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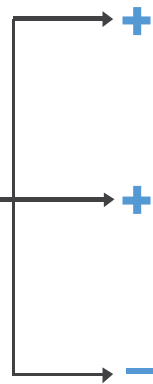


CLIMATE AND FOOD SECURITY

April - June 2017



Most Indonesia experienced abnormally high rainfall, especially across **Sulawesi, Maluku and parts of Kalimantan**



Lower number of forest fires



Main seasons paddy and maize harvest higher than normal



More floods and landslides

Damaged	988	499
Died/Missing	88	84
Injured	80	111

[January - June 2017]

Outlook for August - September 2017



Dry season peak in July and August, with the lowest rainfall expected across **NTT and NTB**



Good prospect for paddy planting

BUT



High risk of pest

Recommendations



- Promote prudent use of pesticide. Using too much pesticide can kill pests' natural enemies and develop pesticide-resistant pests.
- Promote prudent use of nitrogen fertilizer. A high dose of nitrogen fertilizer is conducive to pests.

Key messages

Summary

Higher than normal rainfall levels boosted crop production in early 2017, but also led to more floods and landslides. The climate outlook for August and September suggests above-normal rainfall levels for most of the country, but very low precipitation is expected across southern parts of Indonesia, especially East and West Nusa Tenggara, southern West Papua and eastern Java.

Planting area for paddy might exceed a normal-year by around 1.2 million hectares in July and August. There is an increased risk of pest outbreaks, so appropriate input use and enhanced pest management will be needed to prevent crop damage and loss.

Recommendations

- Take preventive measures to minimize potential pests outbreaks:
 - Avoid excessive use of a nitrogen-based fertilizer
 - Protect natural enemies of pests by limiting pesticide use

Introduction

This is the seventh of a series of monitoring bulletins on the impact of weather extremes on food security and seasonal topics related to food security in Indonesia. The previous bulletins are available online: <http://bmkg.go.id/iklim/buletin-iklim.bmkg>

<https://www.wfp.org/content/indonesia-food-security-monitoring-2015>)

In the first section of this issue, an update on climate, disasters and crops is presented.

The next section presents climate and planting outlook for July, August and September 2017.

