Philippine Rice information SysteM (PRiSM) Operation

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Introduction

PRiSM is a rice monitoring system in the Philippines using Earth Observation (EO) technologies coupled with Crop Growth Simulation Models (CGSM), and Information Technology (IT) to provide timely information on:
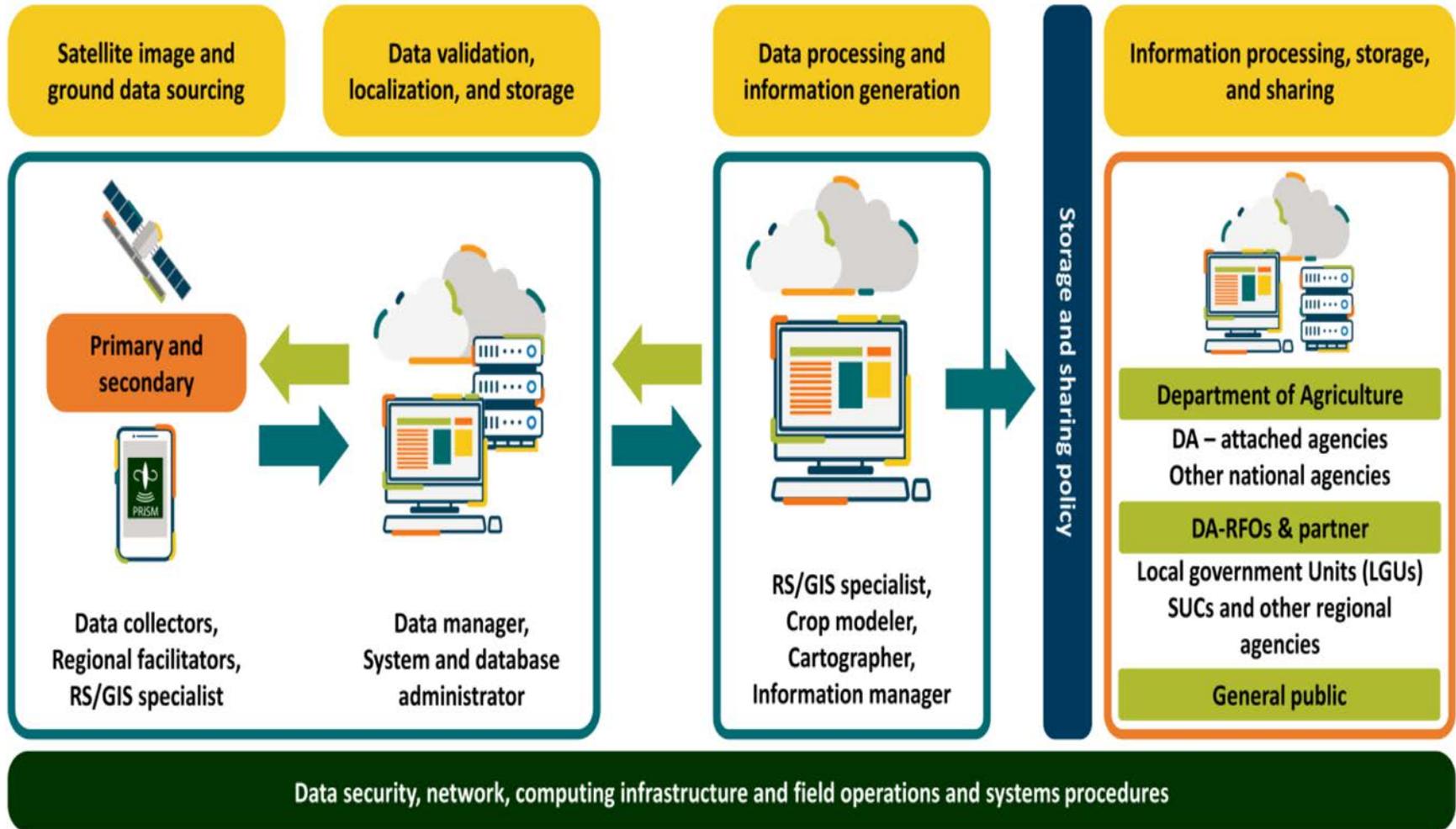
➢ Area planted,

➢ Yield estimates,

➢ Planting dates or Start of season, and

➢ Extent of area affected by flood or drought

PRiSM helps the Department of Agriculture in making informed decisions for action planning and policy formulation

PRiSM
Philippine Rice
Information System

Brief History of PRiSM

- ✓ Developed in 2013-2018 by IRRI and PhilRice with funding from the Department of Agriculture

- ✓ Institutionalized through the creation of PRiSM Unit at PhilRice (DA-AO No. 09, August 10, 2017)

- ✓ Created the PRiSM Management Team for operation (DA-AO No. 458, April 18, 2018

- ✓ Provided DA Regional Field Offices implementation guidelines for field operations (DA-SO No. 928, August 21, 2018)

- ✓ Started full nationwide operation in 2nd semester 2018

PRiSM
Philippine Rice
Information System

PRiSM Overall Operational Framework

Satellite image and ground data sourcing

Primary and secondary

Data collectors, Regional facilitators, RS/GIS specialist

Data validation, localization, and storage

Data manager, System and database administrator

Data processing and information generation

RS/GIS specialist, Crop modeler, Cartographer, Information manager

Storage and sharing policy

Information processing, storage, and sharing

Department of Agriculture
DA – attached agencies
Other national agencies

DA-RFOs & partner
Local government Units (LGUs) SUCs and other regional agencies

General public

Data security, network, computing infrastructure and field operations and systems procedures

PRiSM
Philippine Rice
Information System

- **Data sourcing** – satellite images are acquired, field data are gathered, and other secondary data are collected.

- **Data validation, localization and temporary storage** – data are validated and stored for processing to ensure the reliability for use by the system processes.

- **Processing and information generation** – rice area, seasonality and yield estimates are generated and validated. Extent of floods and droughts are assessed during weather extremes.

- **Information processing, storage, and sharing** – generated information are further processed for targeted clients then stored for historical purposes.

OPERATIONAL STRUCTURE

(Management)

PRiSM Operation Management Team
(DA- Special Order 458)

Chair: DA *Usec. Ariel T. Cayanan*

Co-Chair:
DA Dir. Andrew B. Villacorta
DA-BAR Dir. Nicomedes P. Eleazar
PhilRice Dir. Sailila Abdula

Vice-chair:
Engr. Christopher V. Morales

Members:
DA-National Rice Program
Engr. Ronald Gregory V. Roces
Mr. Edmund Sana

PHILRICE
Dr. Eduardo Jimmy P. Quilang
Mr. Jovino de Dios

DA-FPCMD
Mr. Vener L. Dilig

DA-DRRMC
Ms. Lorna Belinda L. Calda

DA Operations Center
Ms. Zaida A. Manglicmot

DA-ICTS Head

Technical Consultant
IRRI
Dr. Alice G. Laborte
Ms. Jenny Raviz

Secretariat

DA-BAR
Mr. Raymond Patrick Cabrera
Mr. Jay Bermas

PHILRICE
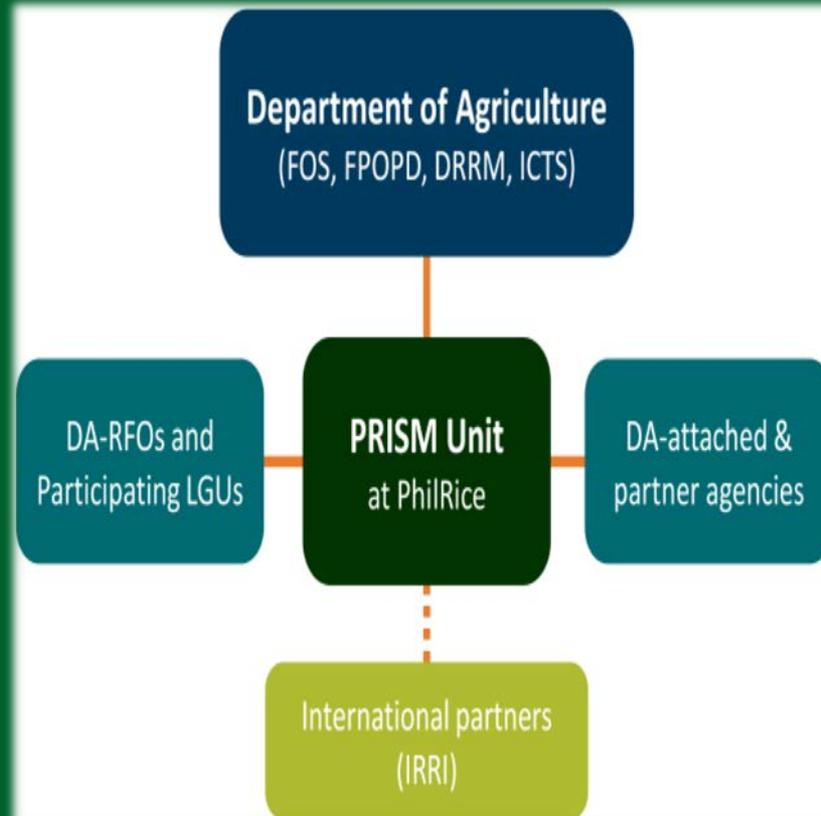*Eve Daphne Radam*
Darlynne Kaye Bumagat

