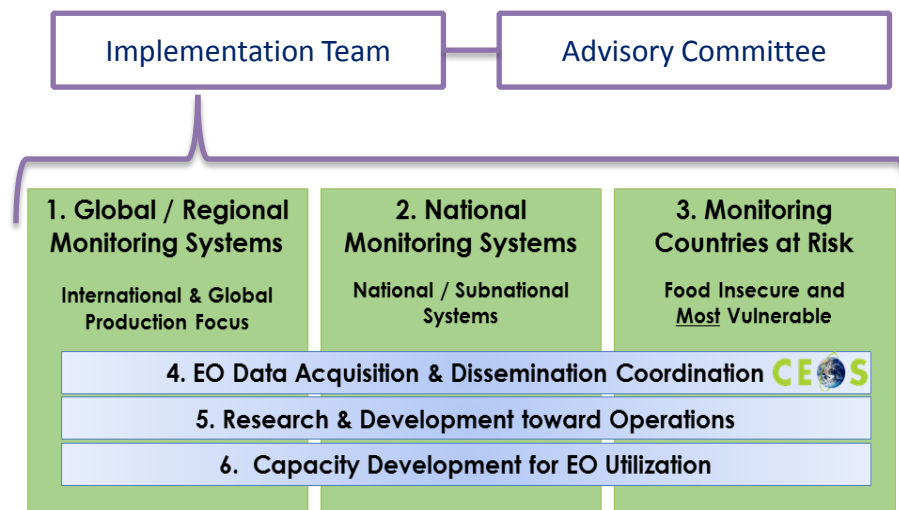


# The GEOGLAM Initiative

## Group on Earth Observation Global Agricultural Monitoring Initiative

- Established in 2011 by G20 to provide timely, accurate, and actionable information on crop production...

...by improving the international community's capacity to utilize EO data for agricultural monitoring at national, regional, and global levels



- GEOGLAM is a *system of systems*
  - Responding to intergovernmental and national end-user needs
- Harmonizing, centralizing, “glue” functions (**GEOGLAM Secretariat**):
  - Coordinating Crop Monitors (AMIS, Early Warning): consensus crop conditions
  - EO Data Coordination with CEOS: for R&D activities, baseline dataset generation, and developing/implementing community requirements
  - Operational R&D (JECAM, Asia-RICE)
  - Capacity Development coordination

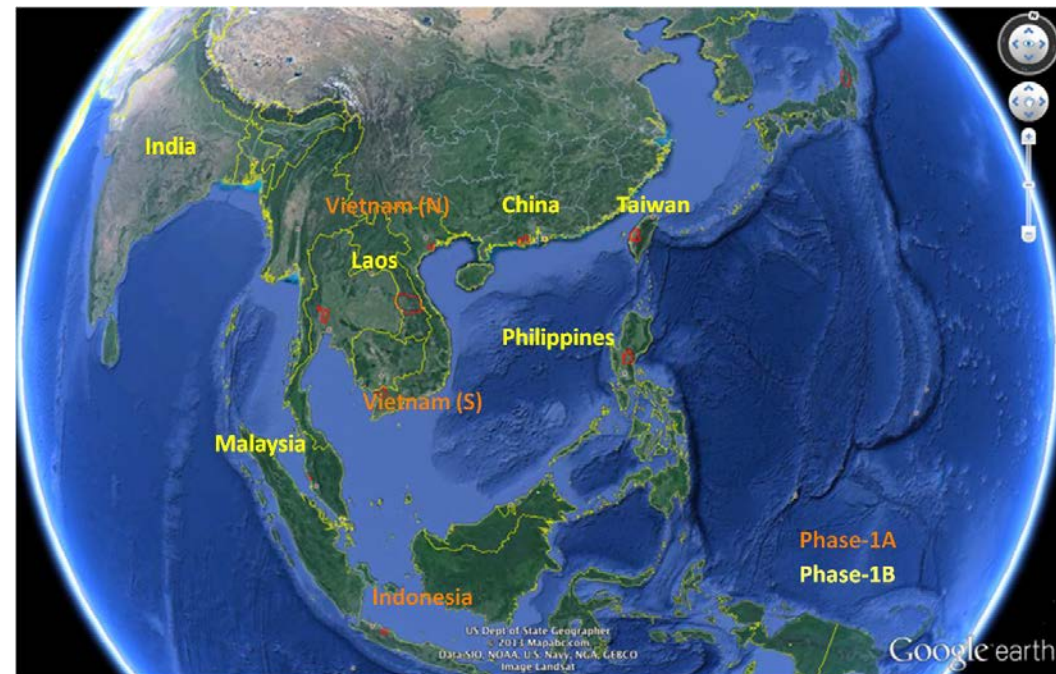
# Users of EO Data and Derived Information