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Part 1

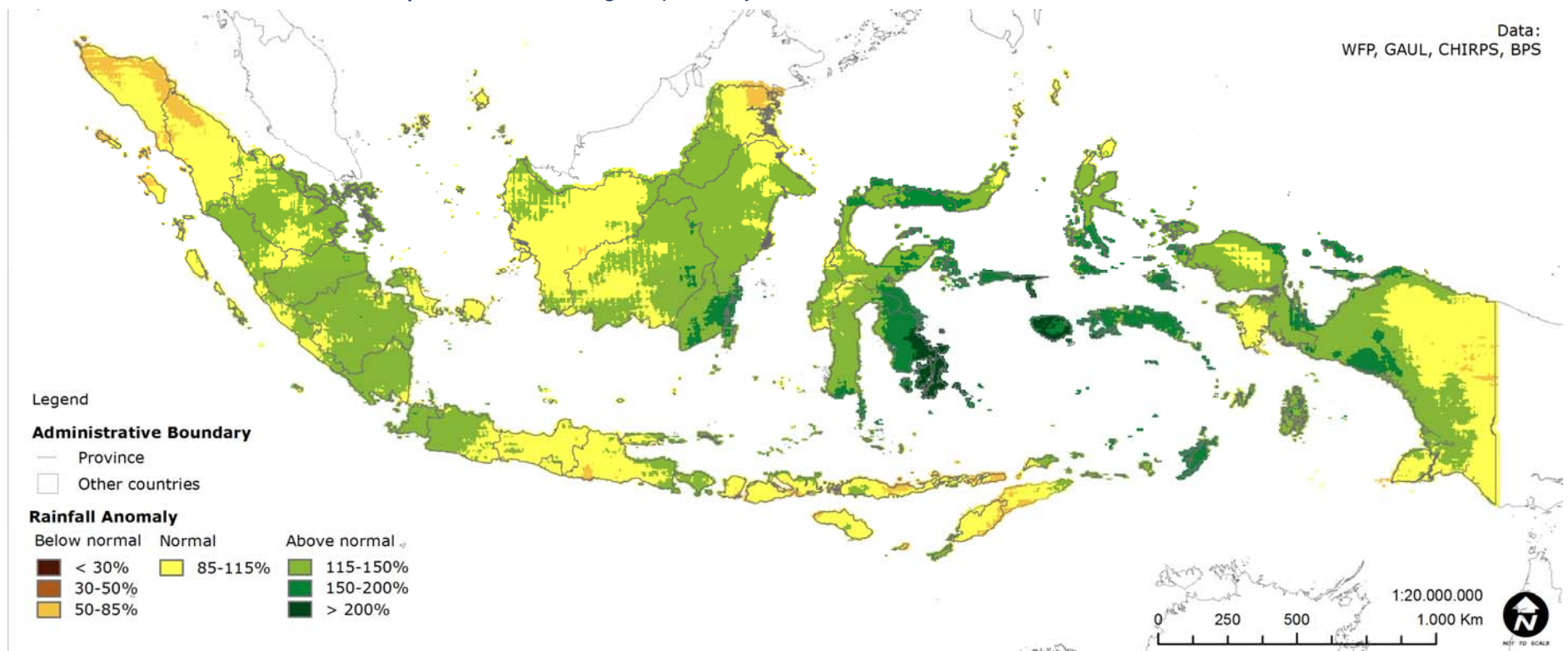
Update: Climate, disasters and crops

Between April and June 2017, most of Indonesia experienced abnormally high rainfall.

Overall, between April and June 2017, Indonesia received abnormally high precipitation, especially across Sulawesi and Maluku and parts of Kalimantan and Papua.

Higher than normal precipitation contributed to lower number of forest fires and created favorable conditions for planting, however it also resulted in more floods and landslides in the first half of 2017, causing death and destruction.

3-MONTH RAINFALL ANOMALY | Percent of Average, April- May- June 2017



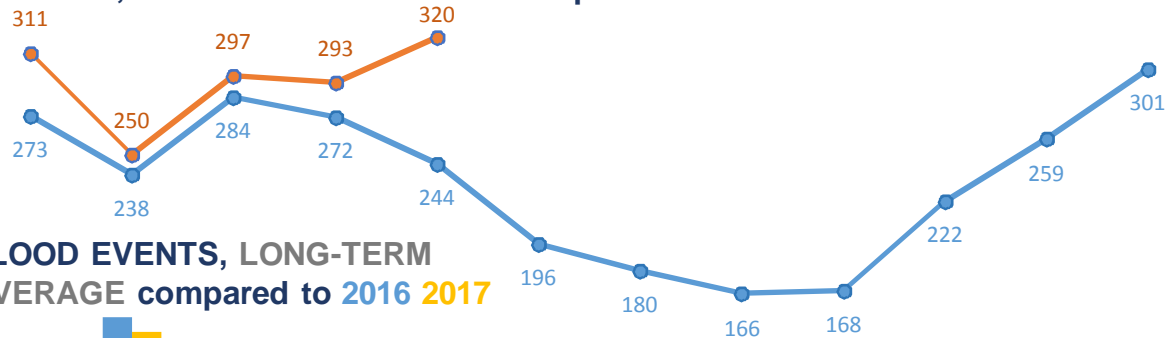
An unusually large number of floods and landslides has affected Indonesia since mid-2016.

Higher rainfall in the first half of 2017, generated an unusually high number of floods and landslides, especially when compared to a long-term average, and a continuation of the trend from mid-2016.

