Food Security Monitoring Bulletin

INDONESIA

Special Focus: Estimating Impact of Disasters on Market Access

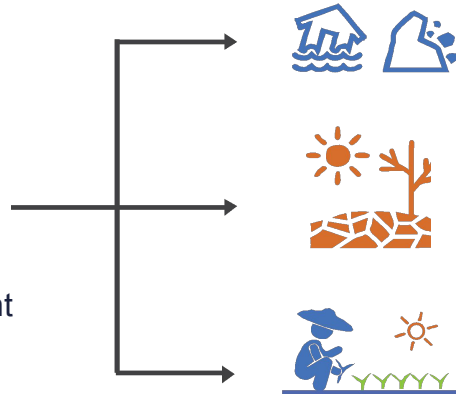
Volume 10, May 2018

CLIMATE AND FOOD SECURITY

January - April 2018

Most Indonesia experienced normal rainfall, consistent with the rainy season levels

Parts of the country entered the dry season in April.

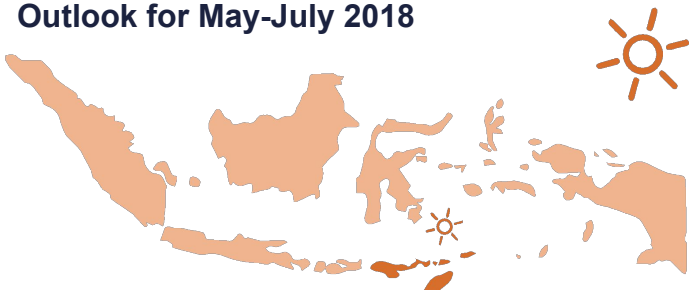


More floods and landslides

More land/ forest fires in areas with low rainfall

Peak paddy harvesting

Outlook for May-July 2018



Start of the dry season will be 1-3 weeks later for half of the country

Lowest rainfall expected across **NTT and NTB**

Good planting potential for paddy

Recommendations

Preparedness for the dry season:

- Water management and conservation in areas with expected low rainfall and planned agricultural activity
- Use of appropriate crops and seed varieties

Key messages

Climate

During the last months of the 2017/2018 rainy season, Indonesia experienced mainly normal to above-normal rainfall levels. The areas with very heavy rains were affected by unusually high number of floods and landslides.

As the dry season approached, some parts of the country were affected by localized dry spells, contributing to more land/forest fires recorded in early 2018 compared to the long-term average.

Over the next three months, most of the country will enter the 2018 dry season. Rainfall levels are expected to be sufficient during May-June for the peak of the secondary season paddy planting.

Special Focus: Estimating impact of disasters on market access

New methodologies and data are available to estimate impact of disasters on population and food security. The technical working group used the scenario of an eruption of Mt Agung to experiment with new high resolution datasets to assess the impact on access to food markets. Using the 1963 eruption and the latest data on population and infrastructure, estimates of changes in access to markets for population in the affected zones are made. Same methodology can be utilized to assess impact on people's access to water sources or other relevant infrastructure, such as health facilities or schools.

Recommendations

- Preparedness for dry season:
    - Water management and conservation in areas with expected low rainfall and planned agricultural activity
    - Use of appropriate crops and seed varieties

Introduction

This is the first of a series of monitoring bulletins on the impact of weather extremes on food security and seasonal topics related to food security in Indonesia in 2018.

The first section of this issue presents an update on climate, crops and disasters in the first months of 2018.

The second section focuses on the climate outlook for May to July 2018.

The last section presents new data and methods for estimating the impact of a Mount Agung eruption scenario on population's access to markets.

Previous bulletins are available online:
http://bmkg.go.id/iklim/buletin-iklim.bmkg

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

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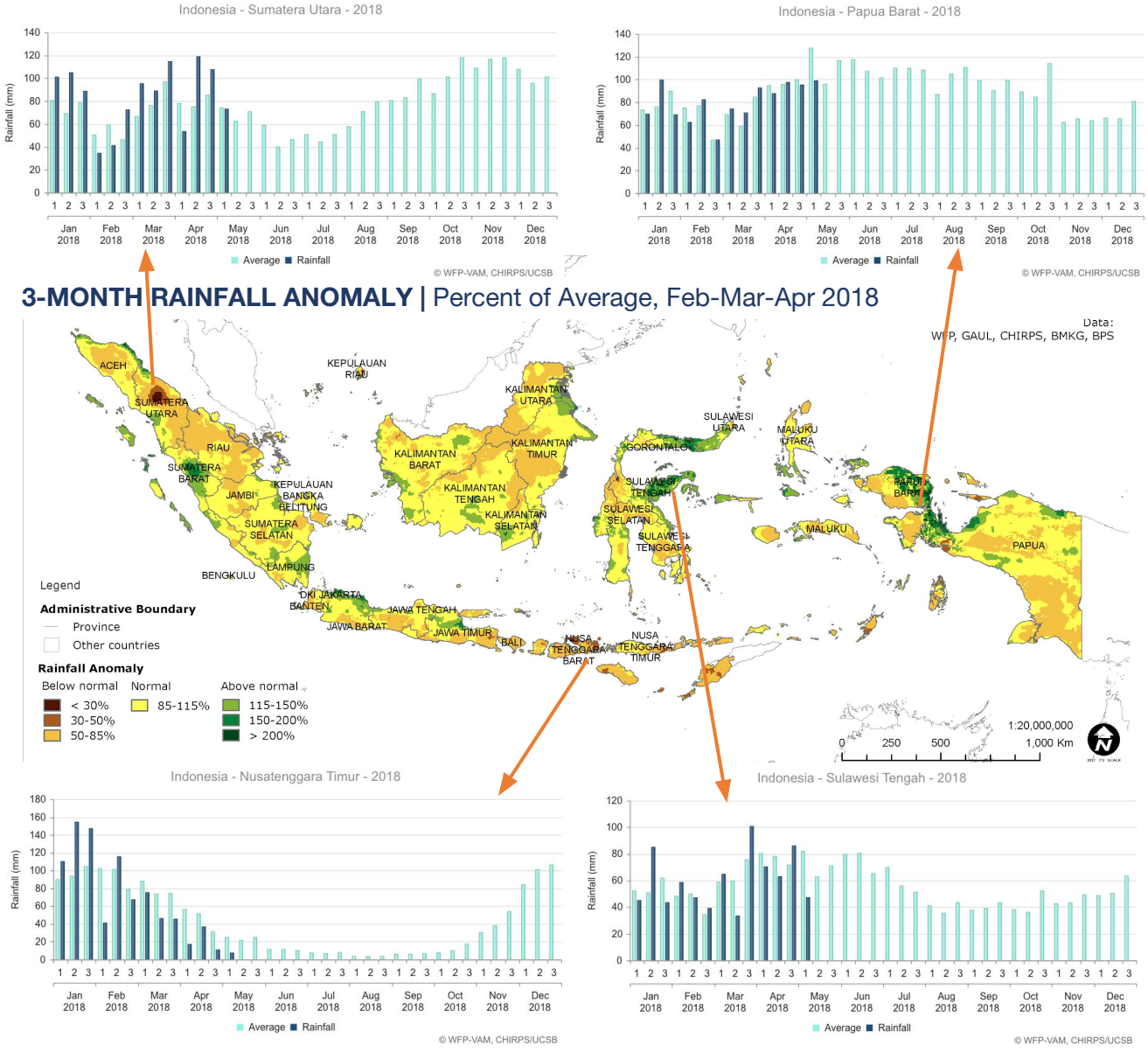
List of maps and analyses