Users of EO Data	Users of Derived Information
<ul style="list-style-type: none"> <li>• GEOGLAM Community of Practice</li> <li>• Crop Monitor participants (countries &amp; major early warning entities (e.g. FAO GIEWS, USAID FEWS NET, JRC MARS))</li> <li>• National Monitoring Agencies</li> </ul>	<ul style="list-style-type: none"> <li>• Agricultural Market Information System (AMIS)</li> <li>• Food policy and food aid agencies</li> <li>• National Ministries of Agriculture</li> <li>• Commodities marketeers</li> </ul>



# The Asia-Rice Initiative

- Among the 4 main crops in GEOGLAM, **rice** is the main crop in Asia,
- JAXA proposes and leads the Asian Rice Crop Estimation & Monitoring project (**Asia-RiCE**) for GEOGLAM.
- Asia-RiCE is a collaborative effort between a number of organizations





# Asia-RiCE Home Page – www.asia-rice.org

Asia-RiCE  
www.asia-rice.org/index.php




Home About Work Plan News/Events GEOGLAM Contacts Links



Rice is the staple food for more than half of humanity, with 80% of the world crop grown and consumed in Asia.

## About

Asia-RiCE is the work of an ad hoc team of stakeholders with an interest in the development of an Asian Rice Crop Estimation & Monitoring (Asia-RiCE) component for the GEO Global Agricultural Monitoring (GEOGLAM) initiative.

**Rice is the staple food for more than half of humanity - with 80% of the world crop grown and consumed in Asia.**

World population, and therefore demand for food, has increased linearly over the last fifty years (+80M/year), and is projected to keep growing until around 2050 up to 9 billion inhabitants (United Nations Department of Economic and Social Affairs, Population Division 2004). This conjuncture is prone to create tensions in food markets that could lead to world food price crises - as in 2008 when the price of rice more than doubled in only seven months. In this context of price instability and threatened food security, tools to monitor rice production in real-time are highly needed by governments, traders and decision makers.

Accurate information is needed on the spatial distribution of rice fields, water resource management, risk occurrence and annual production projections. However, most agricultural surveys rely mainly on statistics based on limited ground samplings at which data are extrapolated on a national scale. Although the census can provide statistical estimates, slow and unsystematic collection of data can limit the ability to make timely decisions.

Moreover, rice agriculture is strongly linked to environmental issues, from water management to climate change. For these reasons, long term inter-annual monitoring is also required in order to study the production and cultural impacts of these factors. Satellite remote sensing can support this long term monitoring requirement at regional and global scales.

## Objectives


Asia-RiCE describes a work plan for the definition and development of the Asia-RiCE component for GEOGLAM. The objectives are:

- To ensure that Asian countries receive the full potential benefits of GEOGLAM, and that they are suitably engaged and prepared to do so;
- To ensure that rice crop monitoring issues are given suitable priority and attention within the scope of the full GEOGLAM initiative, including in the development of the observing requirements; and
- To establish a framework for the coordination necessary to engage, manage and support the various stakeholders.

