

RIICE

Remote sensing based Information and Insurance for Crops in emerging Economies (RIICE)

The Earth Observation component



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giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

IRRI International Rice Research Institute

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

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PHASE – I
2012 - 2015



PHASE – II
2015 - 2017



RIICE

Partners

NIAPP

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ĐẠI HỌC CẦN THƠ

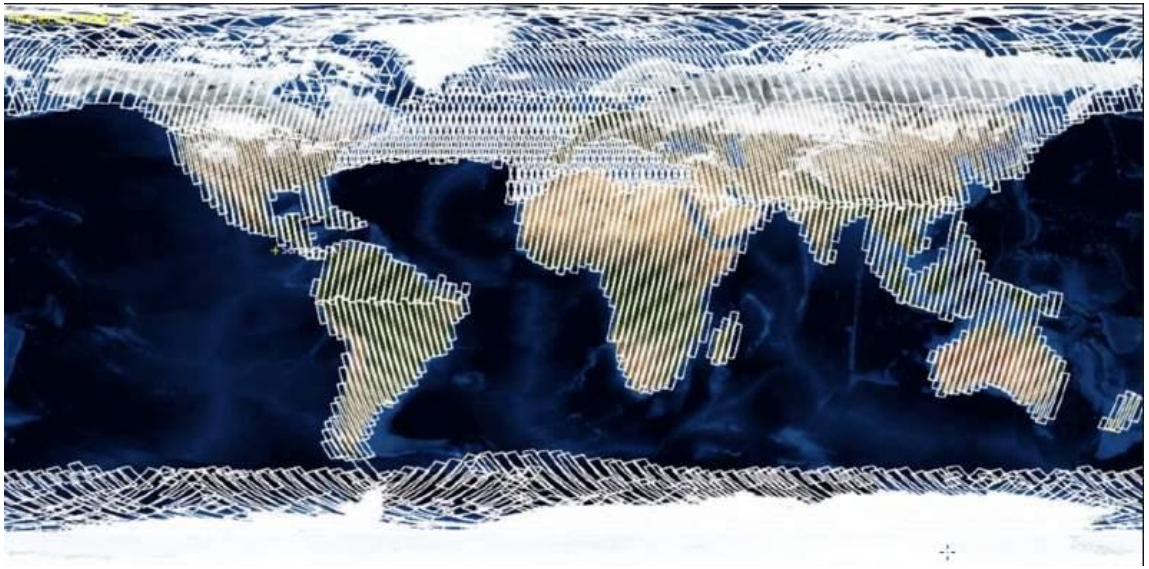
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Application of remote sensing for rice monitoring