Most of Indonesia received normal rainfall in Q1 2018

Between February and April 2018, Indonesia received normal rainfall levels, with localized above-normal rainfall.

Unusually high rains affected parts of Papua, eastern parts of Sulawesi and Kalimantan. Localized higher than normal precipitation was received across southern and central parts of Sumatra.

On the other hand, northern parts of Sumatra Island, and parts of East and West Nusa Tenggara experienced below-normal rainfall.



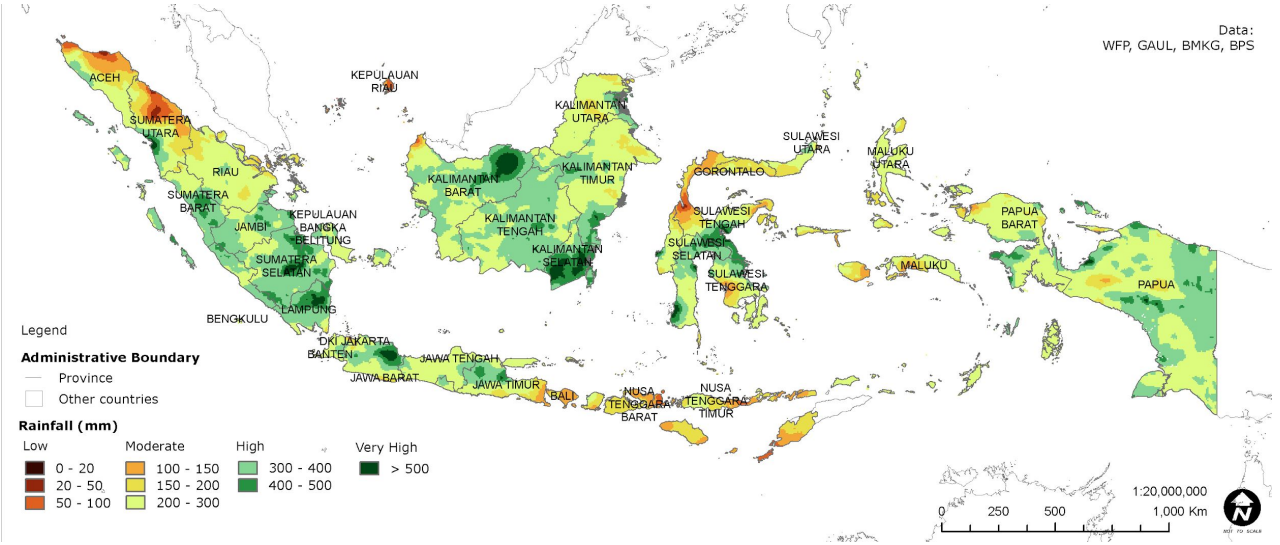
High levels of rainfall consistent with wet season.

In terms of the actual rainfall, most of the country received high precipitation, in line with the rainy season. The Java island, parts of Kalimantan, southern Sumatera and eastern parts of Sulawesi received the highest rainfall levels, reaching up to 500 mm of monthly rainfall. On the other hand, precipitation levels gradually declined in the Nusa Tenggaras, reaching moderate levels in March.