The regional activities suggested by the Asia-RiCE Work Plan will be consistent with and undertaken within the broader GEOGLAM Work Plan and there will be a number of interdependencies and interchanges between the two Plans.

Website provided by   GROUP ON EARTH OBSERVATIONS

Asia-RiCE  
www.asia-rice.org/about.php




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## About

This work has been undertaken by an ad hoc team of stakeholders with an interest in the development of an Asia-Rice Crop Estimation & Monitoring (Asia-RiCE) component for the GEO Global Agricultural Monitoring (GEOGLAM) initiative.


GEOGLAM aims to enhance agricultural production estimates through the use of Earth observations. It was developed in response to the G20 Agricultural Ministers' concern about reducing market volatility for the world's major crops. The initiative builds on recent advances in Earth observation technologies. These technologies have great potential to contribute to timely forecasts of crop production and early warnings of potentially significant harvest shortfalls.

## Importance of Rice Crop Monitoring


Rice is the staple food for more than half of humanity - with 90% of the world crop grown and consumed in Asia. Global rice production has increased continuously in the last half-century, since the Green Revolution. In the same period, the use of chemical inputs, the introduction of modern high-yielding varieties with short growing cycles, and the increased access to machinery and irrigation systems have led to a linear growth of the crop yields (+0.05ton/ha/year) as well as to an increase of the number of crops per year (Food and Agriculture Organization of the United Nations 2009).

This higher cropping intensity (from single to double or triple crop) together with the conversion of non arable land to arable land have resulted in a drastic increase of rice harvested areas in the 50s and 70s (+1.4Mha/year) which slowed down in the 80s and 90s (+0.46Mha/year) and has tended to stabilize over the last ten years as a result of approaching the limits of land use and of cropping intensity, however there is a large inter-annual variability due to climatic conditions and socio-economic factors. As both the increase in yield and in planted areas will be facing limitations in the next decades, it is unlikely that rice production can keep increasing at the same rate.

Meanwhile, world population, and therefore demand for food, has increased linearly over the last fifty years (+80M/year), and is projected to keep growing until around 2050 up to 9 billion inhabitants (United Nations Department of Economic and Social Affairs, Population Division 2004). This conjuncture is prone to create tensions in food markets that could lead to world food price crises - as in 2008 when the price of rice more than doubled in only seven months - and eventually to famines. In this context of price instability and threatened food security, tools to monitor rice production in real-time are highly needed by governments, traders and decision makers.



Top rice producing countries by MT, 2010 (Source: FAOSTAT).  
Click to enlarge.



Accurate information is needed on the spatial distribution of rice fields, water resource management, risk occurrence and

# Major Achievements

## 1. Rice crop area and growth monitoring

- Technical demonstration sites at one province (Chinese Taipei, India, Japan, Malaysia, Philippine, Thailand + Cambodia and Myanmar from 2016).
- Regional area (wall-to-wall): Vietnam and top 10 rice production provinces in Indonesia

## 2. Rice crop outlook using agro-met information

Derived from EO satellites such as GPM, GCOM-W, MODIS... in 5 countries (Indonesia, Phillipine, Thailand, Vietnam, Japan) from 2013 + Cambodia, Laos, Myanmar in cooperation with AFSIS

## 3. Capacity Building and training

- Rice crop monitoring training by JAXA with coordinating UN-ESCAP, Servir-Mekong, MRC
- GEORICE training in Thailand, Vietnam, Myanmar