DA-FPOPD
*Mr. Alvin G. Tallada*

PRiSM Operational Strategy
Multi-tiered level of operation

At the national level, the PRISM Unit at PhilRice receives policies, and general directions from the Management Team
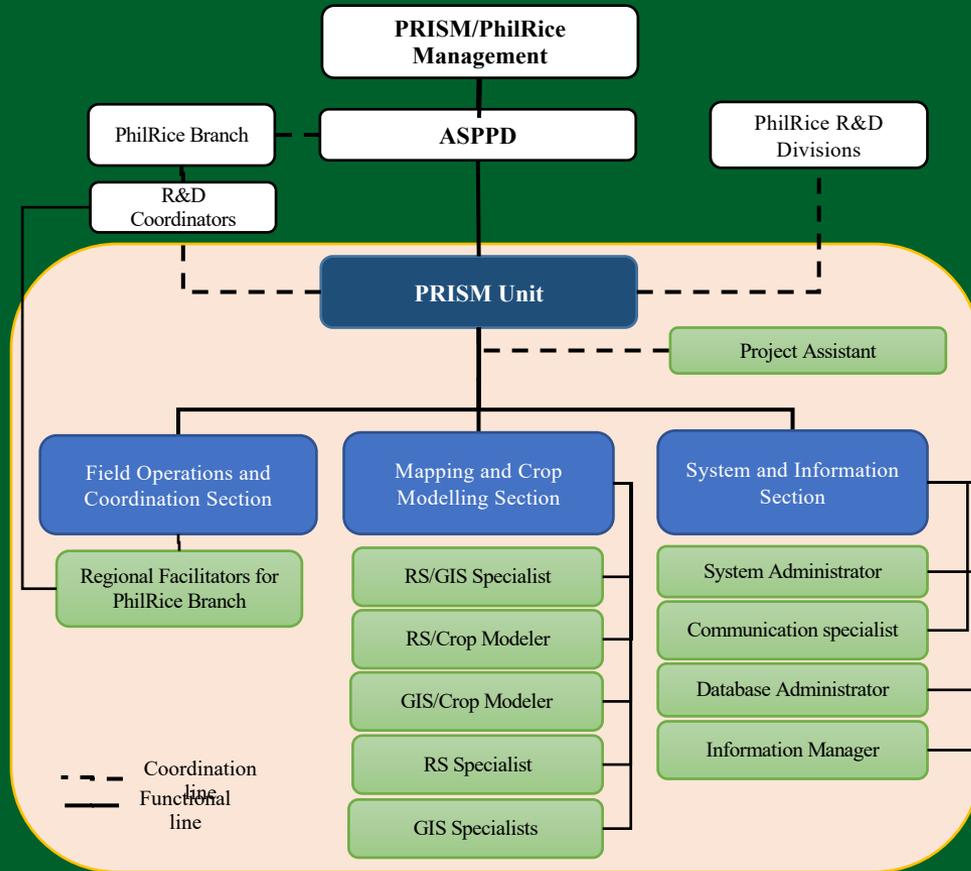

Department of Agriculture
(FOS, FPOPD, DRRM, ICTS)

DA-RFOs and Participating LGUs

PRISM Unit at PhilRice

DA-attached & partner agencies

International partners (IRRI)

PR*i*SM
Philippine Rice
Information System

Multi-tiered level of operation

At regional level, PRISM activities are led by the Department of Agriculture Regional Field Operation Office (DA-RFO) in coordination with the PRISM Unit at PhilRice.
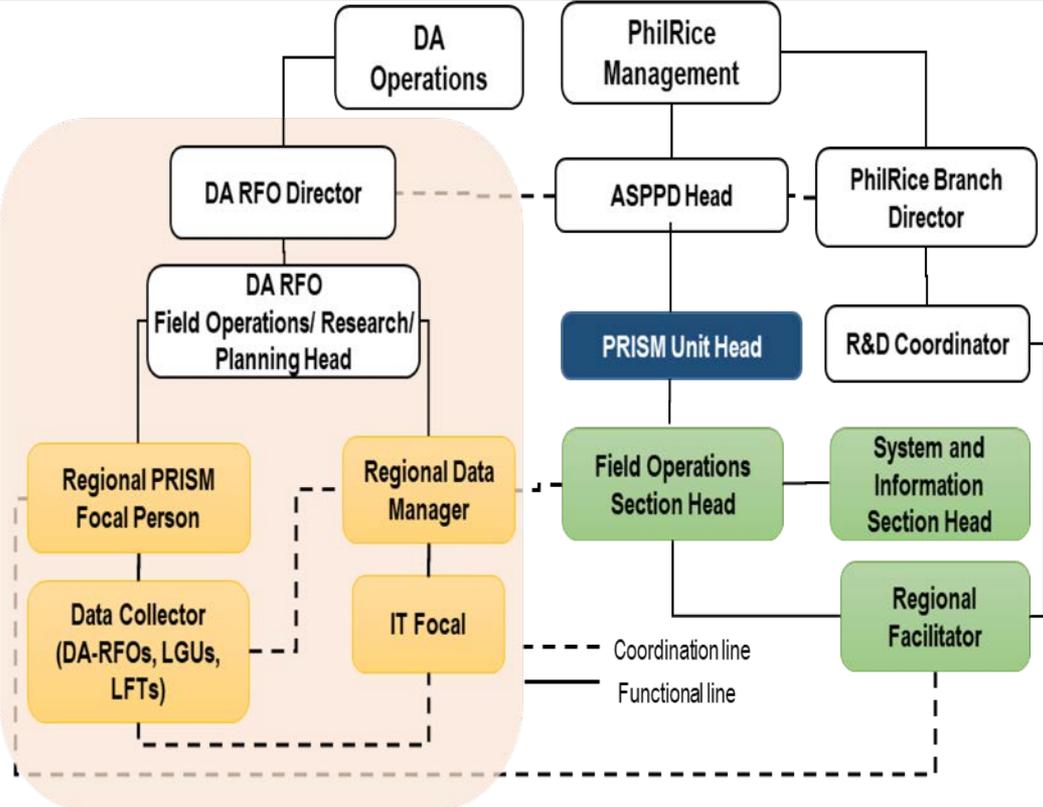
Multi-tiered level of operation

At Unit level, PRiSM performs its functions through the leaderships of PRiSM Unit head and section heads

1. *Rice area mapping*
2. *Yield estimation*
3. *Start of season*
4. *Flood and Drought extend evaluation*
5. *Continual improvement through R&D*

PRISM/PhilRice Management

PhilRice Branch

ASPPD

PhilRice R&D Divisions

R&D Coordinators

PRISM Unit

Project Assistant

Field Operations and Coordination Section

Mapping and Crop Modelling Section

System and Information Section

Regional Facilitators for PhilRice Branch

RS/GIS Specialist

RS/Crop Modeler

GIS/Crop Modeler

RS Specialist

GIS Specialists

System Administrator

Communication specialist

Database Administrator

Information Manager

- - - Coordination line
Functional line

PRiSM
Philippine Rice
Information System

PRiSM Strategies

Management Team

Gives Policy and General Direction

Unit management

- ➢ Delivers Information outputs
- ➢ Manage Field Operations
- ➢ Manage the System Infrastructure
- ➢ Manage Data and Information
- ➢ Capacitating the PRISM implementers and other stakeholders
- ➢ Doing System Improvement through research
- ➢ Coordinating and collaborating

AREA OF OPERATION
(All Philippine Regions)

PHILIPPINES

■ Rice

SAR imagery from Airbus Defence and Space and European Space Agency (ESA): Sentinel-1A and 1-B © Copernicus data were processed using MAPscape-RICE®. Background layer from Google Road. The boundaries are not authoritative and do not reflect any stance on the part of PRISM.

Region	PhilRice Branch	Collaborator
Ilocos	Batac	DA-RFO 1
CAR	Batac, Isabela	DA-RFO CAR
Cagayan Valley	Isabela	DA-RFO 2
Central Luzon	CES	DA-RFO 3
CALABARZON	Los Baños	DA-RFO 4A
MIMAROPA	Los Baños	DA-RFO 4B
Bicol	Bicol	DA-RFO 5
Western Visayas	Negros	DA-RFO 6
Central Visayas	Negros	DA-RFO 7
Eastern Visayas	Bicol	DA-RFO 8
Zamboanga	Midsayap	DA-RFO 9
Northern Mindanao	Agusan	DA-RFO 10
Davao	Agusan	DA-RFO 11
SOCCSKSARGEN	Midsayap	DA-RFO 12
CARAGA	Agusan	DA-RFO 13
ARMM	Midsayap	DA-RFO ARMM

# OUTPUT DELIVERY STRATEGY
(Product delivery schedule)

PRiSM Outputs	Observation Period		Submission to DA	
	1st Semester	2nd Semester	1st Semester	2nd Semester
Planted area and planting dates	Monthly	Monthly	10th of the month	
Planted area mid-season estimates	Sep 16-Jan 15	Mar 16- Jul 15	10th Feb	10th Aug
Rice yield, mid-season forecast	Sep 16-Jan 15	Mar 16- Jul 15	15th Feb	15th Aug
Rice area, end-season estimates	Sep 16-Mar 15	Mar 16- Sep 15	10th May	10th Nov
Rice yield, end-season estimates	Sep 16-Mar 15	Mar 16- Sep 15	20th May	20th Nov
Rice area at risk prior to flood or drought	Region/s affected		1-3 days after receipt of request or pronouncements	
Flooded or Drought area estimates	Region/s affected		within 10 days after receipt of request or pronouncements with updates every new image acquisition until condition exists	