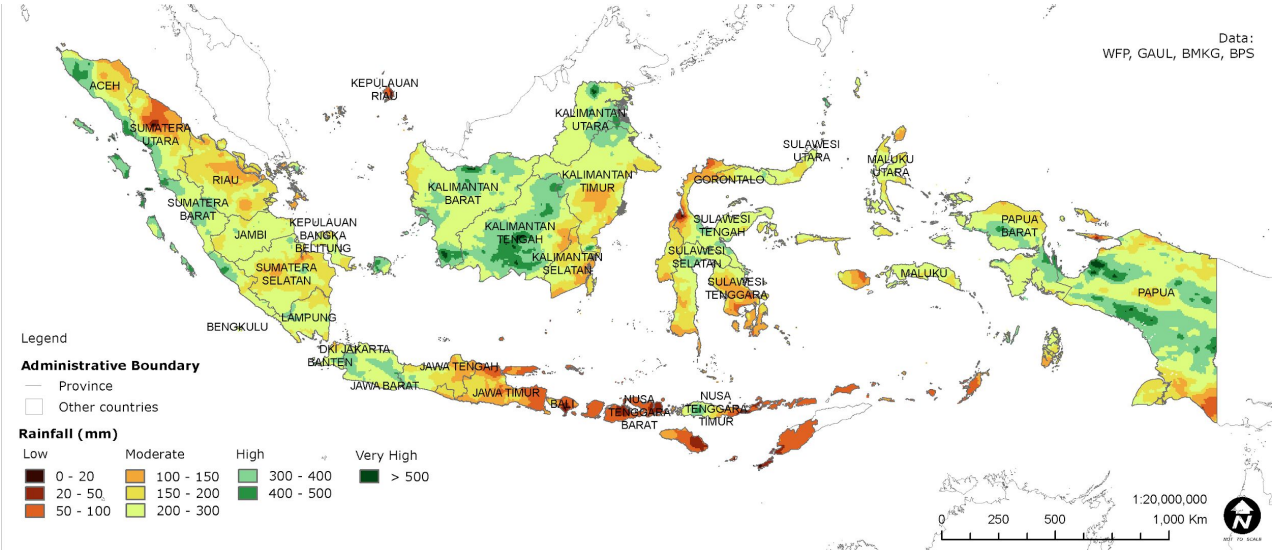
Low rainfall in some places increased fires.

Low rainfall levels fell across northern Sumatra, and parts of Kalimantan and Sulawesi. In line with the low rainfall levels, BNPB recorded 28 land/forest fires between January and April in these areas. Most fires occurred across Riau and Aceh provinces. In the past ten years, average number of land/ forest fires in the same time period was 20, slightly lower compared to land/forest fires recorded in 2018.

Monthly Rainfall, March 2018



Monthly Rainfall, April 2018



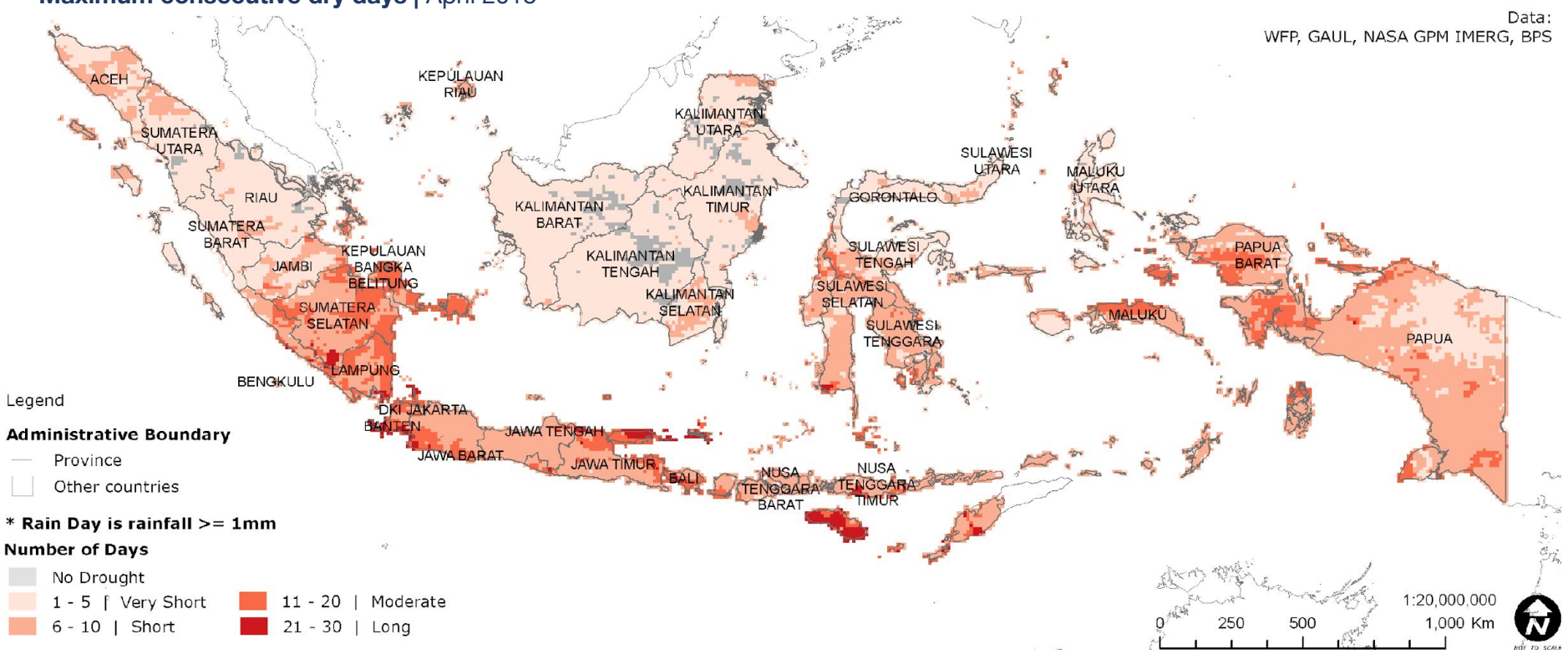
Dry season commenced in April.

Indonesia received normal precipitation, in line with the rainy season levels, until March. April marked the beginning of the dry season. Prolonged dry spells (days without daily rainfall reaching 1 mm) were felt in the southern parts of the country as shown on the map below. Long dry spells, ranging from 21 to 30 days without rainfall, affected parts of East Nusa Tenggara, Madura, Lampung and Banten.