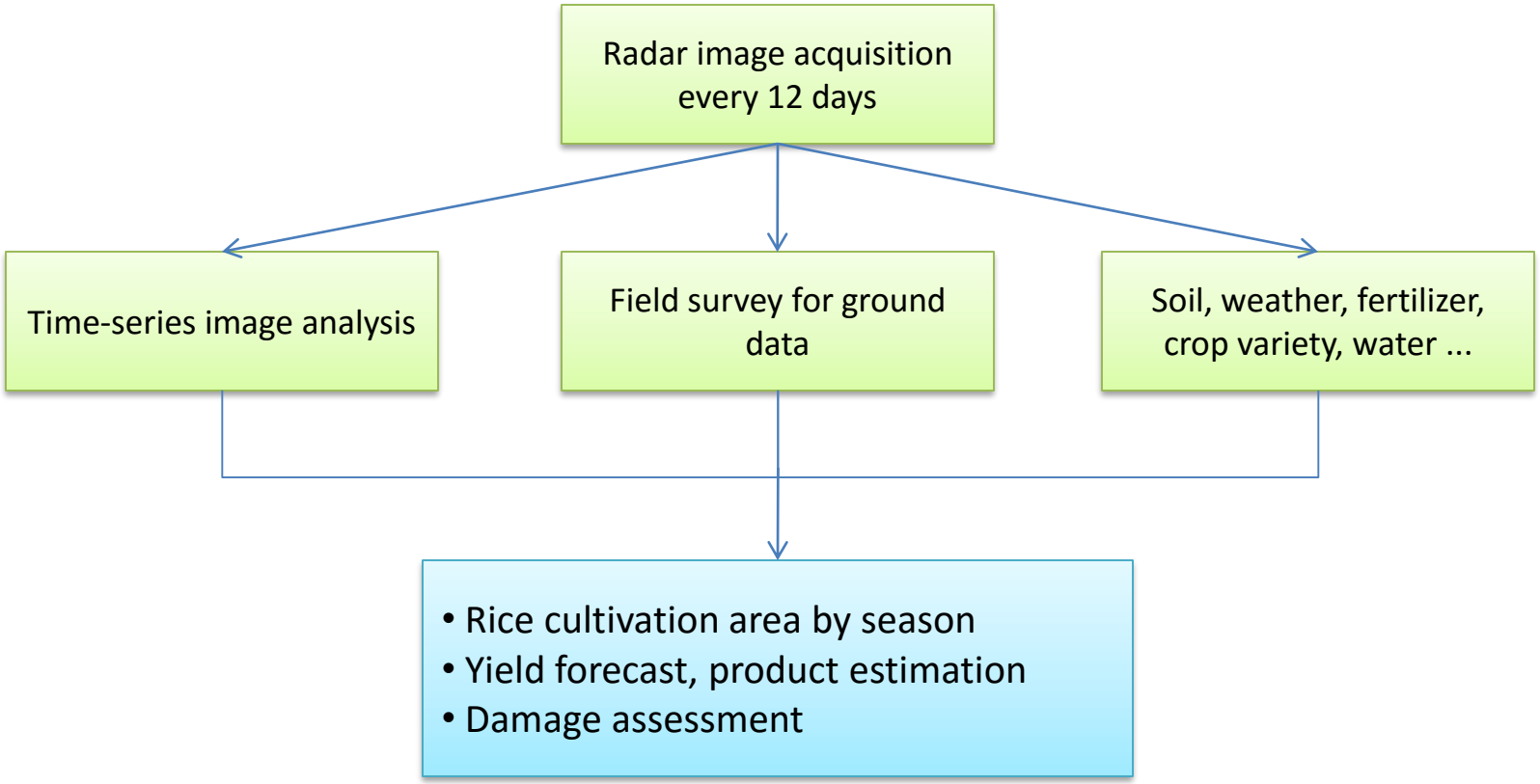


Sentinel-1 imagery

- Free data source
- 12-day acquisition
- Radar imagery
- Spatial resolution 20m
- Global coverage



Methology


Radar image acquisition every 12 days
Time-series image analysis
Field survey for ground data
Soil, weather, fertilizer, crop variety, water ...
• Rice cultivation area by season
• Yield forecast, product estimation
• Damage assessment

Crop calendar

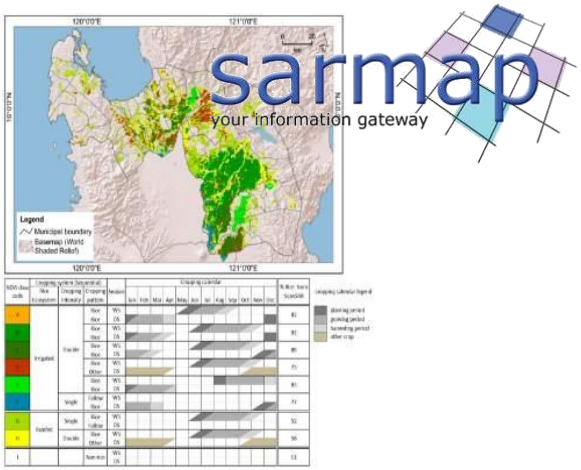
Mekong River Delta (MRD):

- Winter-spring: November - February.
- Summer-autumn: March - June.
- Autumn-Winter: July - October.