Types of Output Information
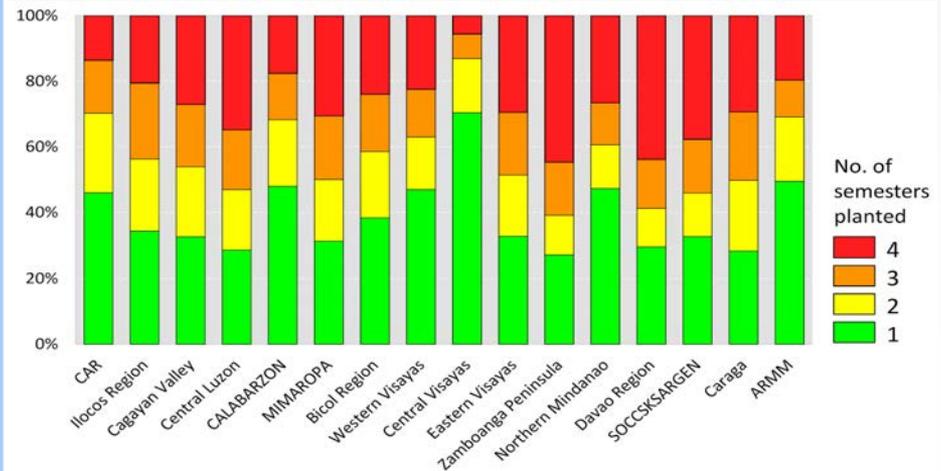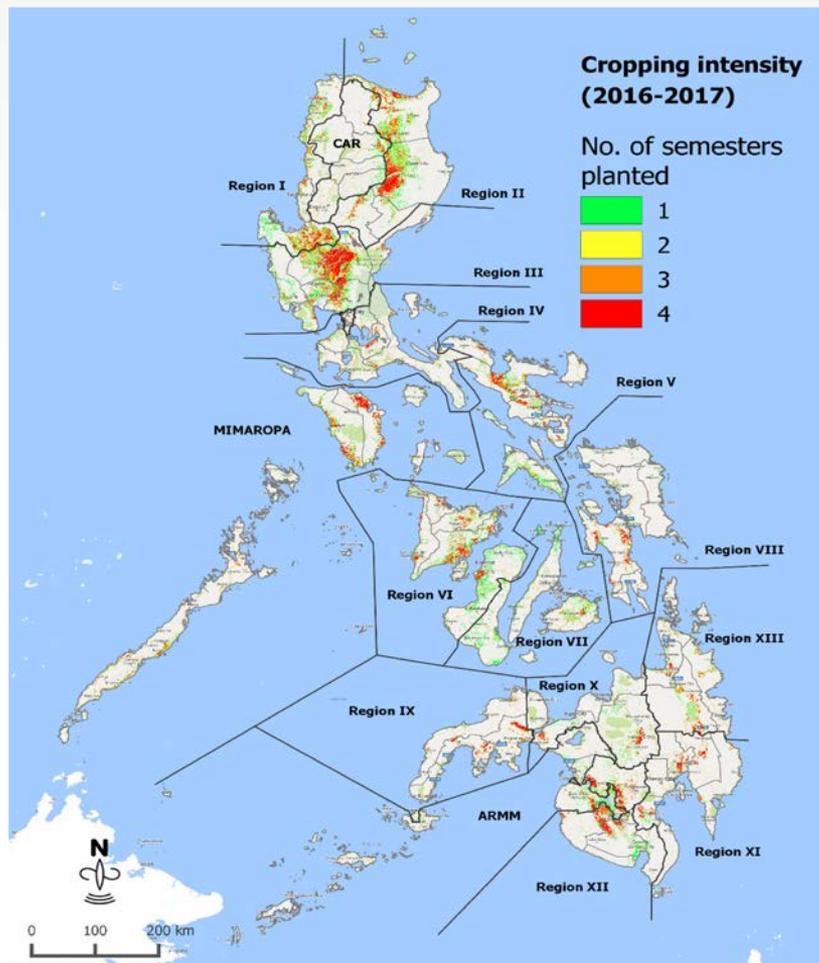# (Start of season or planting date maps)
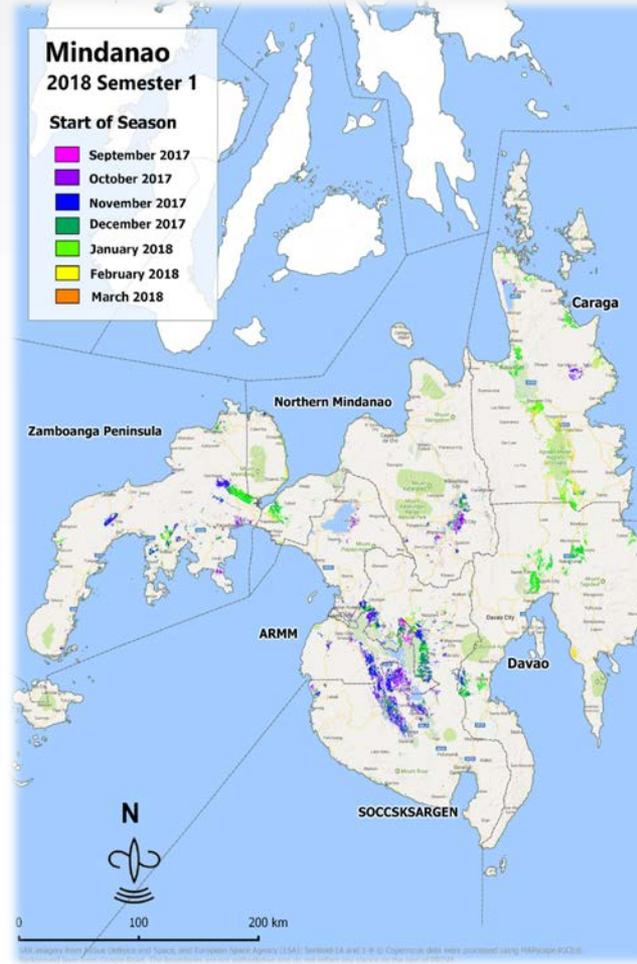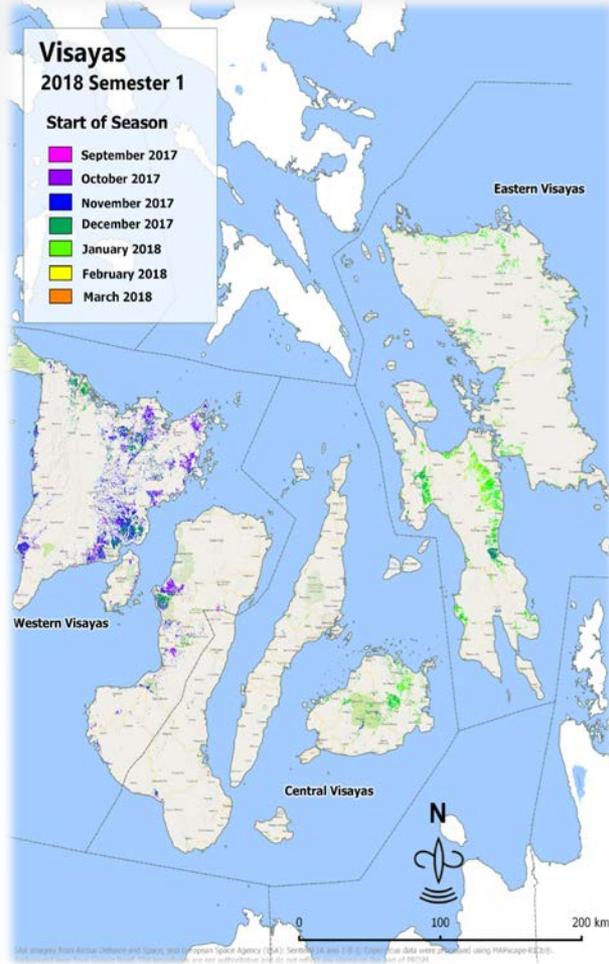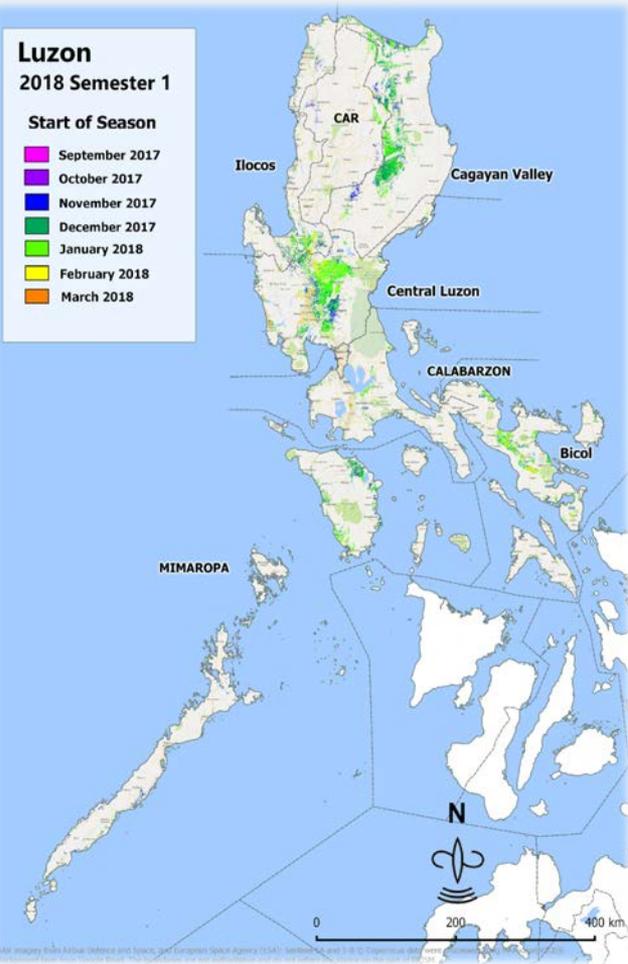
Types of Output Information
(Planting window map)
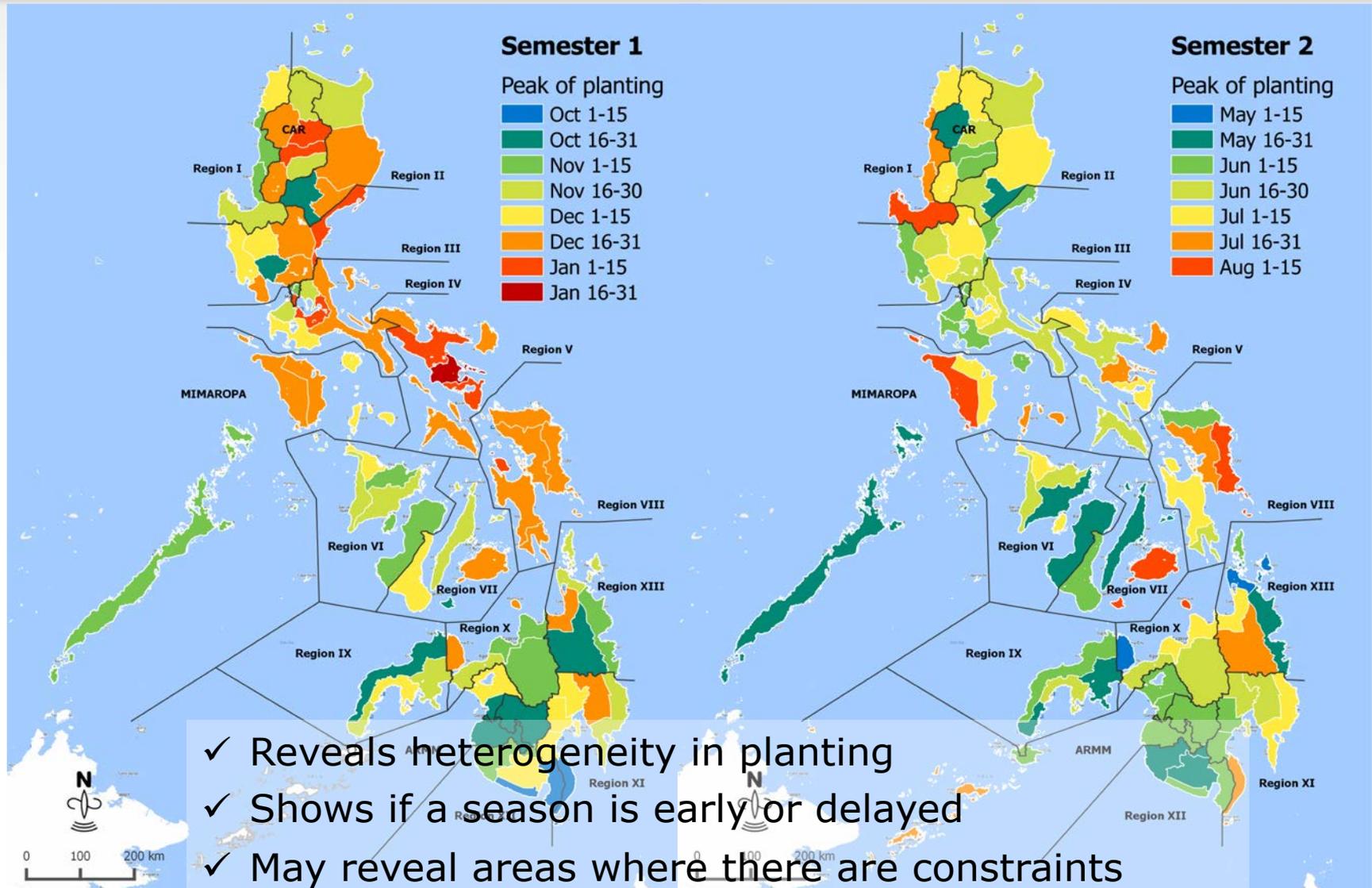
- ✓ Reveals heterogeneity in planting
- ✓ Shows if a season is early or delayed
- ✓ May reveal areas where there are constraints