Meanwhile, northern parts of Sumatra island also experienced dry spells in February and March, as these areas enter the dry season at the beginning of the calendar year.

As the country is entering the dry season, these areas are likely to be exposed to longer periods without rainfall, hence water conservation and careful water management is recommended.

Maximum consecutive dry days | April 2018



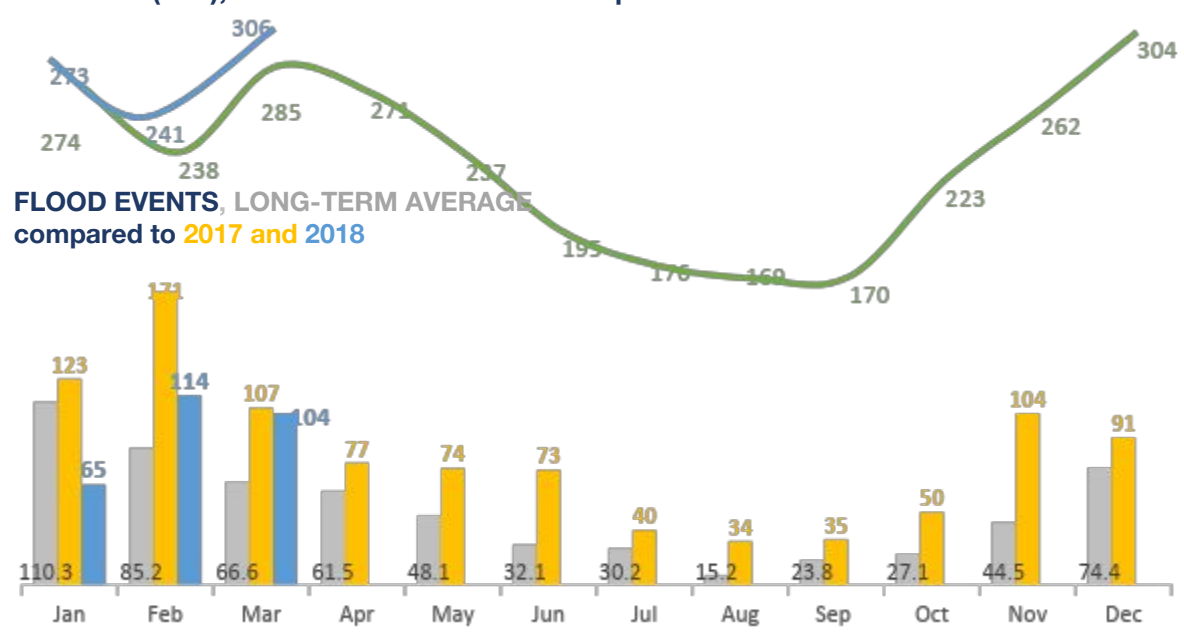
High number of floods and landslides continued to cost lives and damage infrastructure.

Despite relatively normal rainfall levels, the number of floods and landslides in early 2018 exceeded the 10 year average. Since mid-2016, Indonesia experienced an unusually high number of floods and landslides, causing loss of life and damage to infrastructure.

From January to March 2018 620 houses were heavily damaged, 21 people died or remain missing, 216 people were injured and 176,659 were displaced. The majority of floods, landslides and associated damages occurred across Java island, in line with the high precipitation received in these areas between January and March 2018.

Given that the unusually high number of floods and landslides occurred across the country for nearly 2 years, longer-term mitigation and prevention measures are recommended to minimize negative impact.

Comparing rainfall and floods in 2017, 2018 and the 10-year average



Data: BNPB DIBI, WFP

Comparing landslide events in 2017, 2018 and the 10-year average

Month	Average	2017	2018
Jan	54	134	49
Feb	50.2	169	91
Mar	39.6	74	63
Apr	32.2	96	46
May	24.7	55	
Jun	16.3	33	
Jul	12.4	15	
Aug	8.4	8	
Sep	13.3	23	
Oct	17.1	91	
Nov	36.7	90	
Dec	49.4	60	

Data: BNPB DIBI

The dry season will be 1-3 weeks late for more than half of Indonesia.

