

## Asia-RiCE CEOS Plenary Side Meeting – Brief Notes

4<sup>th</sup> November 2015

*Asia-RiCE Overview, Activities and Accomplishments (Shin-ichi Sobue, RESTEC)*

- Shin-ichi presented a brief overview of the activities and accomplishments of Asia-RiCE to date:

### Asia-RiCE Team Highlights Key Achievements

- **CEOS agencies' SAR and VHR data coordination**
  - Worked with CSA/MDA to organise the acquisition and provision of Radarsat-2 data to the TDS;
  - Worked with JAXA to organise the acquisition and provision ALOS/ALOS-2 ScanSAR data under K&C Phase 4 research to the TDS;
  - Arranged 42 TerraSAR-X datasets for the TDS free of charge thanks to DLR;
  - ISRO collected and delivered RISAT-1 data to the Phase 1A TDS;
  - Worked with ESA to organise the acquisition and provision of SPOT 5 under SPOT 5 take 5 to TDS in Vietnam and Japan
  - Worked with CNES to propose Venus observation
- **Established a Mekong Delta Sentinel-1A Reference Site, securing early ramp-up phase Sentinel-1A data for researchers and production of operational products for TDS (GEORICE);**
- JAXA/RESTEC teams developed the INAHOR (rice crop planted area estimation software) and JASMIN (agro-met information provision system for outlook) tools;
- **NASA/CEOS SEO developed and tested a cloud computing SAR processing (INAHOR) platform for Indonesia;**
- **Worked with ASEAN food security information system (AFSIS) to provide crop condition overview information and outlooks for FAO AMIS through GEOGLAM.**

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### Asia-RiCE Team Highlights 2015 Achievements

#### **CEOS Agency Data Acquisition and Provision**

1. C/L/X-band SAR data coordinated with CSA/MDA, ESA, ASI, DLR, ISRO and JAXA
2. HR optical data (ESA/CNES)

#### **Data Analysis and Information Production**

1. Time series SAR data from multiple sources has been used to estimate rice planted area, growing status, etc.
2. Provision of agro-meteorological information derived from satellites (NDVI-based)
3. Worked with the ASEAN Food Security Information System (AFSIS) to provide crop condition overview information and outlooks for FAO AMIS (via GEOGLAM)

#### **Research and Development**

1. The JAXA/RESTEC teams continued to develop the INAHOR (rice crop planted area estimation software) and JASMIN (agro-met information provision system for outlook) tools.
2. NASA/CEOS SEO has continued to test and improve the cloud computing SAR processing platform (using INAHOR) for Indonesia.

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- Shin-ichi noted the planned shift in focus from 'wall-to-wall' to key cropping area coverage for Indonesia. This has been driven by the difficulty of frequently covering the whole country due to its East-West extent (13 orbits are required).

This is not a problem for countries such as Thailand, where the cropping regions are covered by a smaller number of orbits.

- Shin-ichi noted that crop calendars are very difficult to discern for Indonesia, Thailand and Vietnam, as farmers generally have more planting flexibility due to favorable weather conditions. Therefore, to facilitate accurate crop assessments it is necessary to frequently derive crop calendars using satellite data. Shin-ichi confirmed that crop masks are generally quite stable.
- Asia-RiCE has made significant advances in cloud computing in collaboration with NASA, and provides substantial inputs to AMIS in coordination with the ASEAN Food Security Information System (AFSIS).

#### *ASEAN Food Security Information System (Montol Jeamchareon, AFSIS)*

- Montol presented an overview of AFSIS, the collaboration with Asia-RiCE and the Rice Growing Outlook reports that are submitted to AMIS. See the slides on [www.asia-rice.org](http://www.asia-rice.org) for more information.
- Montol noted that the reports submitted are country-level, however it is possible to do provincial level assessments using the tools available.
- He added that further education on NDVI is required within national agricultural ministries, and that AFSIS wishes to perform more studies on relating NDVI and SAR backscatter.
- **Caiying Wei (NSMC-CMA) offered to share NDVI information with the Asia-RiCE/AFSIS team. Shin-ichi thanked Caiying and will follow-up after the meeting.**

#### *How Satellite Data Can Support Rice Crop Monitoring in Indonesia (Rizatus Shofiyati, Indonesian MoA)*

- Rizatus noted that rice accounts for approximately 54% of Indonesia's food production. In 2012, the Indonesian Minister of Agriculture made a call for the use of remote sensing data for crop monitoring, in an attempt to improve the accuracy and detail of estimates. In response, the Indonesian Ministry of Agriculture has adopted remote sensing for rice crop monitoring since 2014.
- Information derived from remote sensing supports crop insurance, crop planting decisions, nutrient management, paddy field mapping and yield estimations.
- Unfortunately, high cloud cover inhibits the use of optical data, and there has been a lack of medium and high resolution SAR data since 2012 (required due to the often small and fragmented field sizes). The many different varieties of rice grown in Indonesia also present a challenge due to their varied backscatter signatures. SAR data can be used to generate very good results and has the potential to be used operationally.
- The Indonesian Ministry of Agriculture is planning to use Sentinel-1A data, and Rizatus noted that the 24-day coverage is critical for rice crop monitoring.