Types of Output Information (Cropping Intensity map)

Cropping intensity (2016-2017)

No. of semesters planted
- 1
- 2
- 3
- 4

No. of semesters planted
- 4
- 3
- 2
- 1

✓ Cropping intensity is highest in irrigated areas

✓ Areas planted one to two times in two years were possibly rainfed areas

✓ Identified potential target areas for agricultural intensification (areas with low-cropping intensity)

(Preliminary area estimate and mid-season yield outlook reports)

Preliminary estimate of areas planted to rice in the Philippines for 2018 second semester

Based on the analyses of Synthetic Aperture Radar (SAR) images used for rice detection, the preliminary estimate of total area planted to rice in the Philippines as of July 30, 2018 was **1,081,027** ha (Figure 1 and Table 1). These estimates were based on analyses of 20 m resolution Sentinel-1A images from the Copernicus Programme developed and operated by the European Space Agency (ESA) (Table 2).

Rice areas under land preparation during the last SAR image acquisition are not yet mapped as rice. For areas affected by the South West Monsoon or "Hanging Habagat" like Central Luzon and MIMAROPA, the SAR images during and after flooding were not included in the rice area classification.

Philippine Rice Information System (PRISM) unit, operated in the Philippine Rice Research Institute, generated the rice area maps and estimates of rice area planted. PRISM is a collaborative project among the Department of Agriculture (DA), Philippine Rice Research Institute (PhilRice), International Rice Research Institute (IRRI), sarmap, Bureau of Plant Industry (BPI) and DA Regional Field Offices (DA-RFOs). The project is funded by the National Rice Program of the DA through the Bureau of Agricultural Research (BAR).

Highlights

1. Preliminary estimate of areas planted to rice in the Philippines for 2018 2nd semester (p.1-5)
2. Mid-season rice yield outlook for 2nd semester (p.6-8)

Mid-season rice yield outlook for 2nd Semester 2018

At national level, the average yield of rice is projected to be around 3.98 t/ha or about 1.02% higher than the previous year wet season (2nd Semester 2017) record of PSA (Table 3). Both Region II (Cagayan Valley) and Region III (Central Luzon) have an average yield of 4.72 t/ha, the highest among all regions. The ARMM have the lowest average yield of 2.80 t/ha or about 30% below the national average yield. The provincial yield ranges from 2.04 t/ha (Basilan) to 5.28 t/ha (Nueva Ecija).

The top 10 high-yielding provinces are Nueva Ecija (5.28 t/ha), Bukidnon (5.17 t/ha), Lanao del Norte (5.08 t/ha), Ilocos Norte (5.00 t/ha), Davao del Sur (4.83 t/ha), Isabela (4.77 t/ha), La Union (4.77 t/ha), Southern Leyte (4.75 t/ha), Bulacan (4/75 t/ha), and Nueva Vizcaya (4.75 t/ha). On the other hand, the top 10 low-yielding provinces are Basilan (2.04 t/ha), Surigao del Sur (2.39 t/ha), Dinagat Islands (2.49 t/ha), Camiguin (2.67 t/ha), Negros Oriental (2.73 t/ha), Lanao del Sur (2.78 t/ha), Maguindanao (2.90 t/ha), Apayao (2.94 t/ha), Guimaras (2.99 t/ha), and Northern Samar (3.00 t/ha).

In comparison to the 2nd Semester 2017 yield estimates of PSA, a significant increase in the average yield is expected in Benguet (49%), Abra (37%), Cavite (30%), Mt. Province (23%) and Batangas (21%) whereas, significant decrease in yields is expected in Basilan (-32%), Surigao del Sur (-25%), Camiguin (-13%), Apayao (-12%), and Davao Oriental (-11%). At regional level, increase in yields is expected for almost all regions except CARAGA (-4%), Zamboanga Peninsula (-3%), Northern Mindanao (-2%), and Davao Region (-2%).

The above yield projections are based on the prevailing crop canopy status in terms of leaf area index, general crop management practices observed from PRISM monitoring fields, current weather conditions, seasonal climate forecast, and yield caused by natural factors such as extreme weather events (floods and drought) and pest/diseases that might occur during the remainder of the season were not accounted in the current crop yield estimates.

Table 3. Average rice yield by province for 2nd Semester 2018.