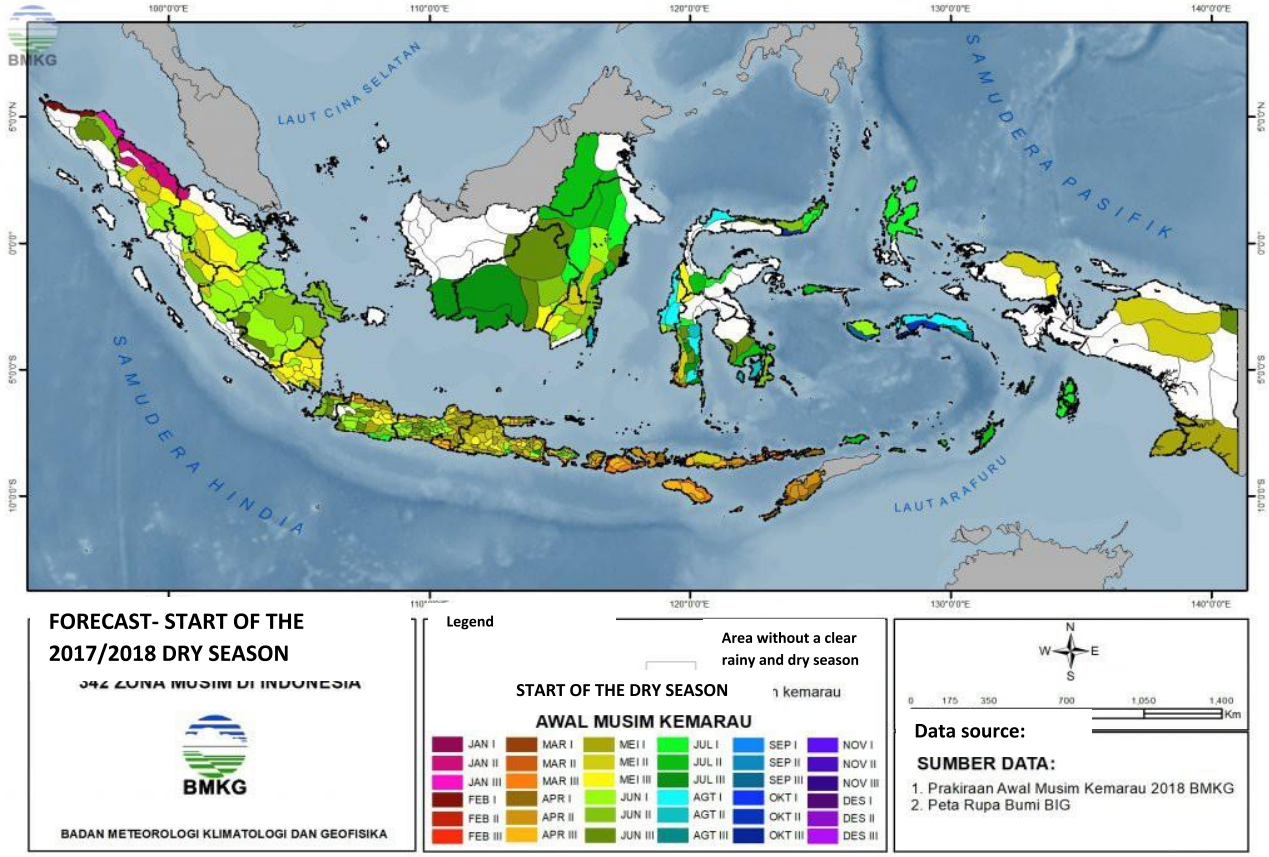
Around 20 percent of the country, covering eastern coast of Aceh and North Sumatra, and the Nusa Tenggaras already entered the dry season by April 2018. Most of the rest of the country is expected to have started dry season in May or June 2018.

As shown on the map below, Papua, eastern parts of Java and southern and central parts of Sumatra will enter the dry season in May. By July, most of Sumatra and Kalimantan and western and central Java are expected to transit to the dry season.

Compared to the long-term average, more than half of Indonesia will likely see a late start of the dry season, delayed by 1 to 3 weeks, while around 12 percent of the country will enter the rainy season earlier than usual.

Start of the 2018 dry season, compared to the long-term average

	Early	Same	Delay
SUMATRA	19%	31%	50%
JAWA	5%	25%	70%
BALI	27%	13%	60%
NTB	18%	36%	45%
NTT	14%	71%	14%
KALIMANTAN	5%	64%	32%
SULAWESI	19%	62%	19%
MALUKU	11%	33%	56%
PAPUA	17%	17%	67%
Indonesia	12%	36%	52%



Normal to below normal rainfall is predicted between May and July 2018.

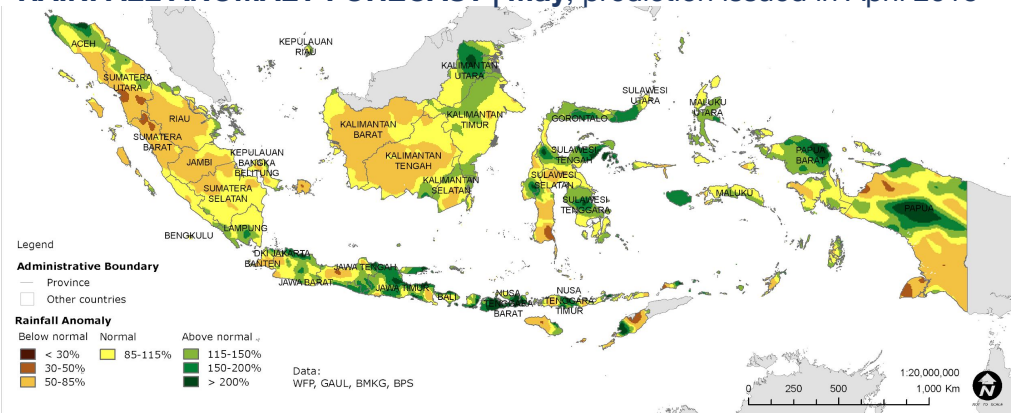
Rainfall levels that were slightly above the usual levels due to a weak La Nina are expected to return to normal.

From May to July, BMKG forecasts that central parts of Sumatra, most of Kalimantan and western-central parts of Java are likely to receive slightly below-normal rains. Significantly below-normal precipitation is predicted for southern parts of Papua, the Maluku islands, southern Sulawesi and parts of the East and West Nusa Tenggara. Drier than normal conditions are predicted across Java in July.

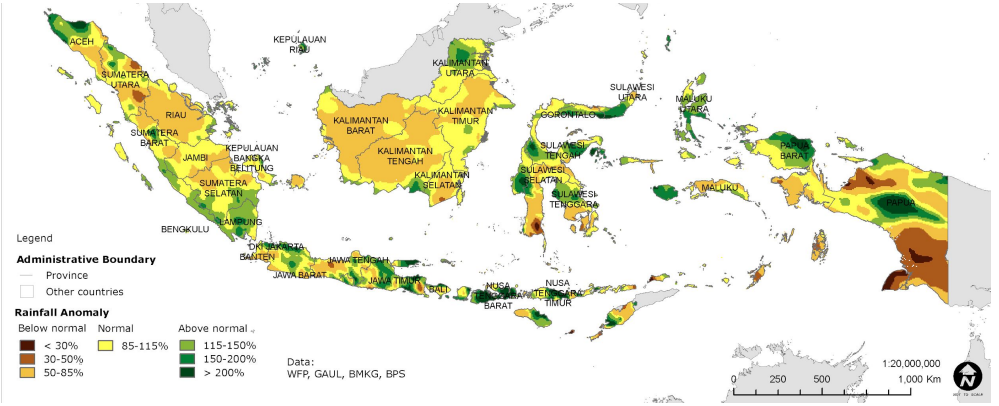
BMKG forecasts above-average rainfall for northern and western parts of Sumatra, East Java, Northern Sulawesi and central parts of Papua.

