Use the concept of satellite DGPS (Differential Global Positioning Systems) developed by the United States is a powerful tracking tool that can be used to make a significant contribution to the agricultural industry, like determining the location of the planting of the season, analyze and retrieve information about the tables farming, planting problems and patterns of tree growth based on environmental influences or a specific climate. Example of satellites that can be categorized as Earth Observation Satellite is the development of the global landscape.

Conclusion

Most countries disseminate information about the landscape of their respective countries through the internet by using the term land care and land monitoring analysis. One of the country that has development and landscape interest is Florida. Satellite technology is used to determine the area or place of trade for development, including the location, accommodation, agriculture, water catchment systems and open spaces. In addition to determining the areas of land developed, satellites can also be used by the users to control the information specifically related to land development or landscape.

To study the development and management of land using satellite is an important claim. Knowing and understanding the use of satellites will help us to determine the pattern of the landscape as a whole, which will create natural resource management systems to be more effective in the future.

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