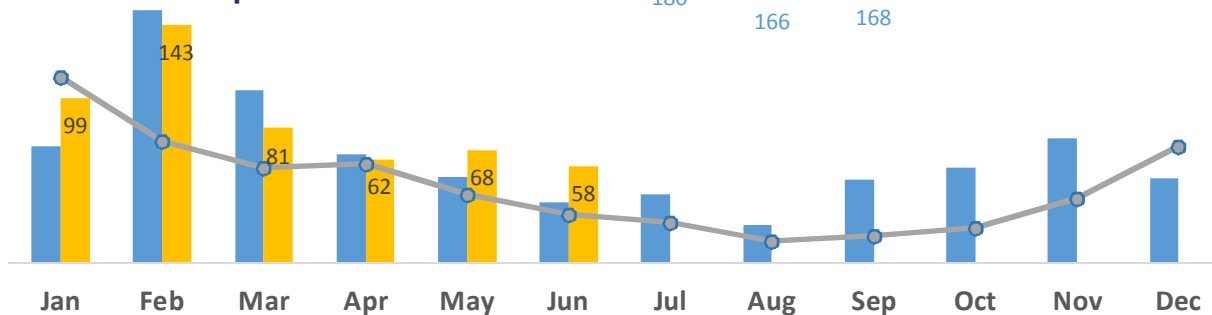
The high occurrence of floods and landslides recorded in the first half of 2017 led to high infrastructure and human loss: 988 houses were heavily damaged, 88 people died or remain missing and 80 people were injured due to the floods in 224 districts. Moreover, 499 houses were heavily damaged, 84 people died or remain missing and 111 people were injured due to landslides in 115 districts.

Comparing rainfall and floods in 2016, 2017 and the 10-year average

RAINFALL, LONG-TERM AVERAGE compared to 2017



FLOOD EVENTS, LONG-TERM AVERAGE compared to 2016 2017



Data: BNPB, WFP

Comparing landslide events in 2016, 2017 and the 10-year average

	10-year average	2016	2017
Jan	60	36	83
Feb	49	88	126
Mar	37	93	45
Apr	33	47	72
May	27	22	41
Jun	19	28	29
Jul	14	40	
Aug	8	18	
Sep	8	76	
Oct	12	78	
Nov	32	108	
Dec	40	67	
Total	339	701	

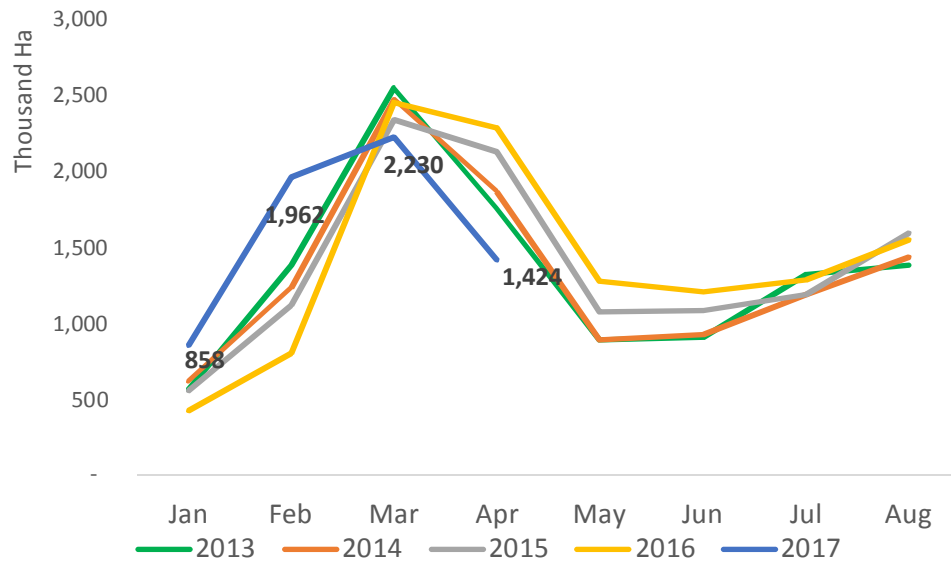
Data: BNPB

Main season's paddy and maize harvest is higher than normal.

