

FORMOSAT-2 Explores Water Resources

A team of EU-funded researchers is drawing on the latest satellite imaging technology to investigate how scarce water resources, used by farmers in arid regions, are. The tool could be used by local authorities to allocate water resources more effectively, or to encourage farmers to alter their farming practices to save more water.

The use of satellites in agriculture is not a new phenomenon. GIS allow specialists to visualise and comprehend data in ways that reveal relationships, patterns and trends in the situation on the ground. In this latest study, a team from the French Institute for Research for Development (IRD) studied images taken by the FORMOSAT-2 satellite. The Taiwanese satellite possesses a spatial resolution of two meters in black and white and eight meters in colour mode. Its colour capability allows it to provide specific information for mapping shallow waters, distinguishing between bare earth and vegetation, mapping forests and identifying crops, and making atmospheric corrections.

The researchers focused their research efforts on the Tensift Plain around Marrakech in the centre of Morocco, and the Yaqui Valley in the State of Sonora in North-West Mexico, two agricultural areas where farmers make extensive use of irrigation. These areas, both of which are spread out over several thousand square kilometres, are famous for their farming of cereals, fruit trees and vegetables. Crucially, water demand in these areas far exceeds water supply.

The high resolution offered by FORMOSAT-2 enabled the scientists to assess yields with greater accuracy and model water transfer between soil, vegetation and atmosphere. Their investigation in the wheat growing area of Morocco for example, showed that evaporation from the plant cover, the principal factor in water loss, could be evaluated with a margin of error of between 10 and 20%. Grain yields could also be estimated to an accuracy of about 25%.

This ability to determine the water evaporation and plant growth rates are vitally important in a world where water and food scarcity are growing problems. According to experts, with the global population estimated to reach 8 billion by 2030, it is essential to optimise the use of water resources and to increase agricultural production.

The FORMOSAT-2 satellite, while operated by Taiwan's National Space Organisation NSPO, was designed in Europe and built by EADS-Astrium. It is the first and only high-resolution satellite with a daily revisit capability. The ability to acquire repeat imagery of an area of interest every day with the same sensor, from the same angle and under the same lighting conditions guarantees a timely flow of compatible data.