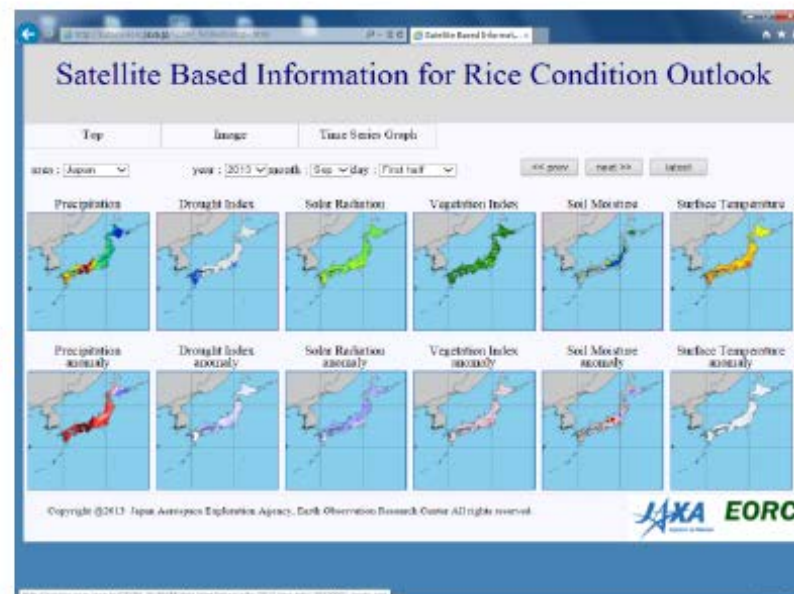
## - Monthly rice crop outlook / Agro-meteorological Information Products -



Provision agro-meteorological information derived from satellites with NDVI

Worked with ASEAN food security information system (AFSIS) to provide crop condition overview information and outlooks for FAO AMIS through GEOGLAM

- The JAXA/RESTEC teams developed the JASMIN (agro-met information provision system for outlook) tools