As the country is embarking on the dry season, which coincides with the peak paddy planting for the secondary season, prudent water management in the areas with higher likelihood of below-normal rains is advised, particularly for the areas with expected agricultural activity.

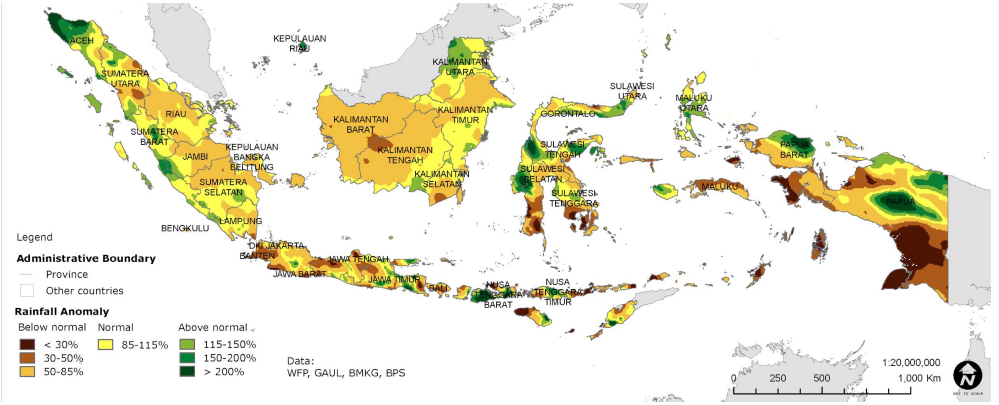
RAINFALL ANOMALY FORECAST | May, prediction issued in April 2018



RAINFALL ANOMALY FORECAST | Jun, prediction issued in April 2018



RAINFALL ANOMALY FORECAST | Jul, prediction issued in April 2018



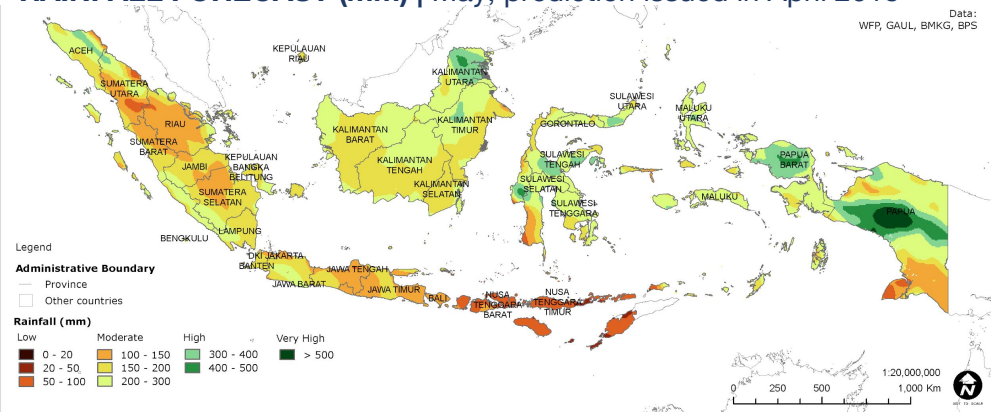
Between May and July, rainfall levels will gradually decline

In terms of the amount of rainfall, the lowest precipitation is expected in southern Indonesia - eastern parts of Java island, Bali, East and West Nusa Tenggara, and southern parts of Papua. By July, monthly precipitation in these areas should only reach 20 mm per month.

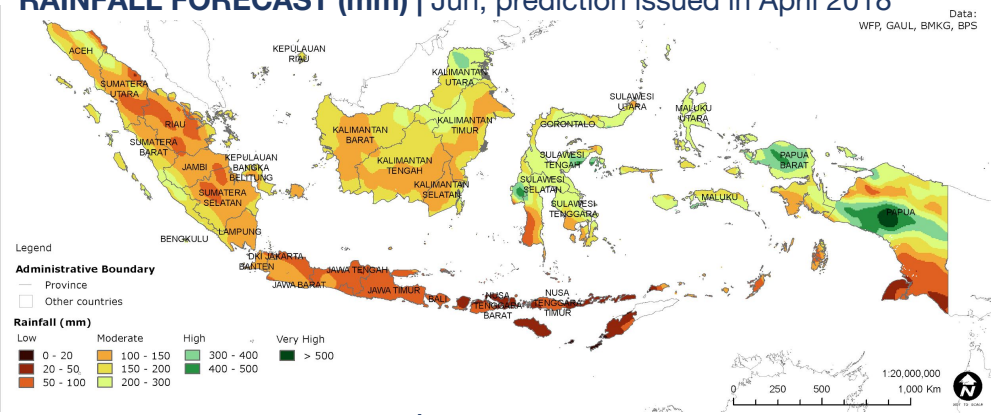
Given the prediction for lower than normal rains across in East and West Nusa Tenggara, water conservation and careful water management is recommended in these chronically dry areas.

On the other hand, localized high rainfall, up to 500 mm, is predicted for the mountainous regions of Papua.