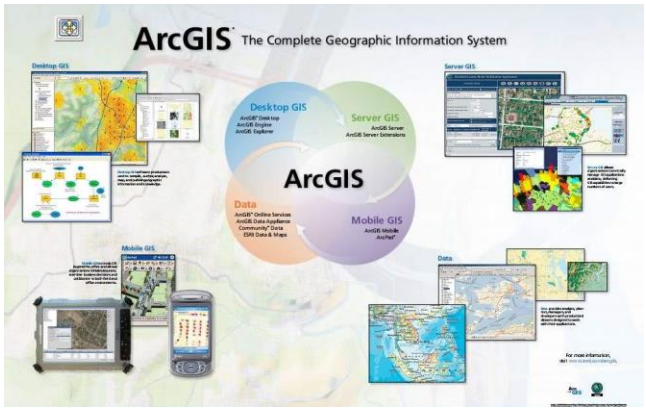
Red River Delta (RRD):

- Winter-spring: January - May.
- Summer-autumn: June - October.

Tools



Pocket LAI



GPS Status



Mobile mapping

Phase - I

- Location: Soc Trang and Nam Dinh.
- Time: mid. 2012 – mid. 2015.
- Accuracy: 90%
- Scale: district level.



RIICE

Rice yield forecast at district level, Summer season, Soc Trang and Nam Dinh, 2013 + 2014

Province	District	2013		2014	
		RIICE forecast (t/ha)	Statistical data*	RIICE forecast (t/ha)	Statistical data *
Soc Trang	Soc Trang City	5.94	5.73	5.63	5.50
Soc Trang	My Xuyen	5.93	5.98	5.74	5.70
Soc Trang	My Tu	6.07	5.40	5.74	5.52
Soc Trang	Chau Thanh	5.84	5.46	5.16	5.40
Soc Trang	Ke Sach	5.64	5.42	4.56	5.41
Soc Trang	Long Phu	5.90	5.73	5.15	5.50
Nam Dinh	Nam Dinh Town	4.83	3.15	4.96	3.54
Nam Dinh	My Loc	4.83	4.14	5.04	4.67
Nam Dinh	Vu Ban	4.81	4.66	5.00	5.20
Nam Dinh	Y Yen	4.80	4.49	4.99	5.17
Nam Dinh	Nghia Hung	4.87	4.57	4.98	5.32
Nam Dinh	Nam Truc	4.88	4.69	5.00	5.31
Nam Dinh	Truc Ninh	4.71	4.93	5.06	5.33

* Red-color data indicates measurements from rice-cutting in field, the rest (balck-color) are official statistical data.