Region / Province	Yield (t/ha)		Change (2018/2017)	
	PRISM 2018 2nd Semester	PSA 2017 2nd Semester	Level	%
PHILIPPINES	3.98			
CAR	3.62	3.94	0.04	1.02
Abra	3.66	3.35	0.27	8.06
Apayao	2.94	2.68	0.98	36.57
Benguet	4.19	3.33	-0.39	-11.75
Ifugao	3.21	2.80	1.39	49.48
Kalinga	4.66	3.51	-0.30	-8.67
Mountain Province	3.84	4.24	0.42	9.91
Ilocos	4.65	3.12	0.18	23.23
Ilocos Norte	5.00	4.47	0.03	4.03
Ilocos Sur	4.59	4.97	-0.15	0.60
La Union	4.77	4.74	-0.05	-3.16
Pangasinan	4.43	4.82	0.22	-1.04
Cagayan Valley	4.72	4.21	0.42	5.23
Cagayan	4.65	4.30	0.56	9.77
		4.09		13.69

PHILIPPINES
2018 Semester 2
Mid-season

Rice

map derived from Sentinel-1 imagery for second semester 2018. The rice area maps were

(Seasonal rice area map and tabulated estimates)

Figure 1. End of season rice area map derived from Sentinel-1 imagery for the first semester 2018. The rice area maps processed using MAPscape-RICE®.Source of SAR images: ESA: Sentinel-1 © Copernicus data (2018).
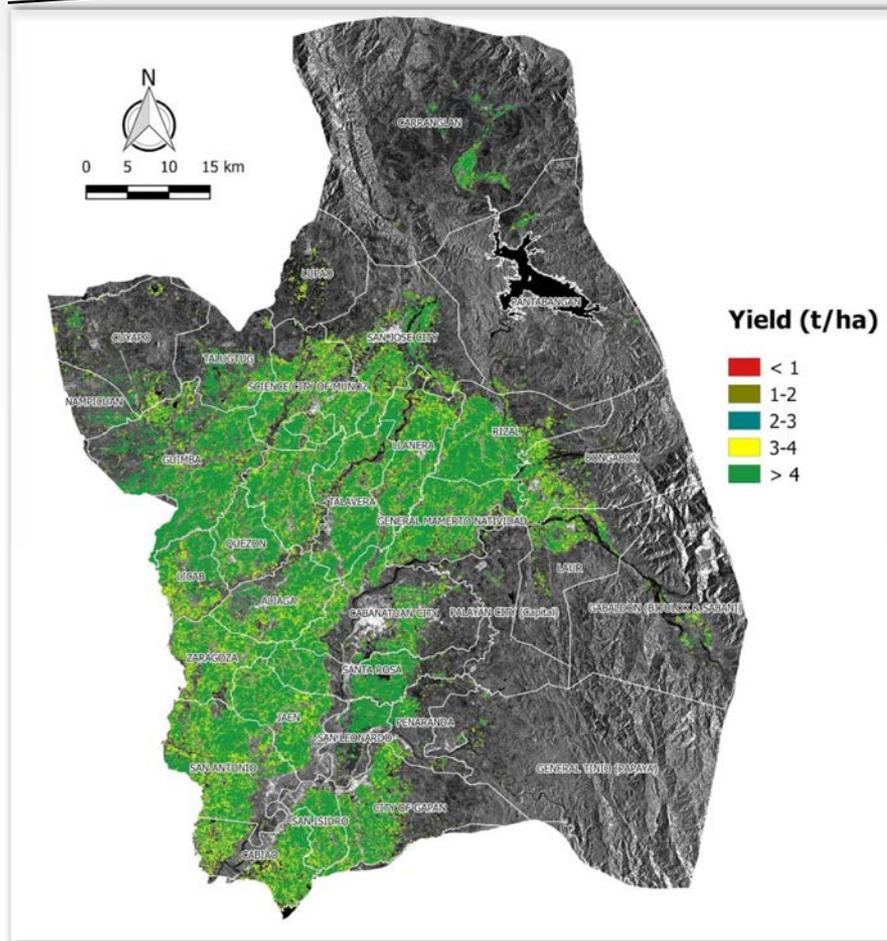
Table 1. Estimates of planted rice area (ha) in the Philippines, by province, first semester of 2018.

| Region/ Province	% covered by footprints	Date of last image acquisition	Rice area (ha)		
			PRISM estimate of rice area planted	PSA harvested area	
				2017 1st Semester	2018 1st Semester
PHILIPPINES	99.9		1,882,073	2,055,014	2,127,502
CAR	100	22-Mar-18	38,210	45,900	45,441
Abra	100		6,376	5,089	
Apayao	100		10,874	10,787	
Benguet	100		407	2,639	
Ifugao	100		6,619	7,035	
Kalinga	100		12,099	19,585	
Mountain Province	100		1,835	765	
Ilocos	100	25-Mar-18	109,464	103,230	101,121
Ilocos Norte	100		14,232	14,105	
Ilocos Sur	100		7,821	5,630	
La Union	100		8,564	7,885	
Pangasinan	100		78,847	75,610	
Cagayan Valley	99	29-Mar-18	319,227	314,375	312,683
Batanes	0			5	
Cagayan	100		138,643	126,662	
Isabela	100		154,175	145,430	
Nueva Vizcaya	100		18,305	31,131	
Quirino	100		8,104	11,147	
Central Luzon	100	22-Mar-18	358,805	322,734	326,889
Aurora	100		8,460	13,497	
Bataan	100		8,039	15,410	
Bulacan	100		23,631	38,922	
Nueva Ecija	100		171,772	136,561	
Pampanga	100		65,681	52,537	
Tarlac	100		63,722	55,018	
Zambales	100		17,500	10,789	
CALABARZON	100	27-Mar-18	38,068	56,589	59,623
Batangas	100		2,930	4,743	
Cavite	100		2,842	4,250	
Laguna	100		12,302	15,578	
Quezon	100		19,074	28,662	
Rizal	100		920	3,356	
MIMAROPA	97	27-Mar-18	131,449	118,806	125,797
Marinduque	100		1,400	2,849	
Occidental Mindoro	100		37,134	22,785	

(Yield estimate maps)

Simulated rice yield map of Nueva Ecija during the 1st Semester cropping season 2018

(Flooded area reports)

Track of tropical depression "Henry" as of 17 July 2018.
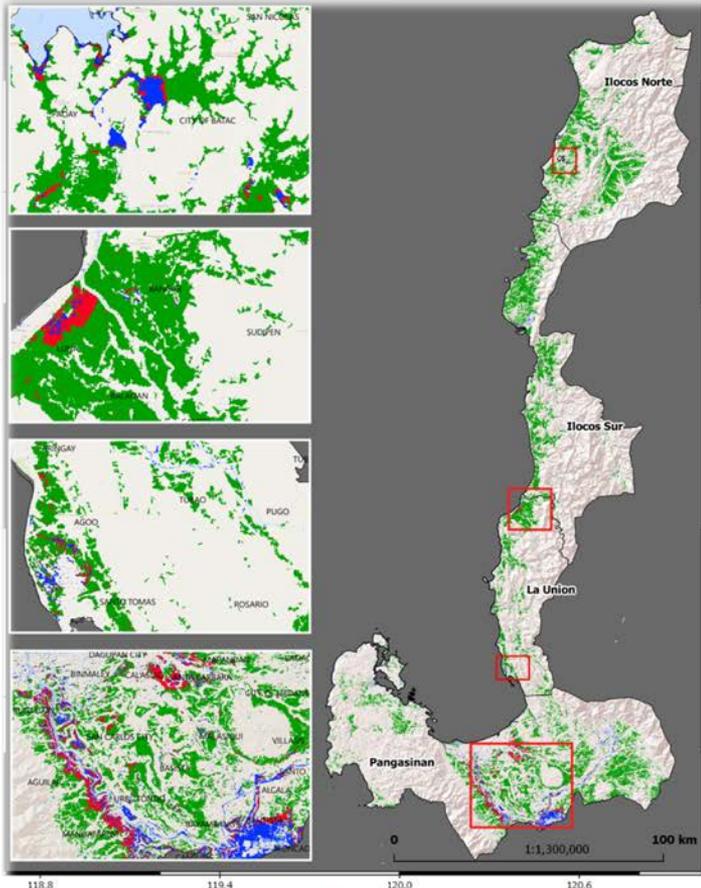Source: https://weatherph.org/tropical_cyclone/2018-11w-05-f/
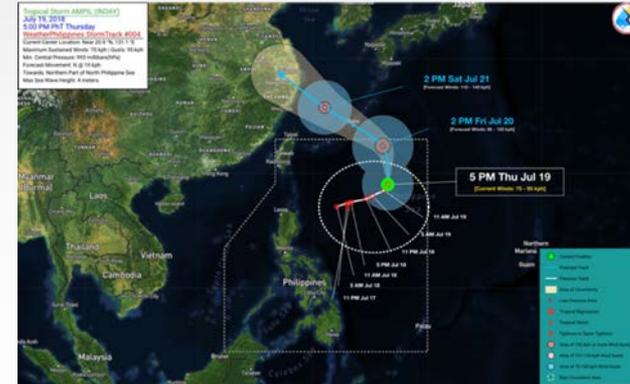
Track of Tropical Storm "Inday" as of 19 July 2018.
Source: https://weatherph.org/tropical_cyclone/2018-12w-04/

Estimates of flooded area, flooded rice area, and planted rice area as of July 8, 2018 in the 12 provinces in the country affected by tropical cyclones (Henry and Inday)

Province	Flooded area	Flooded rice area	Rice area planted
Pangasinan	2,838	286	37,461
Bataan	126	11	1,495
Bulacan	570	98	8,824
Nueva Ecija	**5,560**	**1,213**	**73,900**
Pampanga	1,161	314	19,187
Tarlac	2,306	622	31,882
Batangas	791	27	10,903
Laguna	856	64	12,988
Rizal	78	6	2,671
Occidental Mindoro	1,263	110	16,637
Aklan	916	240	3,200
Negros Occidental	1,110	110	19,335
ALL	**17,574**	**3,102**	**238,482**

(Flooded area maps)

2nd Semester, 2018
Region I - Ilocos

Legend:
- Flooded rice area
- Flooded non-rice area
- Non-flooded rice area
- Persistent water