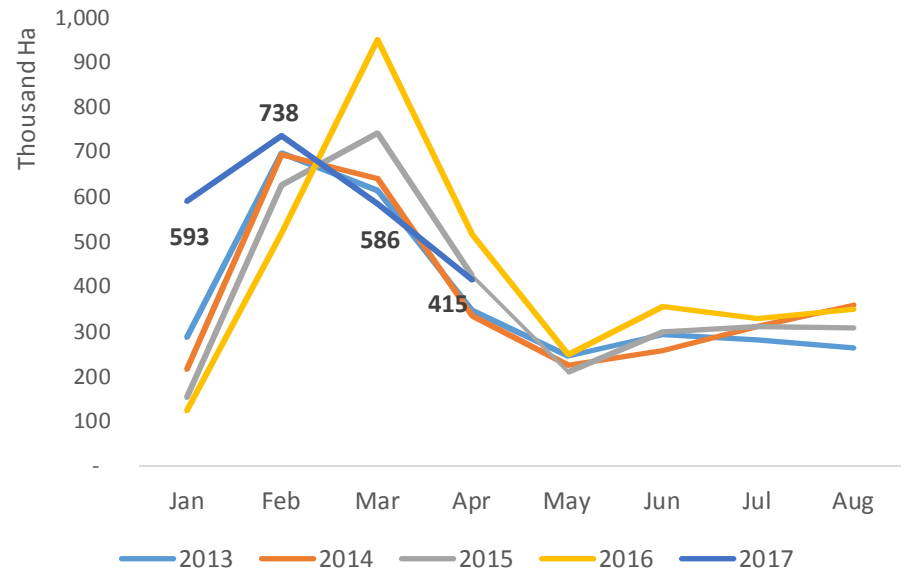
Most of the main season's paddy and maize was harvested between February and March 2017. Favorable weather conditions in late 2016 and early 2017, and the Government's initiative to rehabilitate irrigation channels benefited paddy production. Based on the estimates of the Ministry of Agriculture, between January and April 2017, around 300,000 hectares more paddy, and around 380,000 hectares more maize was harvested compared to the harvested area in the same period in the last 4 years.

As abundant rains favored earlier planning, more paddy and maize was harvested in February as shown in the graph below. Combined with the favorable weather conditions and water availability, the earlier harvested fields will allow an earlier second season planting.

Paddy harvested area at national level, 2013-2017



Maize harvested area at national level, 2013-2017



Part 2

Climate and planting outlook: July-
September 2017

Good prospects for paddy planting in July and August 2017, but risk of pest outbreaks remains.

Continued higher than normal rainfall, and the earlier harvest favored second season planting. At national level, based on the estimates by the Ministry of Agriculture, July and August planting potential for 2017 is around 1.2 million hectares higher compared to the actual planting in the same period in a normal year- 2013.

The estimates are based on the analysis of satellite imagery for harvest potential in June, the July-August rainfall forecast and the government's programme for paddy planting. The actual planting area will however depend on other variables not captured in this estimates, such as water availability and pest and diseases management.

Provinces with more than 5000 ha of potential planting area for paddy in July and August 2017 (ha)

Province	July	August	Total
Aceh	54,979	43,825	98,803
Sumatera Utara	91,778	57,858	149,637
Sumatera Barat	51,495	39,936	91,430
Riau	21,940	12,015	33,956
Jambi	26,001	17,530	43,530
Sumatera Selatan	112,274	68,950	181,224
Bengkulu	10,365	8,241	18,605
Lampung	49,595	37,835	87,431
Jawa Barat	173,152	92,893	266,045
Jawa Tengah	223,456	132,836	356,292
Jawa Timur	239,816	135,578	375,393
Banten	46,001	25,817	71,818
Bali	16,326	10,082	26,408
Nusa Tenggara Barat	31,402	31,317	62,719
Nusa Tenggara Timur	36,223	18,083	54,307
Kalimantan Barat	70,286	44,329	114,616
Kalimantan Tengah	44,657	27,189	71,845
Kalimantan Selatan	84,612	67,011	151,623
Kalimantan Timur	7,326	5,591	12,917
Sulawesi Utara	13,666	7,874	21,540
Sulawesi Tengah	24,084	17,504	41,589
Sulawesi Selatan	93,019	79,366	172,385
Sulawesi Tenggara	16,308	11,135	27,444
Sulawesi Barat	7,600	6,431	14,031
National	1,586,882	1,017,022	2,603,904