Note: Summer season

Nam Dinh June – October

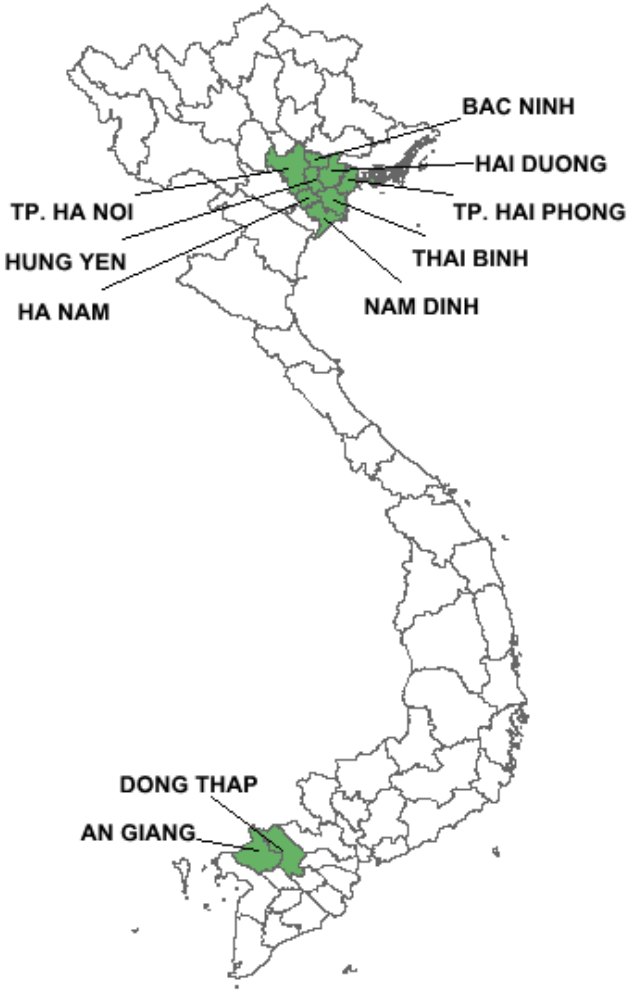
Soc Trang June – September/October

Yield forecast accuracy

		Summer 2013		Summer 2014
Soc Trang		90%		90%
Nam Dinh		83%		87%

Phase - II

- Mekong River Delta:
  - An Giang
  - Dong Thap
- Red River Delta:
  - Bac Ninh
  - Ha Noi
  - Ha Nam
  - Hung Yen
  - Nam Dinh
  - Hai Duong
  - Hai Phong
  - Thai Binh