Figure 8. Flooded rice areas in Region 1 are shown in red.
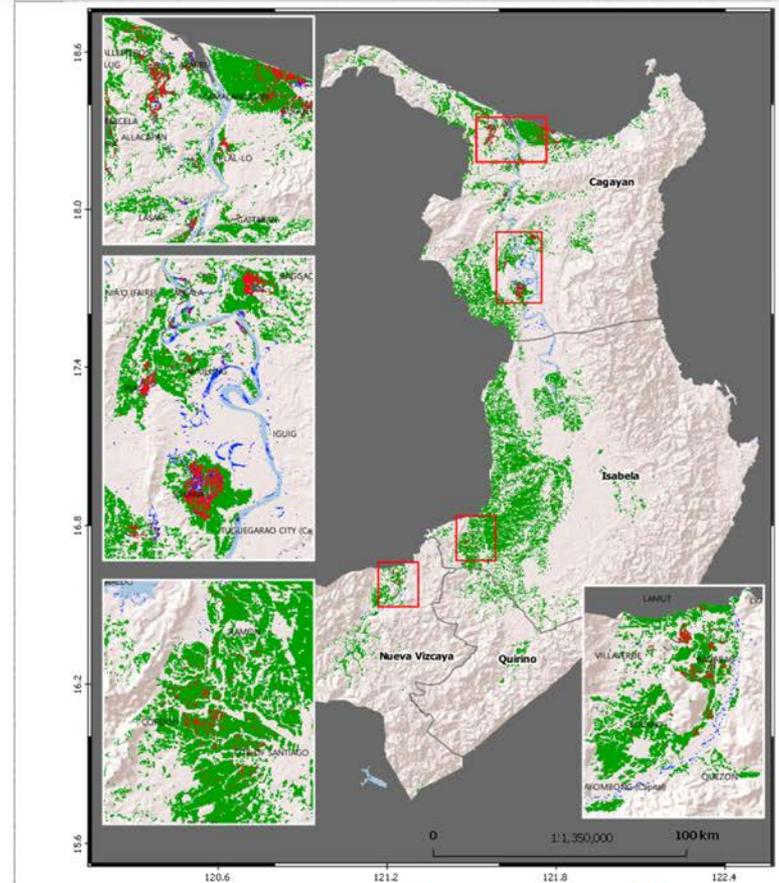
2nd Semester, 2018
Region II - Cagayan Valley

Legend:
- Flooded rice area
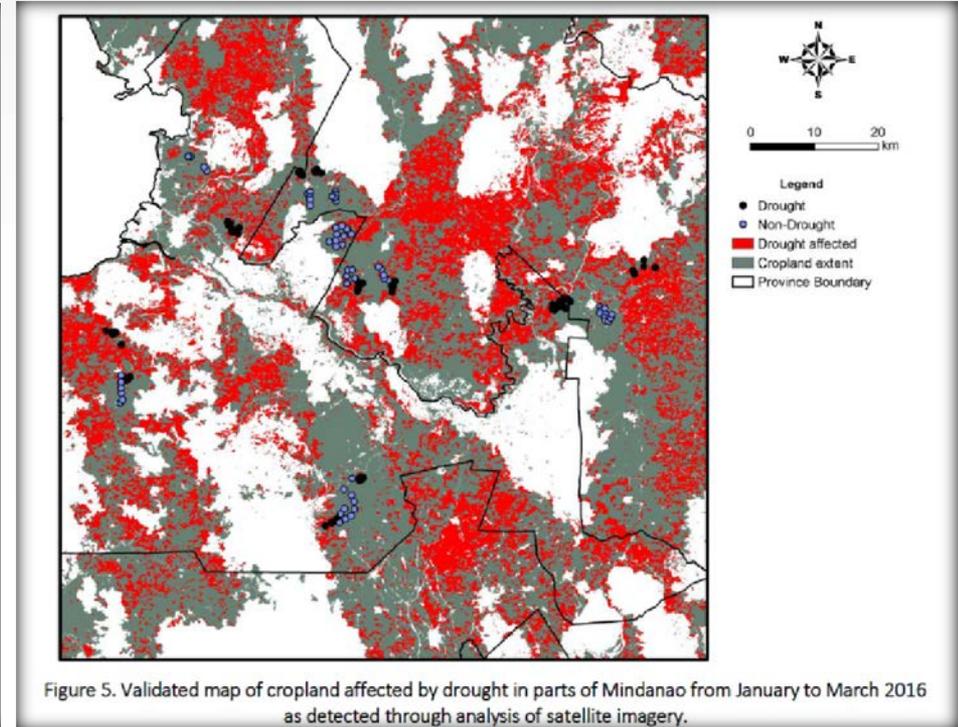- Flooded non-rice area
- Non-flooded rice area
- Persistent water

Figure 9. Flooded rice areas in Region 2 are shown in red.

(Drought-affected area maps and tables)

Estimate of drought affected areas based on analysis of satellite image

Region	Province	Cropland affected (%)	Rice area affected (%)	PRISM estimate rice area (ha)	Rice area affected by drought (ha)
Region IX	Zamboanga del Norte	3.01	9.67	10,124	979
Region IX	Zamboanga del Sur	6.81	8.17	33,305	2,722
Region IX	Zamboanga Sibugay	7.55	13.63	13,170	1,795
Region X	Bukidnon	11.63	11.54	36,096	4,165
Region X	Camiguin	0.00	0.00	194	-
Region X	Lanao del Norte	4.14	8.62	16,751	1,444
Region X	Misamis Occidental	2.77	4.77	4,690	224
Region X	Misamis Oriental	5.14	9.55	1,836	175
Region XI	Compostela Valley	2.23	3.09	11,300	349
Region XI	Davao del Norte	7.01	2.02	16,896	341
Region XI	Davao del Sur	7.09	11.69	13,647	1,596
Region XI	Davao Oriental	6.26	14.11	3,855	544
Region XII	North Cotabato	13.61	11.62	52,386	6,086
Region XII	Sarangani	11.36	29.92	4,554	1,362
Region XII	South Cotabato	17.82	32.07	29,346	9,411
Region XII	Sultan Kudarat	13.74	23.87	42,542	10,154
Region XIII	Agusan del Norte	0.82	0.77	11,242	87
Region XIII	Agusan del Sur	0.76	0.89	32,354	288
Region XIII	Dinagat Islands	0.00	0.00	475	-
Region XIII	Surigao del Norte	0.65	0.51	5,946	30
Region XIII	Surigao del Sur	1.19	0.90	10,824	98
ARMM	Basilan	16.64	0.00	461	-
ARMM	Lanao del Sur	4.22	7.10	8,314	590
ARMM	Maguindanao	17.42	15.51	41,769	6,478
All				402,078	48,918

Figure 5. Validated map of cropland affected by drought in parts of Mindanao from January to March 2016 as detected through analysis of satellite imagery.

The drought that occurred between February to March 2016 affected 12% (48, 698 ha) of the total rice areas (402, 078 ha) in Mindanao Philippines

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PRiSM
Philippine Rice Information System

REGULAR BULLETIN
Series of 2018
No. 7   July 26, 2018

PHILIPPINES
2018 Semester 1

☐ Rice

Estimate of areas planted to rice in the Philippines, 2018 first semester

Based on the analyses of Synthetic Aperture Radar (SAR) images used for rice detection, the estimate of total area planted to rice in the Philippines for the first semester of 2018 was **1,882,073** ha (Figure 1, Table 1). The area estimate at national level has an overall accuracy of **92.5%**. The accuracy was based on the **1,959** validation points collected from rice and non-rice areas across the country (Figure 2, Table 2).

For the 1ˢᵗ semester of 2018, the harvested rice area projected by PSA is generally higher for CALABARZON (36%), Bicol Region (31%), Western Visayas (24%), Central Visayas (28%), Eastern Visayas (36%), Northern Mindanao (29%) and ARMM (53%) when compared to PRISM's planted rice area. The correlation of rice area estimates from PRISM and PSA (Table 1) showed a strong linear relationship for the 1ˢᵗ semester of 2018 (r = 0.96) (Figure 3), results of paired t-test indicate statistically significant difference (t = 2.28, p value = 0.037) in the rice area estimates of Philippine Rice Information System (PRISM) unit, operated in the Philippine Rice Research the rice area maps and estimates of rice area planted. PRISM is a collaborative project of Agriculture (DA), Philippine Rice Research Institute (PhilRice), International Rice Research sarmap, Bureau of Plant Industry (BPI) and DA Regional Field Offices (DA-RFOs). The project National Rice Program of the DA through the Bureau of Agricultural Research (BAR). A total SAR images acquired from 16 September 2017 – 29 March 2018 (Figure 4,Table 3) were used and estimation of rice area planted. The SAR images have a spatial resolution of 20 m and days. A total of 1,000 monitoring fields distributed nationwide that were used to calibrate during rice area estimation.

End-of-season yield estimates for 1ˢᵗ Semester 2018

Estimated average yield of rice at country-level was around 4.18 t/ha or about 2.2% higher than the previous year dry season (1ˢᵗ Semester 2017) record of PSA. Provincial yields (Table 4) ranged from 2.15 t/ha (Eastern Samar) to 6.05 t/ha (Nueva Ecija). Highest-yielding region was Region III (Central Luzon) with an average yield of 5.30 t/ha or about 27% higher than the national average, whereas ARMM recorded the lowest average yield (2.67 t/ha). In comparison to the 1ˢᵗ Semester 2017 yield estimates of PSA (Figure 5), significant increase in average yields were recorded in Southern Leyte (45%) followed by Compostela Valley (25%), Dinagat Islands (21%), Davao del Sur (18%), and Palawan (14%). On the other hand, decrease in yields were recorded in the Mountain Province (-31%), Capiz (-22%), Rizal (-21%), Cavite (-19%), and Nueva Ecija (-12%). At regional level, significant increase in yields were recorded in Davao Region (16%), Eastern Visayas (9%) and CALABARZON (6%) whereas decrease in yields were recorded in CAR (-6%), Caraga (6%) and Central Luzon (5%). No significant yield increment or decline were observed in Bicol, Northern Mindanao, and ARMM.