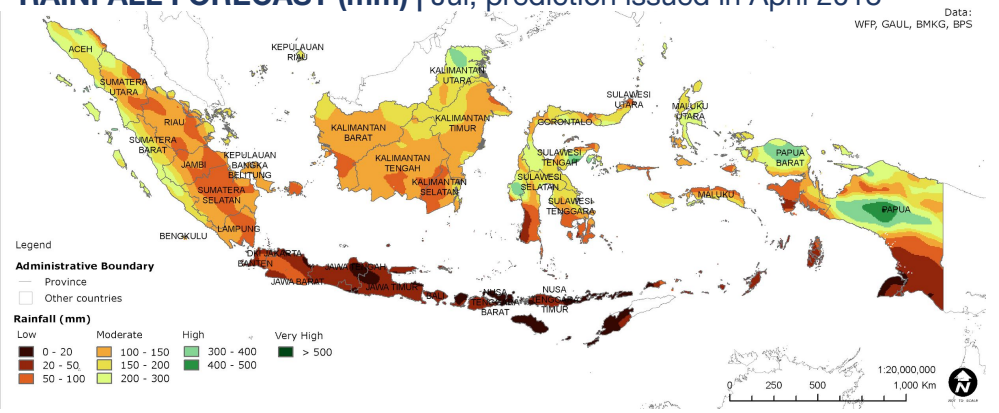
RAINFALL FORECAST (mm) | May, prediction issued in April 2018



RAINFALL FORECAST (mm) | Jun, prediction issued in April 2018



RAINFALL FORECAST (mm) | Jul, prediction issued in April 2018

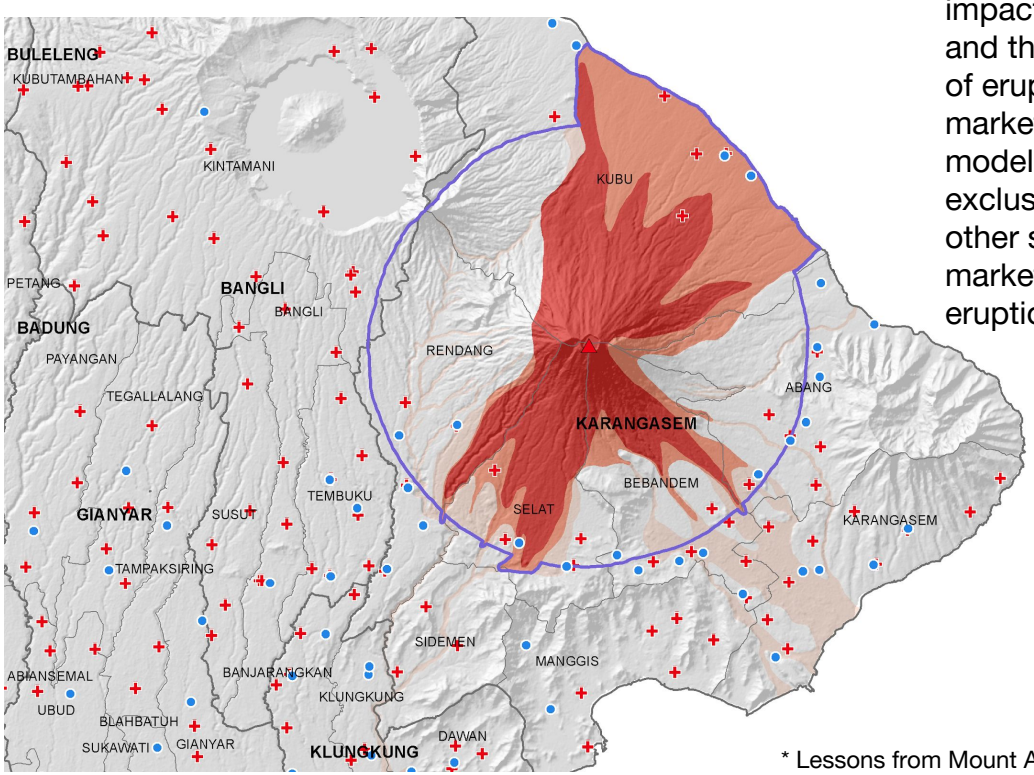


Estimating disaster impact on access to food markets

Mount Agung, Bali's largest volcano, showed an increased activity in September 2017, leading to the displacement of over 234,000 people*, and a robust preparedness and response action by the Government of Indonesia. No lives were lost, and most of the people have subsequently returned to their homes.

The last large major eruption of this volcano occurred in 1963, killing more than 1,000 people and causing widespread damage. It was considered one of the largest eruptions in the country's recent history.

Disaster scenario of Mt Agung eruption, Bali



Data: Ministry of Health, BIG, PVMBG

The technical working group used the scenario of an eruption of Mt Agung to experiment with new data sets to estimate the impact on access to food markets. Using the 1963 eruption and the latest data on population and infrastructure, estimates of eruption-induced obstruction and changes in access to markets for population in the affected zones are made. A model for assessing travel time to the nearest market in the exclusion zone, pixel by pixel, combines remote sensing and other spatial data on landscape, road and river network, market location, population and obstruction caused by the eruption.