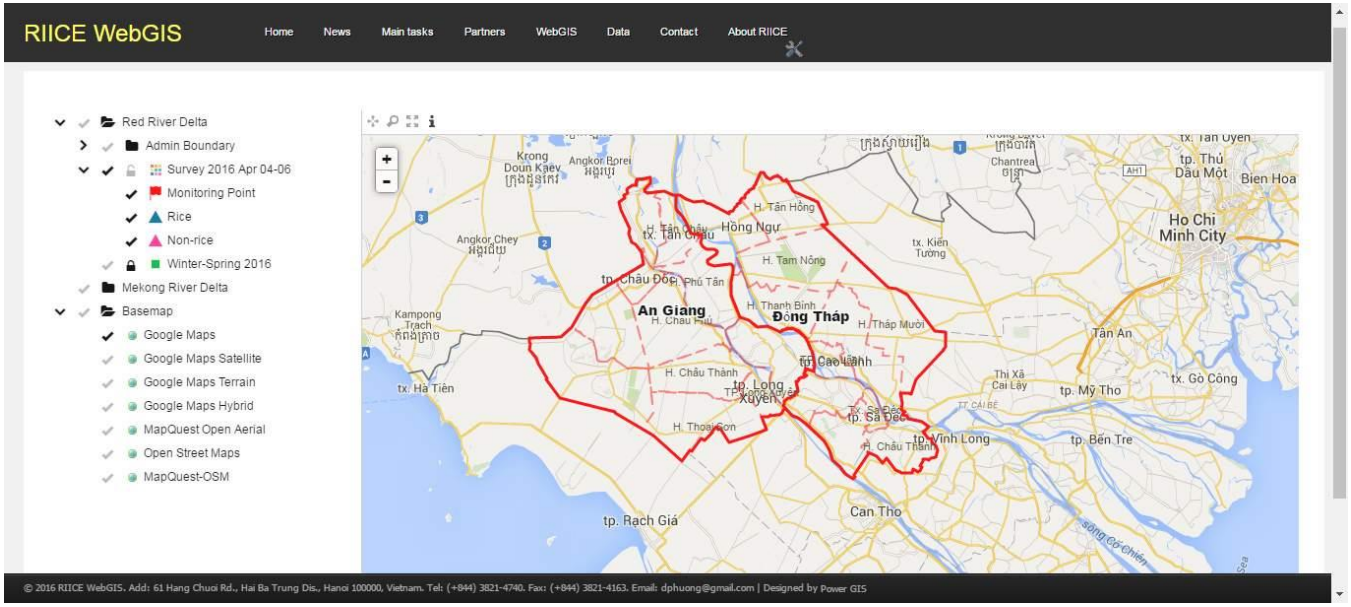


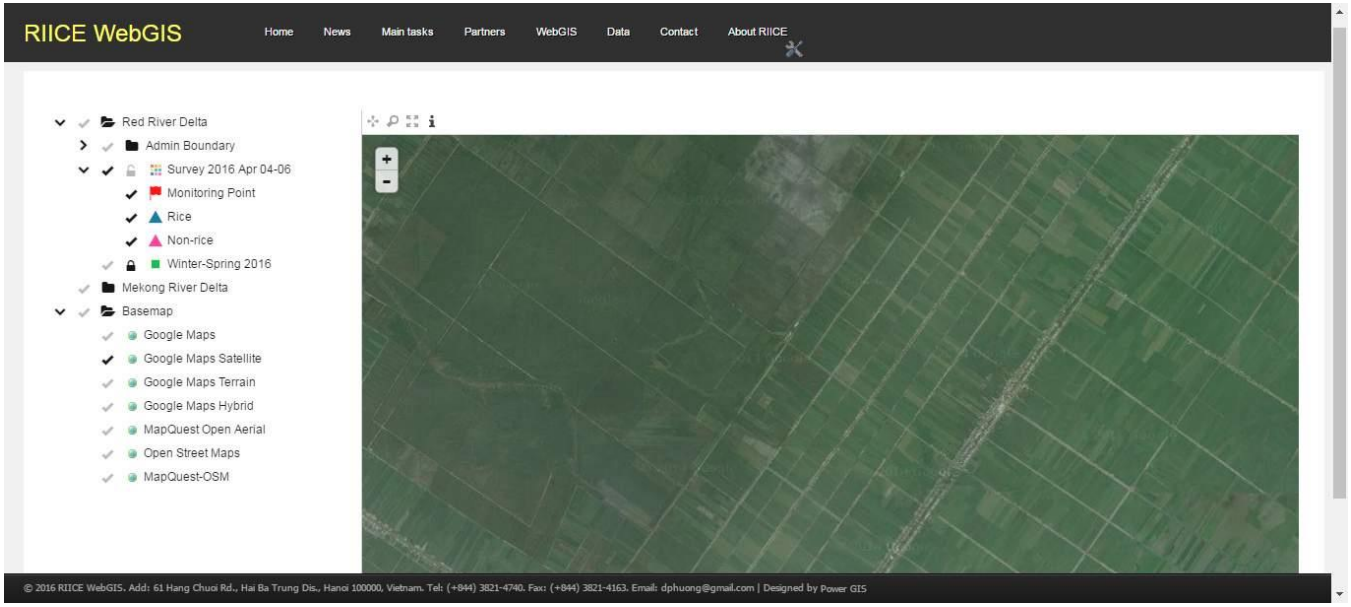
Phase - II

- Monitoring at commune level.
- Large area coverage (10 provinces).
- Daily-weather data collection.
- Monthly reports on rice production from each province.
- Cutting-edge technologies for surveying, monitoring, database management and mapping.
- Online WebGIS and project website.
- Connection with MARD, DARTs, Dep. of Plantation, Informatics & Statistics Center (MARD), General Statistics Office (GSO).

Major outputs:

1. Rice extent maps: every 12 days
2. Statistical data for rice cultivation area every 12 days.
3. Mid-season yield forecast.
4. End-season yield and product estimation.