The observed seasonal fluctuations in rice growth and yields can be attributed to several crop internal (e.g. genetic) and external/environmental (e.g. climatic, edaphic, biotic, physiographic, socio-economic) factors. For instance, farmer's adoption of new high-yielding technologies would contribute in increasing the average yields, whereas the unfavorable weather conditions, pest outbreaks, and agricultural mismanagement would likely cut yields in some areas. PRISM has limited capability to monitor the occurrences of all those phenomena at country-wide scale and therefore there were some instances that they might not considered during actual yield estimation. However, since PRISM is also monitoring actual canopy state condition of rice vegetation, some potential crop damage due to flood, drought, or pest infestation in terms of their direct or indirect effects on plant growth (e.g. leaf area index or LAI response) have been inferred from satellite imagery and assimilated into the crop model used by PRISM. Despite of the PRISM efforts to deliver timely and accurate rice yield data and information, regional and local partners are still highly encouraged to re-evaluate the validity of PRISM data and do reasonable adjustments if deemed necessary.

What's in...

1. Estima... in the ... semes...
2. End-of... 1st ...
3. Pr Region/ Province Ph...
4. Es...
5. Yf...

Table 1. Estimates of planted rice area (ha) in the Philippines, by province, first semester

Region/ Province	% covered by footprints	Date of last image acquisition	PRISM estimate of rice area planted
PHILIPPINES	99.9		1,882,073
CAR	100	22-Mar-18	38,210
Abra	100		6,376
Apayao	100		10,874
Benguet	100		407
Ifugao	100		6,619
Kalinga	100		12,099
Mountain Province	100		
Ilocos			
Ilocos Norte			
Ilocos Sur			
La Union			
Pangasinan			
Cagayan Valley			
Batanes			
Cagayan			
Isabela			
Nueva Vizcaya			
Quirino			
Central Luzon			
Aurora			
Bataan			
Bulacan			
Nueva Ecija			
Pampanga			
Tarlac			
Zambales			
CALABARZON			
Batangas			
Cavite			

Table 6. Top five (5) varieties planted in monitoring fields per...

Region	First		Second		Third		Fourth		Fifth		Change (2018/2017)	
	variety	use (%)	variety	use (%)	variety	use (%)	variety	use (%)	variety	use (%)	Level	%
CAR	NSIC Rc222	20.69	PHB 79	13.79	PHB 77	10.34	PSB Rc18	5.17	PHB 73	5.17	0.09	2.2
Ilocos	NSIC Rc222	31.43	NSIC Rc160	14.29	NSIC Rc300	11.43	Bigante plus	5.71	PSB Rc18	5.71	-0.29	-6.28
Cagayan Valley	NSIC Rc222	39.29	GSR 8	14.29	NSIC Rc480	10.71	SL 8	7.14	Bigante	3.57	0.01	0.16
Central Luzon	NSIC Rc222	25.37	NSIC Rc402	11.94	NSIC Rc216	10.45	PSB Rc10	8.96	NSIC Rc218	7.46	-0.34	-7.14
CALABARZON	NSIC Rc216	35.00	PSB Rc18	10.00	NSIC Rc222	10.00	NSIC Rc300	10.00	SL 8	10.00	0.01	0.37
MIMAROPA	Dinorado	10.34	NSIC Rc218	10.34	PSB Rc18	10.34	PHB 73	10.34	NSIC Rc300	8.62	0.41	10.96
Bicol	NSIC Rc222	25.97	NSIC Rc216	12.99	PSB Rc18	9.09	PHB 77	7.79	Bulaw	6.49	-0.34	-6.49
Western Visayas	NSIC Rc216	14.20	PSB Rc10	14.20	NSIC Rc222	11.24	NSIC Rc308	5.92	PSB Rc27	5.33	-1.02	-30.59
Central Visayas	Katago	25.45	PHB 79	12.73	PHB 77	9.09	NSIC Rc222	7.27	Bigante plus	5.45	0.11	2.31
Eastern Visayas	PSB Rc18	21.23	NSIC Rc222	19.81	NSIC Rc238	8.96	Bigante plus	7.55	NSIC Rc216	6.60	0.11	2.17
Zamboanga Peninsula	NSIC Rc222	25.00	Bigante plus	23.33	NSIC Rc160	16.67	NSIC Rc216	10.00	Bigante	3.33	0.08	1.55
Northern Mindanao	NSIC Rc216	42.86	TH82	42.86	Hybrid (others)	14.29	-		-		0.25	5.12
Davao	NSIC Rc160	50.00	NSIC Rc128	7.14	NSIC Rc216	7.14	NSIC Rc224	7.14	NSIC Rc286	7.14		
SOCCSKSARGEN	NSIC Rc160	39.66	NSIC Rc222	13.79	NSIC Rc226	10.34	NSIC Rc224	6.90	Bigante	3.45		
CARAGA	NSIC Rc160	23.33	NSIC Rc286	13.33	NSIC Rc300	13.33	PSB Rc82	10.00	NSIC Rc222	3.33		
ARMM	NSIC Rc160	40.74	NSIC Rc222	16.67	NSIC Rc226	5.56	NSIC Rc224	5.56	NSIC Rc238	5.56		
National	NSIC Rc222	16.57	NSIC Rc160	9.11	PSB Rc18	7.17	NSIC Rc216	7.07	Bigante plus	4.17		

Agreement (%)
91
88
97

Table 7. Percent use of different seed classes in monitoring fields per region for first semester 2018.

Region	Hybrid	Registered	Certified	Good	Foundation
CAR	44.83	5.17	46.55	3.45	0

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REGULAR BULLETIN
Series of 2018
No. 8 August 28, 2018

Preliminary estimate of areas planted to rice in the Philippines for 2018 second semester
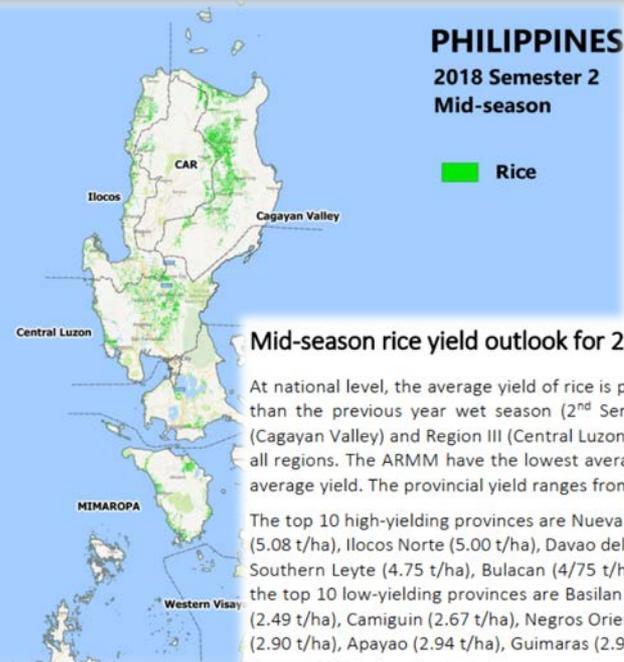
Based on the analyses of Synthetic Aperture Radar (SAR) images used for rice detection, the preliminary estimate of total area planted to rice in the Philippines as of July 30, 2018 was **1,081,027** ha (Figure 1 and Table 1). These estimates were based on analyses of 20 m resolution Sentinel-1A images from the Copernicus Programme developed and operated by the European Space Agency (ESA) (Table 2).

Rice areas under land preparation during the last SAR image acquisition are not yet mapped as rice. For areas affected by the South West Monsoon or "Hanging Habagat" like Central Luzon and MIMAROPA, the SAR images during and after flooding were not included in the rice area classification.

Philippine Rice Information System (PRISM) unit, operated in the Philippine Rice Research Institute, generated the rice area maps and estimates of rice area collaborative project among the Department of Agriculture (DA), Philippine Institute (PhilRice), International Rice Research Institute (IRRI), sampling Industry (BPI) and DA Regional Field Offices (DA-RFOs). The project is funded Rice Program of the DA through the Bureau of Agricultural Research (BAR)

Highlights

1. Preliminary estimate of areas planted to rice in the Philippines for 2018 2nd semester (p.1-5)
2. Mid-season rice yield outlook for 2nd semester (p.6-8)

PHILIPPINES
2018 Semester 2
Mid-season

▮ Rice

Mid-season rice yield outlook for 2nd Semester 2018

At national level, the average yield of rice is projected to be around 3.98 t/ha than the previous year wet season (2nd Semester 2017) record of PSA (T (Cagayan Valley) and Region III (Central Luzon) have an average yield of 4.72 all regions. The ARMM have the lowest average yield of 2.80 t/ha or about average yield. The provincial yield ranges from 2.04 t/ha (Basilan) to 5.28 t/ha

The top 10 high-yielding provinces are Nueva Ecija (5.28 t/ha), Bukidnon (5.1 (5.08 t/ha), Ilocos Norte (5.00 t/ha), Davao del Sur (4.83 t/ha), Isabela (4.77 t/h Southern Leyte (4.75 t/ha), Bulacan (4/75 t/ha), and Nueva Vizcaya (4.75 t/h the top 10 low-yielding provinces are Basilan (2.04 t/ha), Surigao del Sur (2.3 (2.49 t/ha), Camiguin (2.67 t/ha), Negros Oriental (2.73 t/ha), Lanao del Sur (2 (2.90 t/ha), Apayao (2.94 t/ha), Guimaras (2.99 t/ha), and Northern Samar (3.