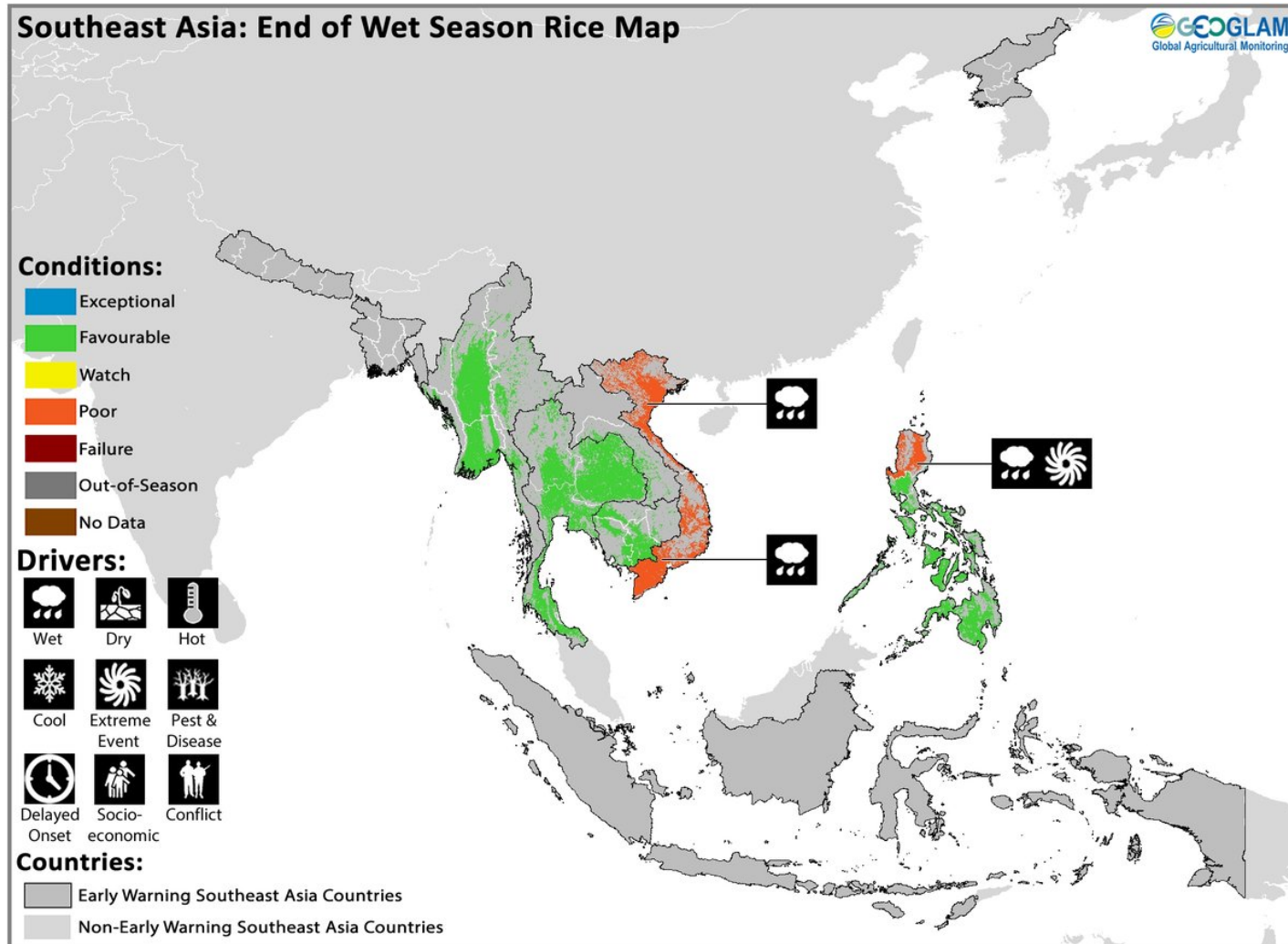




# **GEOGLAM @GEOCropMonitor**

## **December 2016**

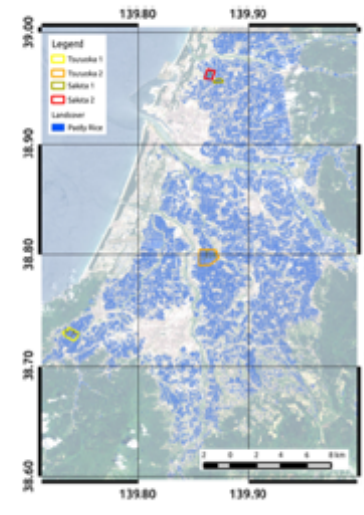
South East Asia rice conditions overall favourable at the end of season with poor conditions in Viet Nam and North Philippines



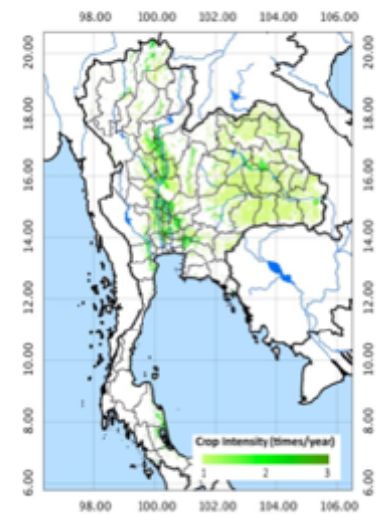
# Asia-RiCE Target Agricultural Products

ID	Product
P1	Rice Planting Area Estimates and Mapping
P2	Crop Calendars/Crop Growth Status
P3	Crop Damage Assessment
P4	Agro-meteorological Information Products
P5	Production Estimation and Forecasting