Volcano hazard

- Low
- Moderate
- High
- 12 Km Buffer and Moderate and High Hazard Areas

Locations

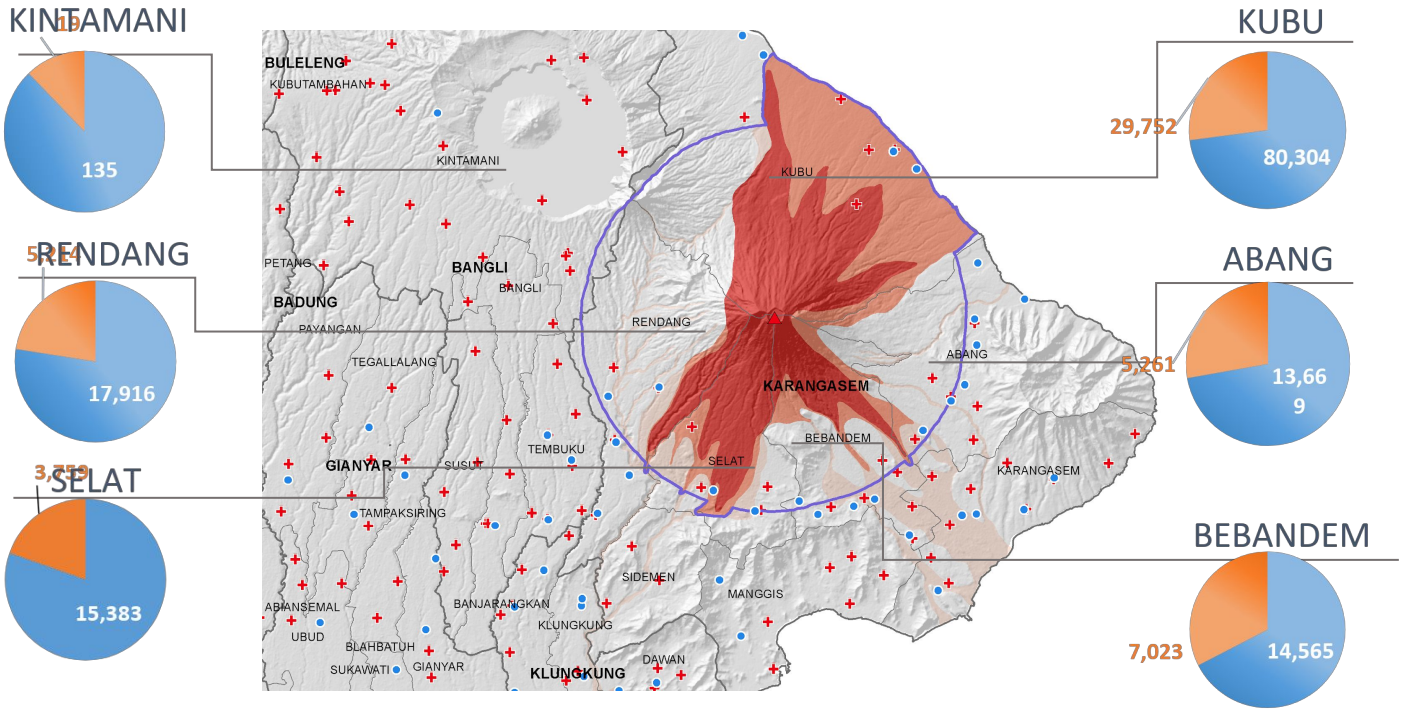
- Market
- Hospital/CHC

* Lessons from Mount Agung Eruption Response-Bali Province, 22 April 2018, Indonesia HCT.

Facebook's high resolution settlement data, which combines high resolution satellite imagery at 0.5m and the most recent census data, is used to derive human population distribution and the number of people in the exclusion zone. Market catchments are then delineated, using market location, and travel costs assigned for each data point. Accounting for road network and quality, land cover, slope and general infrastructure, travel time for population to a market in normal conditions is then estimated. To assess the change in access as a result of an eruption, utilizing the 1963 eruption, potential obstruction is modelled. Subsequently, the travel time to a market and changes in people's access to market in the eruption conditions is calculated.
The below map and graphs shows an example of an estimate of people's access to market after the Mt Agung eruption scenario in the 12km exclusion zone. The estimates indicate that around 34 percent more people will have to travel more than 30 minutes to a market compared to normal, due to a higher number of obstructions brought by the eruption. In total 51,028 people from 37 villages in the 12km buffer zone with high and moderate hazard will have limited access to market.

POPULATION WITH MORE THAN 30 MINUTES TRAVEL TIME TO ACCESS TO THE NEAREST MARKET IN THE EXCLUSION ZONE WITH HIGH AND MODERATE VOLCANIC ACTIVITY

Number of people with more than 30 minutes to the nearest market compared to the total number of people in the exclusion zone



Methodology

Rainfall anomaly is a measure of a lack or excess of rainfall in a period compared to the average. The 3-monthly rainfall anomaly for Jan-Feb-Mar 2018 is derived from BMKG and CHIRPS long-term average dataset. Actual rainfall for February and March 2018 and forecast for May-July 2018 uses BMKG data. Thresholds for anomaly follows a standard protocol.

The number of maximum consecutive dry days is calculated as a count of the most recent days since a day had more than 1 mm of rain. The CDD map was generated from the Integrated Multi-satellitE Retrievals for GPM (IMERG) data product. Using a standard classification, also used by the Indonesia Weather and Meteorology Bureau (BMKG), drought level is then determined.

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).

The 1963 eruption and the latest data on population and infrastructure is used to estimate changes in access to markets for population during an eruption. The model for assessing travel time to the nearest market in the exclusion zone, pixel by pixel, combines remote sensing and other spatial data on landscape, road and river network, market location, population and obstruction caused by the eruption. Data on landscape and elevation is from USGS; Road network from OSM; market location, river and administrative boundaries is provided by BIG; land cover data is from GlobCOVER ESA, and data on population is from Facebook (2015).

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).

The bulletin is directed by Professor Rizaldi Boer of the Bogor Agricultural University (IPB). The World Food Programme and Food and Agriculture Organization of the United Nations provide technical support, including the generation of maps and data analysis.

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 WFP Indonesia.

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