2nd Semester 2017 yield estimates of PSA, a significant guet (49%), Abra (37%), Cavite (30%), Mt. Province (23 ease in yields is expected in Basilan (-32%), Surigao nd Davao Oriental (-11%). At regional level, increase CARAGA (-4%), Zamboanga Peninsula (-3%), Northe

ns are based on the prevailing crop canopy status in sing SAR imagery, current weather conditions, seaso nt practices observed from PRISM monitoring field al factors such as extreme weather events (floo occur during the remainder of the season were not a

Table 1. Preliminary estimates of planted rice area (ha) in the Philippines, by province, second semester 2018.

Region/ Province	% covered by footprints	Date of last image acquisition	Rice area (ha)		
			PRISM estimate of rice area planted	PSA harvested area	
				2016 3rd Quarter	2017 3rd Quarter
PHILIPPINES	99.9		1,081,027	745,136	852,629
CAR	100	20-Jul-18	50,291	17,873	17,550
Abra	100		10,168	716	716
Apayao	100		12,813	3,894	3,894
Benguet	100		52	1,528	1,556
Ifugao	100		10,626	5,126	5,126
Kalinga	100		14,253	3,606	3,280
Mountain Province	100		2,379	3,003	2,978
Ilocos	100	20-Jul-18	91,889	33,706	36,813
Ilocos Norte	100		27,245	7,734	7,060
Ilocos Sur	100		20,128	4,656	4,427
La Union	100		8,956	2,831	2,384
Pangasinan	100		35,560	18,485	22,942
Cagayan Valley	99	30-Jul-18	246,569	57,110	64,718
Batanes	0			10	21
Cagayan	100		128,470	12,837	18,590

by province for 2nd Semester 2018.

	Yield (t/ha)		Chan
	PRISM 2018 2nd Semester	PSA 2017 2nd Semester	Level
PHILIPPINES	3.98	3.94	0.04

OUTPUT DELIVERY STRATEGY
(Special Bulletins for Drought and flood events)

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SPECIAL BULLETIN
Series of 2018
No. 5b September 27, 2018

Assessment of Rice Areas in Luzon Affected by Flood from Super Typhoon "Ompong"

Super typhoon "Ompong" entered the Philippine area of responsibility (PAR) on September 12, 2018 (Figure 1). It was considered to be "Extremely Catastrophic". Provinces in Regions 1, 2, 3 and CAR were hard-hit on September 14 with moderate to extreme rains and damaging winds while CALABARZON and MIMAROPA were less severely affected. The super typhoon left the country on September 15 and according to the National Disaster Risk Reduction and Management Council (NDRRMC), the estimated cost of damage to agriculture in Regions 1,2,3,CALABARZON and CAR amounted to 14.3 billion (NDRRMC Sitrep no. 28).

Right after the super typhoon left the country, PRISM conducted field visits to 193 locations of rice area in the Northern and Central Luzon from September 18 to 24 (Figure 2). Lodging was found in 141 locations which was also reported as the widespread effect of "Ompong" in the rice areas due to its damaging strong winds. Flooding brought by heavy rains was just a secondary cause of damage in the rice areas. Figures 3 to 7 are some of the photos taken in the affected areas during the field visit.

The rice area of the affected regions as of August 30, 2018 were estimated at **1,030,955 ha** (Table 1). The rice area estimates were based on the analyses of Synthetic Aperture Radar (SAR) data. Around 805,916 ha (78%) were at vegetative phase, 125,999 ha (12%) at reproductive phase and 89,346 ha (9%) at ripening phase. One percent (9,694 ha) may have been planted early in the season and were possibly harvested (Table 2).

Using the Synthetic Aperture Radar (SAR) image from the Sentinel-1 satellite, "Ompong" was detected to bring floods to **82,385 ha** in Regions 1, 2, 3, CALABARZON, MIMAROPA and CAR on September 16, **31,703** ha of these were planted with rice (Table 1). Out of the **31,703** ha of flooded rice areas, **95%** (29,991 ha) were at vegetative phase, **3%** (901 ha) were at reproductive phase and **2%** (762 ha) were at ripening phase (Table 3). About 50 ha (0.2%) were probably harvested (Table 3). The severity of flood damage as the floods accrue is dependent on the crop growth phase. Vegetative phase is affected less as it can still recover from short-term submergence as compared to the reproductive and ripening phases with less chance of recovery.

The flood map (Figures 8 to 13) of PRISM derived from SAR images acquired on September 16, 2018 (for flood detection) and October 15, 2017 (non-flooded reference image) was generated using image ratio and rule-based algorithm implemented in MAPscape-RICE®. It was compared with the flood map generated by the Advanced Science and Technology Institute (ASTI). The flooded area estimate of ASTI (88,518 ha) did not differ much from the estimate of PRISM (82,385 ha). Both maps captured major flooded areas in the affected region.

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SPECIAL BULLETIN
Series of 2018
No. 4 September 17, 2018

Assessment of Rice Areas in Region I and CAR [...] Monsoon enhanced by the Tropical Depressi[...]

Tropical depression "Luis" entered the Philippine area o[...] the southwest monsoon (habagat) that brought scatter[...] and CAR. On August 26, the Ilocos region was declare[...] situational report of National Disaster Risk Reduction [...] reported as flooded in Region I.

Tropical depression "Luis" combined with the enhanced [...] Region I and CAR, **10,494** ha of these were planted with [...] (9,946 ha) were at vegetative phase, **2%** (230 ha) were a[...] phase (Table 3). Based on this, **547** ha of rice areas are p[...] accrue is dependent on the crop growth phase. Vegeta[...] submergence as compared to the reproductive and riper[...]

The rice area estimates were based on the analyses of Sy[...] as of August 23, 2018 for Region I and CAR were estimat[...] were at vegetative phase, 14,643 ha (5%) at reproductive [...] than 1% (11 ha) may have been planted early in the season [...]

The rice areas for the second semester were generated [...] of March 16 to August 23, 2018. Flood maps were als[...] 2018 (for flood detection) and a reference image acquire[...] images, PRISM developed preliminary maps of rice areas[...] 2) based on image ratio and a rule-based algorithm imp[...] were not validated and that the flooded rice area esti[...] (August 25, 2018). Municipal level estimates are in the at[...]

This special bulletin is submitted to the Department of Ag[...] in the affected provinces due to the continuous heavy [...] depression "Luis". The SAR images used were acquired f[...] Open Access Hub (https://scihub.copernicus.eu/).

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SPECIAL BULLETIN
Series of 2018
No. 3 September 3, 2018

Assessment of rice areas in Regions I and III affected by flood from tropical storm "Karding"

Tropical storm "Karding" entered the Philippine Area of Responsibility (PAR) on August 8, 2018 (Figure 1). Before Karding left the country on August 11, an orange rainfall alert was posted by the National Disaster Risk Reduction and Management Council (NDRRMC) to warn the public of an impending flood occurrence due to intense rain from the storm and the southwest monsoon (habagat) in Bataan, Zambales, Pampanga, Bulacan and Nueva Ecija. Though Pangasinan was not included in the warning, flooding has been reported in some of its municipalities.

The tropical storm "Karding" brought flooding to **3,366 ha** in Region III and Pangasinan and 505 ha of these were planted with rice. Out of the **505 ha** flooded rice areas, **57%** (289 ha) were in vegetative phase, **33%** (166 ha) were in reproductive phase and **8%** (40 ha) were in the ripening phase. About 2% (11 ha) is probably harvested (Table 3). The severity of damage as the floods accrue is dependent on the crop growth phase. Vegetative phase is affected less as it can still recover as compared to the reproductive and ripening phases with less chance of recovery.

The rice area estimates were based on the analyses of Synthetic Aperture Radar (SAR) data. The total rice area as of July 8, 2018 for Region III and Pangasinan was estimated at **182,094 ha** (Table 1). Of these, **174,737 ha** still have standing rice crop at the time of tropical storm occurrence. Around 98,250 ha (54%) were in vegetative phase, 51,044 ha (28%) in reproductive phase and 25,443 ha (14%) in ripening phase (Table 2). Four percent (7,357 ha) may have been planted early in the season and were possibly harvested.

The rice areas for the mid second semester were generated using 20 m resolution SAR images covering the period of March 16 to July 8, 2018. Flood maps were also generated using SAR image acquired on August 11[...]

OUTPUT DELIVERY STRATEGY
(Creation and Distribution of IEC materials)

Releases of PRISM brochures containing information on General PRISM and semester accomplishments

SUMMARY and ROAD to IMPACT

✓ Presence of Top Management Support for technological innovations

✓ Guidance from multi agency Management Team, and supportive Government Programs and Policies

✓ Right technology being used and proper manpower skills, training, experiences, and dedication

✓ Institutionalized and hosted by an agency

✓ Healthy collaboration with partners and strong linkages with other institutions

✓ Continual research for development to further improve processes, tools, and finally outputs