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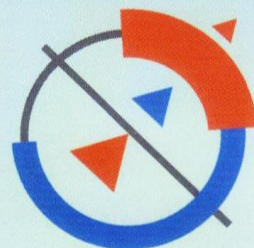
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WE **REAP**

The agri community is sowing the seeds of state-of-the-art technology – including hi-tech machines, GIS and the Cloud – to reap the benefits of efficiency and productivity, even as global demand for food grows in the face of shrinking land and water resources. | **P. 18**

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Courtesy: ARSM



Spot-5 image for the classification of current active paddy and non-paddy area

GIS for Rice Field Management

The Malaysian department of agriculture has adopted innovative rice mapping solutions which helped it in the overall production of paddy

Rice is the staple food not only for Malaysians, but for most of the Asian countries. Growing paddy and increasing rice production have been part of major agricultural development strategies in Malaysia. At present, Malaysia has achieved a level of self-sufficiency in rice production at about 71.7% (2013) of the local consumption.

Challenges

Paddy at field level always faces challenges of monitoring and management as it involves large land area coverage with limited manpower for the extension works. This creates difficulty in field observation, which later reflects on the rice production. The rise of sectors like industrial and tourism have led to the increasing development of structures like building etc. which further put pressure on the land use of an area. These changes are difficult to detect by on-site verification in wide land coverage due to manpower limitation. This affects the reporting of actual acreage of active paddy parcel. Also, any irregularity in the productivity during the growth stages is hardly detected.

There are four major activities during paddy's growth period, namely land preparation, irrigation, planting and harvesting. In case of any irregularity like late/early irrigation and delayed planting, the effects are visible at the end of production, when the production is lower than expected.

Solution

In order to overcome these constraints and manage paddy at field level, the Department of Agriculture collaborated with Malaysia Remote Sensing Agency to establish an application for rice mapping and monitoring using GIS and satellite imagery.

A field cadastral map acquired from the Department of Survey & Mapping Malaysia (JUPEM) is integrated with the profile of entrepreneurs by individual lot, to establish an updated base map with integrated details of the entrepreneurs according to the individual lot number. The project area chosen were the eight granary

areas at Peninsular Malaysia, namely IADA (Integrated Agriculture Development Area) Kerian, IADA Kemasin Semarak, IADA Pulau Pinang, IADA Seberang Perak, IADA Ketara, IADA Barat Laut Selangor, KADA and MADA. Granary in Malaysia refers to major irrigation scheme, where the area is greater than 4,000 hectares and recognised as the main paddy producing areas.

An integrated cadastral map is overlaid with the high-resolution satellite images of 0.5m-1.0m resolution to determine the actual planted area, and distinguish the paddy and non-paddy (fish pond, roads, others) fields. The current planted paddy area can be calculated and the actual acreage can be obtained. This way maps prepared using GIS tools are integrated into the system, and can be viewed with limited access according to the necessity level of the users.

Satellite imagery is not only used for mapping the geographical information of the paddy parcel, but also to monitor and observe the activities during the growth stage, starting from land preparation to harvest. In this case, radar images were used to monitor the status of all four activities mentioned. The images are updated every 11 days. The status of all the four activities (land preparation, irrigation, planting and harvesting) can be monitored at an 11-day cycle to the extent by individual lots without on-site observation and manual verification.

The current trend of technology implementation will enhance the trend of agricultural management, especially of rice. This systematic management of paddy fields and other activities enables farmers to develop strategies to increase the production.

Future

The Department of Agriculture is working towards further expanding the scope of using geospatial technologies to other potential crops in Malaysia. GIS and remote sensing solutions are expected to provide a promising future not only to the agricultural sector, but also to other sectors which elevates the competitiveness among the developing countries. 🌱

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