Planting potential anomaly in August and September 2017 in top rice producing provinces

	Aug	Sep
SOUTH SUMATERA	-2%	3%
LAMPUNG	-2%	0%
WEST JAVA	9%	7%
CENTRAL JAVA	6%	8%
EAST JAVA	8%	-12%
SOUTH SULAWESI	-3%	-28%

Data: MODIS, CHIRPS

At sub-national level, potential paddy planting area in August is higher than the 15-year average of the actual paddy area planted in half of the top rice producing provinces- West, East and Central Java. Slightly lower than normal planting is expected in South Sulawesi, South Sumatera and Lampung. In September, potential planting area in Central Java, West Java and South Sumatera exceeds the average actual area planted in the last 15 year, while the planting potential in East Java and South Sulawesi is estimated to be lower than the average actual planting.

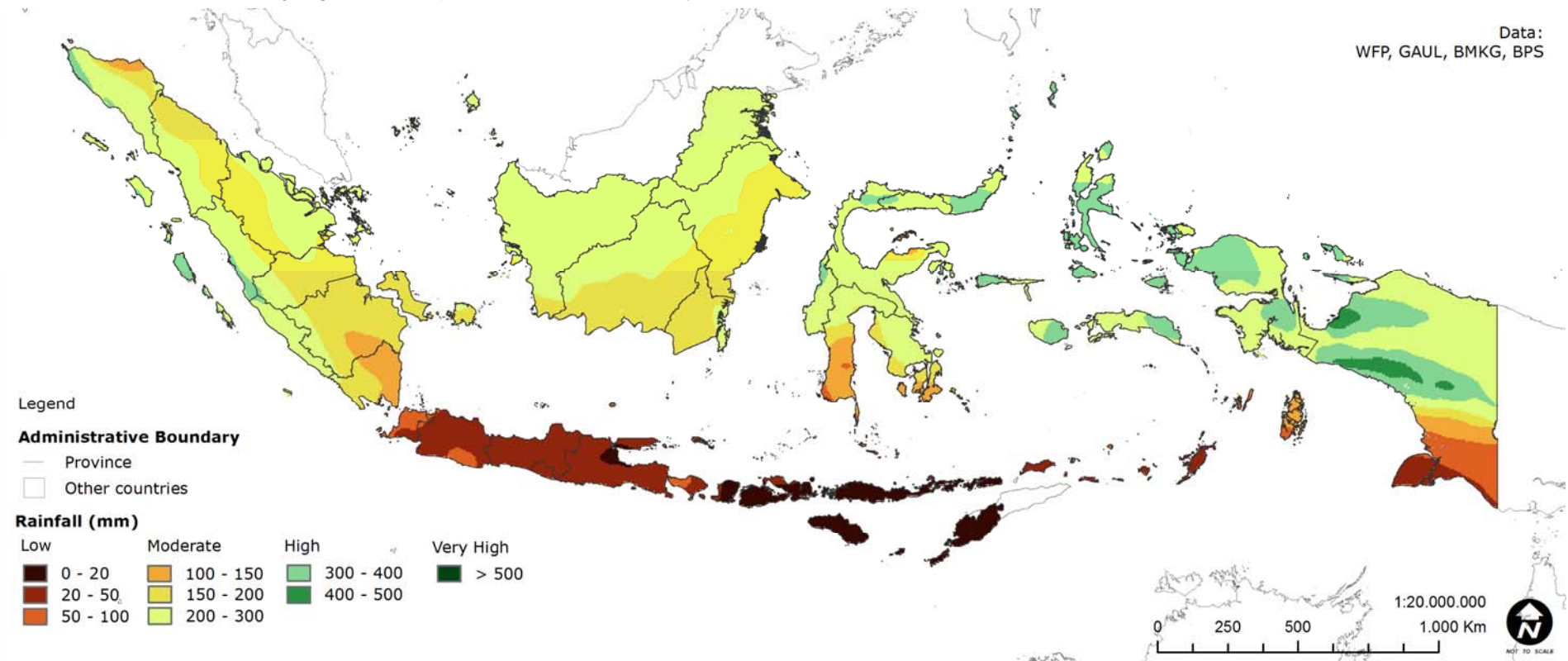
Based on the Ministry of Agriculture estimates, pest outbreaks are likely to occur in a much increased intensity throughout the country during July and August. Among the factors that can contribute to pest outbreaks are an increased use of pesticides and nitrogen fertilizers. Pesticide applications disrupt the ecological balance between pests and their natural enemies by eliminating natural enemies as a result of direct exposure to pesticides. Also, injudicious use of pesticide can induce pest resurgence by developing pesticide-resistance pests. Furthermore, a high dose of nitrogen promotes paddy plant growth, but also favors pest population. The tolerance of pests to adverse environmental stress is positively correlated with the nitrogen fertilizer application.