## CEOS Data Requirements (Shin-ichi Sobue, RESTEC)

- Shin-ichi reviewed the 2016 (and beyond) plans and expectations of Asia-RiCE (see slides/below). He noted that identifying countries for Phase 2 is a challenge and depends upon their capacity.
- Rather than ‘wall-to-wall’ coverage, the top 10 rice producing provinces in Indonesia will be covered.
- Sentinel-1A observation gaps exist over the main crop areas of Thailand, and this will be discussed with ESA.
- Shin-ichi added that continuity of agro-met information is very important.

### 2016+ Plans and Expectations

- Continue working with Phase 1A/1B TDS to generate target products using SAR data from CEOS agencies including Radarsat-2, Sentinel-1, ALOS-2, CSK, TerraSAR-X, RISAT, etc. Continue working closely with CSA, DLR, ESA, JAXA, ISRO and other CEOS Agencies **to ensure continuity of data supply for the TDS;**
- Continue Sentinel-1 reference site work with GEORICE, VAST, ESA and JAXA to explore the possibility of further expansion to other SE Asian sites. Continue working with GEORICE to maximize the potential outcomes from the ESA DUE Innovator III program;
- **Initiate integrated usage of HR optical and SAR for phenology studies** (and others) using SPOT 5 Take 5, Venus, Landsat and Sentinel-2 data along with coarse resolution satellites such as MODIS and GCOM-C;
- **Continue to work with AFSIS and international donors to promote the practical use of rice crop area and production estimates for outlooks in Asia** (in cooperation with JECAM, AFSIS, ESCAP, MRC, APRSAF, SERVIR MEKONG, etc.); - JECAM SAR study
- **Define a standard field survey procedure;**
- **Jointly publish Asia-RiCE TDS results and hold Asia-RiCE meetings/workshops in conjunction with international conference such as ACRS.**



### CEOS Coordination – Data Acquisition Requests

#### 1. Dataset 1: SAR

- 1) Rainy season; May - Oct, 2016
- 2) Dry season Nov 2016 - April 2017

Temporal Resolution: 14-30 days (14 days is optimal but 24 - 30 days is still acceptable)

Spatial Resolution: 20-100m

Spectral: C & L band RADAR, dual polarization VV/VH or HH/HV

#### 2. Dataset 2: Optical and NDVI

- 1) Rainy season; May - Oct, 2016
- 2) Dry season Nov 2016 - April 2017

Temporal Resolution: 14 days (reasonably cloud free)

Spatial Resolution: 20-500m

Spectral: Optical (e.g. MODIS, GCOM-C, Landsat 8, Sentinel-2, SPOT-5)

#### 3. Dataset 3: Agromet info

- 1) Rainy season; May - Oct, 2016
- 2) Dry season Nov 2016 - April 2017

Temporal Resolution: Monthly

Spatial Resolution: 20-500m

Spectral: Microwave (GCOM-W, SMAP, SMOS, GPM, etc.) – precipitation, soil moisture, LST, PAR, NDVI

## CEOS Coordination – Target Areas

### 1. TDSs (provincial-level, 100km x 100km)

### 2. Wall-to-wall

Candidates: Thailand, Vietnam (Mekong + Red river (south and north main area) and Indonesia (top 10 rice producing provinces).

The Indonesian MOA will perform field surveys for the top 10 provinces.  
GEORICE and VAST will do field surveys in the Mekong Delta.  
GISTDA will be doing field surveys in the main rice crop provinces.

### 3. Current issues

Sentinel-1 observation has a gap in Thailand. However, observations are made every 24 days in the main crop area (central plains).

ALOS-2 observations are lacking for some TDS.

### *Discussion*

- Brian Killough (NASA) noted that even covering the top 10 rice production provinces in Indonesia would require a large number of satellite passes, and he asked whether there are other CEOS datasets targeted besides Sentinel-1A. Shin-ichi confirmed that Radarsat-2 and ALOS-2 are also key missions for Indonesia.
- Shin-ichi noted that data management/processing is an ongoing issue. The SDMS is a very useful tool for resolving these issues, however a more permanent hosting solution is required to ensure that it can be scaled and continued long-term.
- Shin-ichi thanked all CEOS agencies for their support to Asia-RiCE, especially CNES (SPOT 5, Venus), CSA/MDA (Radarsat-2), DLR (TerraSAR-X), ESA (Sentinel-1A), ISRO (RISAT-1), JAXA (ALOS/ALOS-2, JASMIN) and NASA (SEO/SDMS).