Improving food security through satellite information

RIICE supports partner countries in satellite-based rice crop monitoring to make reliable forecasts of their country’s rice production. Governments can also use the data to assess very effectively the impact of natural disasters and the related extent of rice crop damages. Such information can be a useful resource for decision-making, targeting of resources, crop insurance and disaster response.

Tamil Nadu: RIICE plays key role in disaster response.

The heavy rains in October/November 2015 lasted for several weeks, causing over 300 fatalities and causing a major rice disaster affecting at least 6.5 million farmers. The floods not only severely affected rice but also the livelihoods of shrimp farmers, small-scale fishermen, and those working in the related value chains. The authorities urgently needed to find out who had been worst hit in order to act immediately.

Help was at hand from two main partners: the Swiss company sarmap SA (a satellite data provider) and the reinsurer Allianz Re. RIICE supplied data on rice fields which had been affected by floods and on rice fields that had not been affected. This made it possible to allocate financial support, in the form of insurance payments, within days of the heavy rain event. RIICE drew up an initial disaster report for the Chief Secretary to the Government of Tamil Nadu based on high-resolution radar images. Thanks to this information, the government was able to open immediate action.

Tamil Nadu’s Coordinating Ministry received 50 initial loss reports and 30,000 vegetable seedlings. According to the state government official responsible for coordinating the response, the people affected had not been aware of the extent of the disaster. In this way RIICE helped to strengthen resilience and improve food security.


The data generated by RIICE provides a very effective information tool for use by decision-makers in a time of natural disasters such as drought, flooding, famine and, in future, even damage. Satellite-based crop production monitoring helps insurance companies determine the extent of an insured event and can be completed in an efficient and transparent manner. Satellite images identify affected areas very quickly. Based on this data, insurers can assess claims and make corresponding payments to those farmers who have suffered damage to their crops. Furthermore, it could take months for loss assessors to travel to the area and put a value on the damage. In this way, RIICE provides the means by which farmers can protect themselves very effectively against potential crop losses and ensures that they receive support quickly when it is needed.

Today rice - tomorrow wheat, soya and maize.

In addition to the rice-based data received from the ESA Sentinel satellite, the RIICE project depends critically on the quality of cooperation with local implementation partners such as experts from governmental institutions or universities. While the ESA’s space-based technology produces measurements of biomass and humidity, the national experts supply key ground-based and meteorological information. Together with the local experts, the project of the RIICE team is to evaluate and to establish data processing chains to perform regular large-scale monitoring of rice production. In cooperation with local partners, the project provides the means to prepare yield forecasts, and quantifies production losses due to natural disasters.

The ESA satellites use radar sensors to scan the earth’s surface. Unlike optical systems, radar sensors are able to penetrate rain and snow, and to image the ground day and night. This method of monitoring and forecasting rice production by combining large-scale radar imagery and software-based automated processing of these images and fine-tuning of early agricultural results can be used in the future to develop similar approaches to monitor other important crops, such as soy, maize and wheat.
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Rice is Asia’s most important staple crop. If the rice season is good, poor families will have enough to eat. If not, they will go hungry.

RIICE works with data generated by the Sentinel-1 / space mission SENTINEL-1A/B, which is carried out by the European Space Agency (ESA) under the Copernicus program. The ESA satellites use radar sensors to scan the earth’s surface. Unlike optical systems, radar sensors can generate reliable data even at night and in cloudy conditions.

The ESA satellites use radar sensors to scan the earth’s surface. Unlike optical systems, radar sensors offer several advantages: they can ‘see’ at all times, regardless of weather conditions.

Governments can use the data provided by RIICE to offer their farmers sound advice on crop management. For the authorities, the project helps to strengthen resilience and improve food security.

Tamil Nadu: RIICE plays key role in disaster response.

The heavy rains that hit Tamil Nadu in November 2015 lasted for several weeks, causing over 300 fatalities and damages amounting to losses of several hundred million dollars. The authorities were apparently not prepared for this sudden and unprecedented event.

For several days, the satellite images of Sentinel-1A/B provided the only available data. The high-resolution imagery of Sentinel-1 enabled the Indian authorities to assess the extent of the rice damage. This information was provided in a few days after the heavy rain started. Thiruvananthrakutti, India's national disaster management authority, was able to use this information to take immediate action.

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A single project with numerous partners in five countries

RIICE stands for Remote Sensing-based Information and Insurance for Crops in Emerging Economies. RIICE is a single project with numerous partners in five countries.

RIICE partners include the International Rice Research Institute (IRRI), the Swiss satellite company sarmap SA, GIZ (on behalf of BMZ), and the reinsurer Allianz Re. To date the project has established partnerships with the following institutions –

Vietnam: Ministry of Agriculture and Rural Development, Vietnam National Rice Institute, University of Agriculture and Forestry;

Cambodia: Ministry of Agriculture, Forestry and Fisheries, Department of Planning and Statistics of the Ministry of Agriculture, Cambodia Agricultural Research and Development Institute, Royal University of Agriculture;


Philippines: Philippine Rice Research Institute, Philippine Insurers and Reinsurers Association;

Today rice – tomorrow wheat, soya and maize.

In addition to the immediate rice image data from the ESA Sentinel satellites, the RIICE project depends greatly on the quality of cooperation with local implementation partners such as experts from government institutions, universities and non-governmental organisations. To date, the project has processed 60,000 high-resolution radar images from India and has trained and advised 700 local agricultural experts.

Together with the local experts, the RIICE team is able to produce reliable and accurate information on rice crop production volumes and yield forecasts, and quantify production damage caused by natural disasters.

Governments can use the data provided by RIICE to offer their farmers sound advice on crop management. For the authorities, the project helps to strengthen resilience and improve food security.

In disaster response.

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Rice insurance is a powerful tool to help reduce the social and economic impact of natural disasters such as drought, flooding and typhoon.

The data generated by RIICE provides a very effective information tool for use in decision-making to cover or avoid insurance claims as well as to assess if funding is needed and, if so, how much and where. Satellite-based crop production monitoring using high-resolution radar data can support the insurance industry in the assessment of an insured event. A satellite-based monitoring system can provide information on the extent of an insured event that can be combined with traditional and geographical data for an efficient and transparent assessment of damage and insurance claims.

Such information can be a useful resource for decision-making, targeting of resources, crop insurance and disaster response.