In the identified potential planting area, local authorities and farmers should prepare appropriate agricultural inputs (seeds, tools), and improve pest management systems (including Integrated Pest Management) to prevent and manage potential pest outbreaks. In particular, nitrogen-based fertilizer and excessive use of pesticide should be avoided to prevent pest outbreaks.

Dry season will reach its peak across southern parts of the country in August.

- Very low precipitation, with maximum 20 mm monthly rainfall, is predicted for most of the Nusa Tenggara. Slightly higher precipitation, up to 100 mm per month, is expected across Java island, Bali and southern part of Papua.
- Sumatera, Kalimantan and southern parts of Sulawesi should receive moderate rainfall levels, reaching around 300 mm monthly rainfall.
- Highest precipitation, around 400 mm of rains per month, is predicted for northern parts of Sulawesi, Maluku and Papua.
- While parts of Indonesia will receive low rainfall levels, compared to the long-term average, rainfall across most of the country is predicted to be above-normal, with an exception of parts of Java and the Nusa Tenggara.

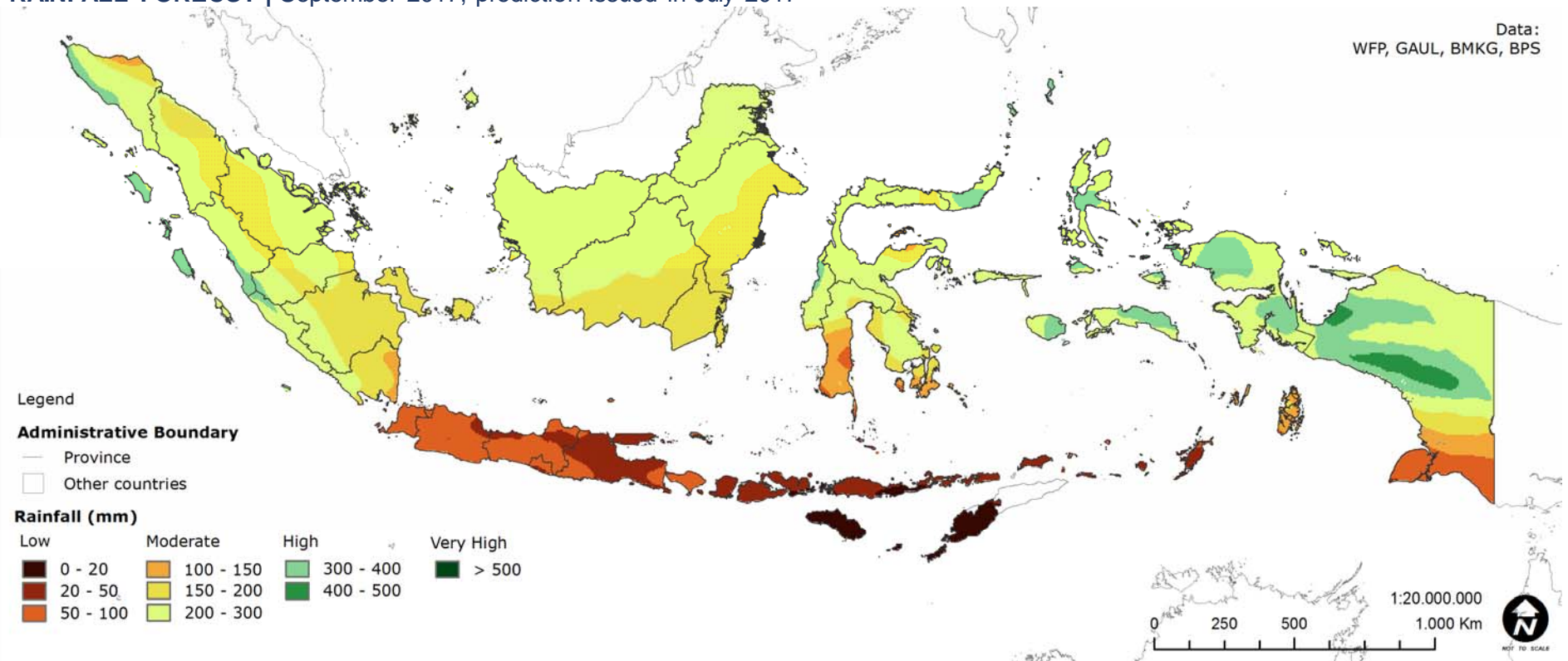
RAINFALL FORECAST | August 2017, prediction issued in July 2017