Hi-res crop monitoring

Rice plantation area by dates

Tỉnh	Huyện	Xã	01-Oct-15	13-Oct-15
An Giang	Thoai Son D.	X. Binh Thanh	103	523
An Giang	Thoai Son D.	Tt. oc Eo	3	3
An Giang	Thoai Son D.	X. Vong Dong	-	104
An Giang	Thoai Son D.	X. Thoai Giang	1	1,026
An Giang	Thoai Son D.	Tt. Nui Sap	0	95
An Giang	Thoai Son D.	X. Vong The	62	2
An Giang	Thoai Son D.	X. Vinh Khanh	52	724
An Giang	Thoai Son D.	X. An Binh	155	95
An Giang	Thoai Son D.	X. My Phu Dong	28	54
An Giang	Thoai Son D.	X. Phu Thuan	320	76
An Giang	Thoai Son D.	X. Dinh Thanh	621	722
An Giang	Thoai Son D.	X. Dinh My	83	1,901
An Giang	Thoai Son D.	X. Vinh Chanh	392	515
An Giang	Thoai Son D.	X. Vinh Trach	23	295
An Giang	Thoai Son D.	Tt. Phu Hoa	27	23
An Giang	Thoai Son D.	X. Vinh Phu	77	638
An Giang	Thoai Son D.	X. Tay Phu	248	159

Note:

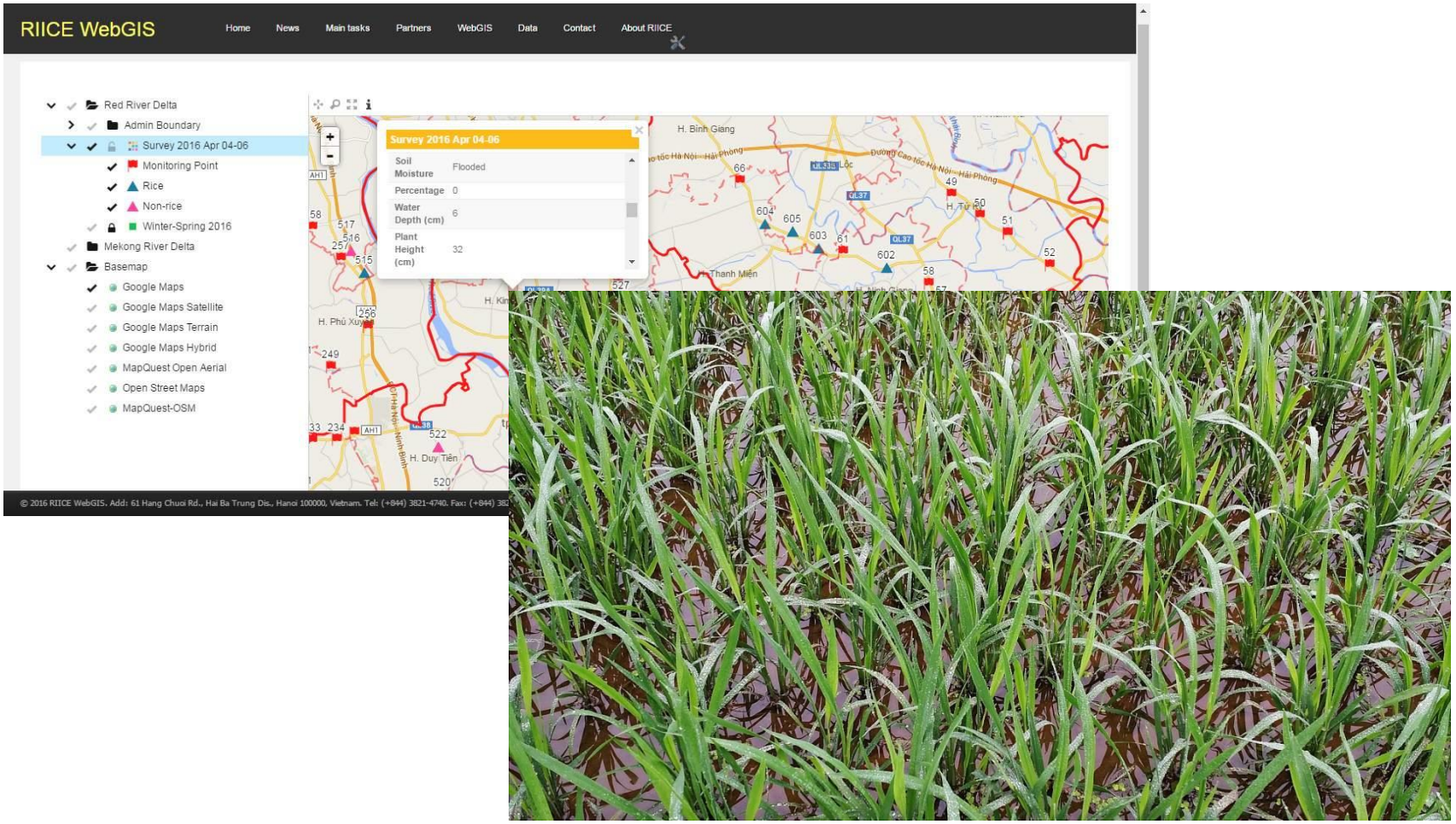
For instance An Binh commune, Thoai Son district (yellow-highlighted), 1 Oct 2015 observed 155 ha planted; 13 Oct 2015 with addition 95 ha.