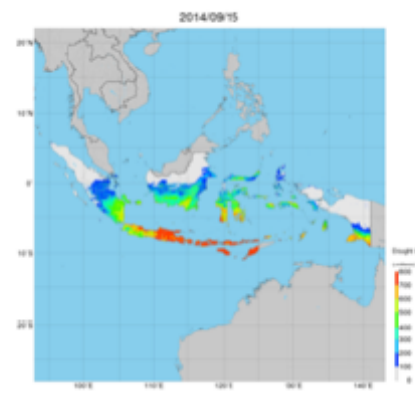
## Example of Products



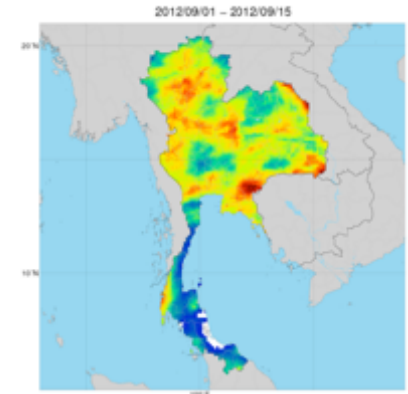
**P1: Planted Area**



**P2: Crop Calendar**



**P3: Drought Warning**

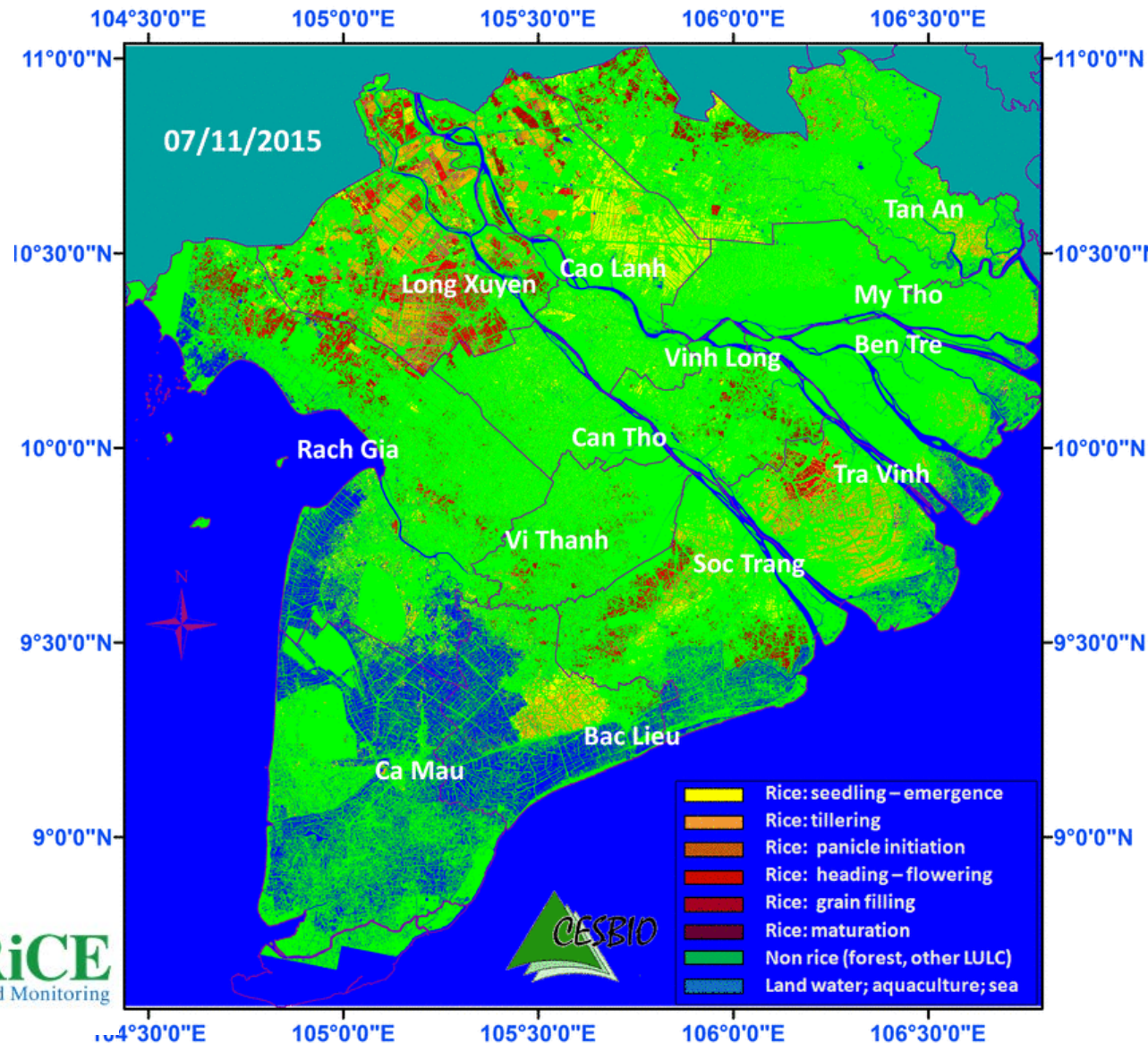


**P4: Precipitation**



# Rice monitoring, Mekong Delta, Vietnam

## Using Sentinel-1 data



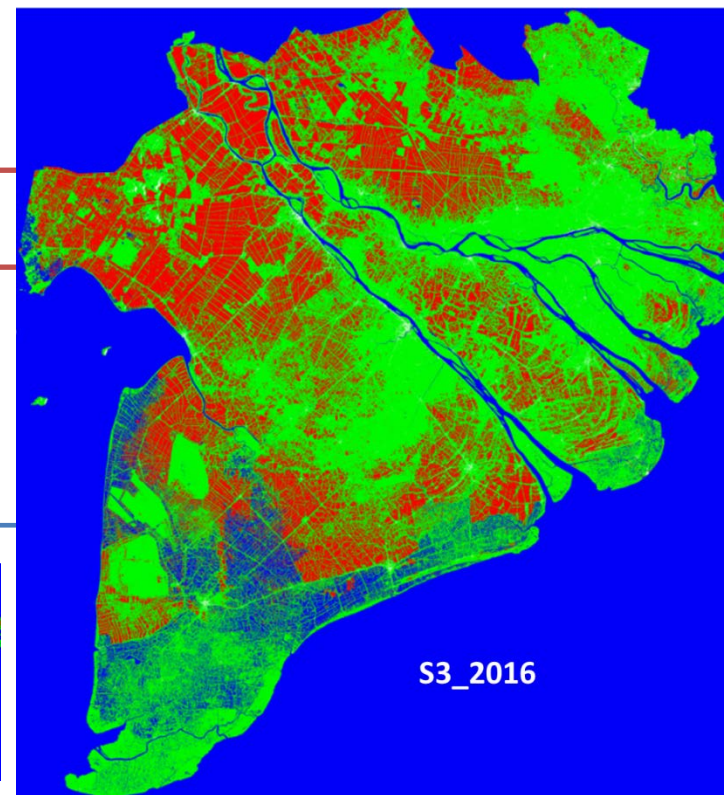
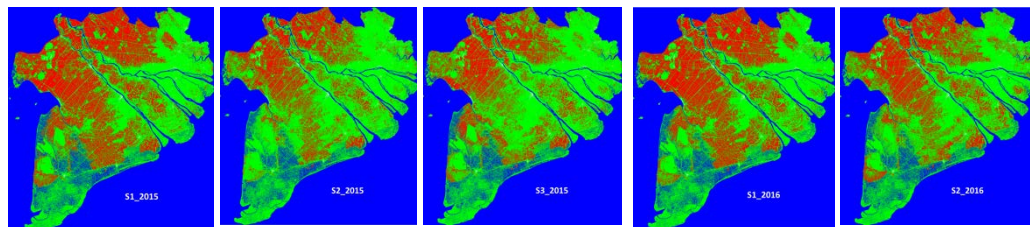
# Rice mapping per season, Mekong Delta, Vietnam

## Using Sentinel-1 data

30/12/2016

Seasons 1, 2, 3  
2015

Seasons 1, 2, 3  
2016



- Every 12 (6) days mapping
- Statistics per season
- Detection of changes (due to El Nino, 2015-2016)