Same trend will continue to September.

- Rainfall levels are expected to remain very low across eastern part of the Nusa Tenggara throughout September. Rainfall will be gradually increasing across Java, Bali and western parts of the Nusa Tenggara.
- Moderate precipitation is predicted for the northern parts of the country, while Maluku and Papua are expected to receive high rainfall levels.
- Similar to August, most of the country will receive above-normal rains, with some normal to below-normal precipitation across Riau and North Sumatera, western and central parts of Java and East Nusa Tenggara.

RAINFALL FORECST | September 2017, prediction issued in July 2017



Methodology

Rainfall anomaly is a measure of a lack of or excess rainfall in a given period compared to the average. The 3-monthly rainfall anomaly for April, May and June 2017 is derived from Chrips dataset. Rainfall forecast for August and September 2017 uses BMKG prediction data.

Assessment of flood and landslide events and their impact is a trend analysis, comparing long-term averages with the current situation. The analysis is based on the data from the National Disaster Management Agency (BNPB).

Harvested area for paddy and maize is the Ministry of Agriculture observation data, updated on a monthly basis. Planting potential estimated for July and August 2017 was estimated using Landsat imagery data, combined with rainfall forecast and the government programme for paddy planting. The data is provided by the Ministry of Agriculture.

The potential planting anomaly was estimated using the 15-year average of the paddy planting area, the average rainfall anomaly for the same time period (2001- 2016), and the rainfall forecast in 2017. The rainfall data uses CHIRPS dataset, a product of the University of California, Santa Barbara. Rainfall forecast data for July and August is based on BMKG prediction. These datasets were aggregated into a provincial level for the purposes of the planting potential analysis. The planting area was calculated by importing MODIS dataset into TIMESAT- a program for analyzing time-series satellite data. To estimate the planting potential anomaly in August and September 2017, regression analysis for estimating the relationship between the planting area (dependent) and rainfall pattern (independent) in each month and region was performed. Using the linear equation from this regression and the rainfall forecast data, planting forecast was calculated. One month time-lag was applied for the rainfall data- for the August planting potential anomaly, rainfall data for July was used, and for planting potential in September, August rainfall.

Contributors

This bulletin is produced by a technical working group led by the Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG) and consisting of the Ministry of Agriculture (incl. the Agency of Food Security, the Directorate General of Food Crops, the Indonesian Agency for Agricultural Research and Development, Information and the Data Center, Directorate General Horticulture), the National Institute of Aeronautics and Space (LAPAN), National Disaster Management Authority (BNPB) and the Central Bureau of Statistics (BPS).

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All content within this bulletin is based upon the most current available data. Weather conditions are a dynamic situation, hence the current realities may differ from what is depicted in this document.

The cover picture is by FAO Indonesia.



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