Mid-season yield forecast and end-season product estimation

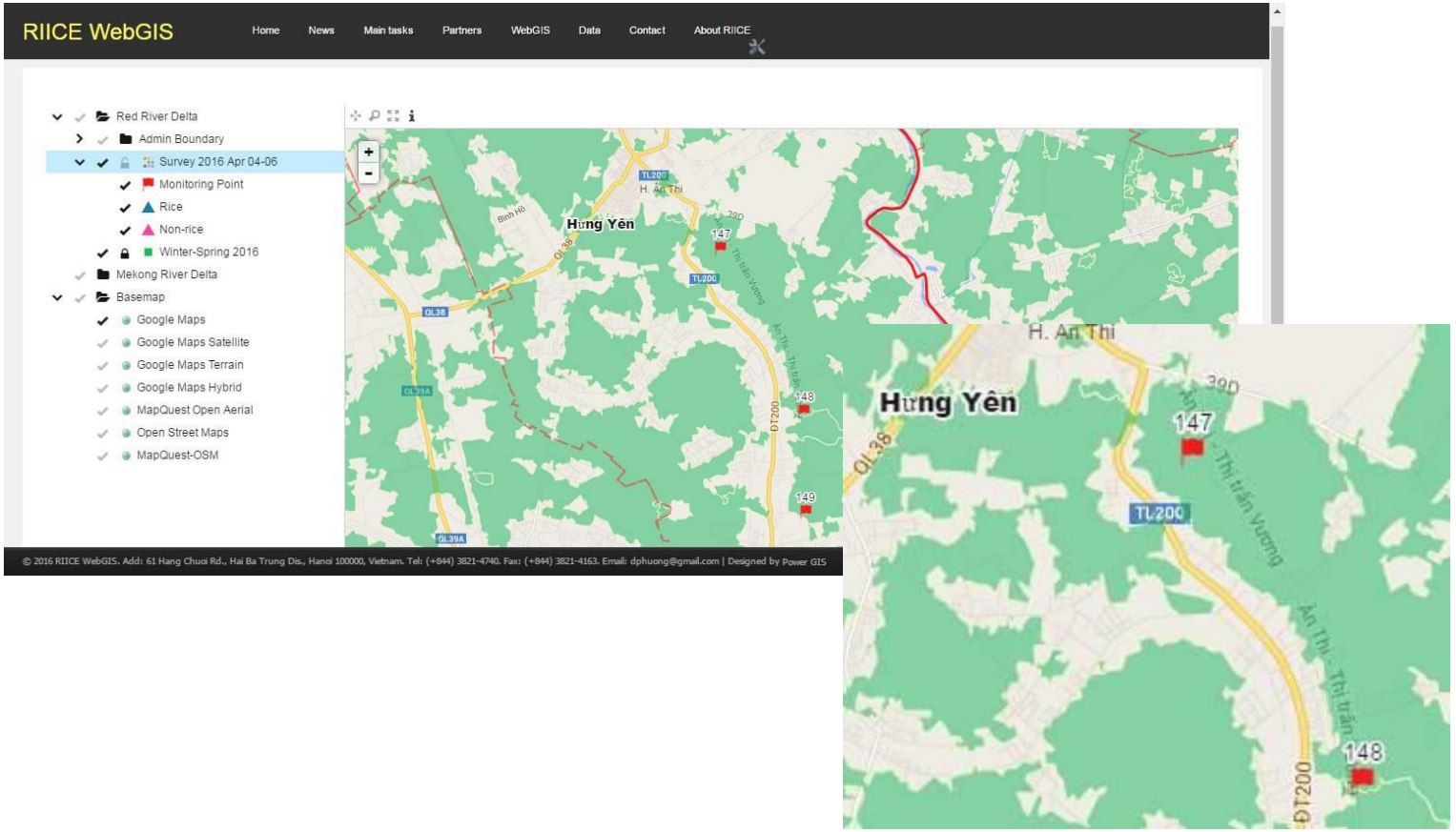
Tỉnh	Huyện	Xã	Dự báo giữa vụ t/ha	Ước lượng cuối vụ t/ha
An Giang	Thoai Son D.	X. Binh Thanh	8.03	7.51
An Giang	Thoai Son D.	Tt. oc Eo	8.14	7.76
An Giang	Thoai Son D.	X. Vong Dong	8.09	7.92
An Giang	Thoai Son D.	X. Thoai Giang	7.85	7.60
An Giang	Thoai Son D.	Tt. Nui Sap	8.32	7.81
An Giang	Thoai Son D.	X. Vong The	8.21	7.65
An Giang	Thoai Son D.	X. Vinh Khanh	7.92	7.56
An Giang	Thoai Son D.	X. An Binh	8.01	7.51
An Giang	Thoai Son D.	X. My Phu Dong	8.16	7.75
An Giang	Thoai Son D.	X. Phu Thuan	7.22	7.68
An Giang	Thoai Son D.	X. Dinh Thanh	7.93	7.65
An Giang	Thoai Son D.	X. Dinh My	8.10	7.55
An Giang	Thoai Son D.	X. Vinh Chanh	7.66	7.54
An Giang	Thoai Son D.	X. Vinh Trach	8.20	7.73
An Giang	Thoai Son D.	Tt. Phu Hoa	8.13	7.49
An Giang	Thoai Son D.	X. Vinh Phu	7.89	7.49
An Giang	Thoai Son D.	X. Tay Phu	7.94	7.58

Note:
Mid-season yield forecast for An Binh commune 8,01 tons/ha; end-season yield estimation 7,51 tons/ha. Fact: up to 18 Apr 2016, official statistical data was not released.

Online database system



Rice extent by season



Early yield forecast

Region	Province	District	Commune	Yield forecast
Red River Delta	Nam Dinh	Nghia Hung D.	X. Nam Dien	6704.05
Red River Delta	Nam Dinh	Nghia Hung D.	Tt. Rang Dong	6120.46
Red River Delta	Nam Dinh	Nghia Hung D.	X. Nghia Phuc	6145.51
Red River Delta	Nam Dinh	Nghia Hung D.	X. Nghia Hai	6192.02
Red River Delta	Nam Dinh	Nghia Hung D.	X. Nghia Loi	6861.48
Red River Delta	Nam Dinh	Nghia Hung D.	X. Nghia Thang	6482.28
Red River Delta	Nam Dinh	Nghia Hung D.	X. Nghia Thanh	6557.16
Red River Delta	Nam Dinh	Nghia Hung D.	X. Nghia Lam	6543.64
Red River Delta	Nam Dinh	Nghia Hung D.	X. Nghia Hung	6891.37

Yield forecast was made by 15/4/2016.

Potential of remote sensing:

- Rice monitoring in large scale, timely outputs.
- Rice extent mapping by season from satellite imagery.
- Rice extent area summary by season/commune level.
- Yield forecast, product estimation by season.
- Damage assessment.