Photo by Jason Goebel on Unsplash

August 2023

INDONESIA

A joint collaboration by:

Seasonal Monitoring Bulletin

April – June (Q2) 2023

BMKG · BNPB · BADAN PUSAT STATISTIK · BAPPENAS · BADAN PANGAN NASIONAL · BRIN · WFP

Photo by Gilang Aria Seta - WFP

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Key Messages

Fluctuating dimate situation across Indonesia: From April to June 2023, rainfall conditions varied geographically across Indonesia ranging from below- and above-normal conditions in comparison to the long-term average. Northern Sumatera, western and central Kalimantan, northern and eastern parts of Java, Bali, West Nusa Tenggara, southern Sulawesi and central parts of Papua received below-normal rains. On the contrary, southern parts of Sumatera, eastern Kalimantan, Central Sulawesi, Maluku, East Nusa Tenggara, northern and southern Papua received above-normal rainfall. The Meteorological, Climatological, and Geophysical Agency (BMKG) reported that approximately 60% of the regions in Indonesia entered dry season as of June 2023, and a meteorological drought was noticed in Java, Bali, and Nusa Tenggara.

Increased frequency of disasters impact: Indonesia's National Disaster Management Agency (BNPB) reported 1094 disasters between April and June 2023. The majority of which were caused by hydrometeorological hazards. Central and West Java were amongst the worst affected provinces.

Status of Food Security and Nutrition: According to the National Food Agency (NFA), more than half of all provinces in Indonesia were considered food secure in May 2023. Out of 34 provinces, 22 provinces were categorized as stable, while 12 other provinces (i.e., Central Java, DI. Yogyakarta, West Kalimantan, North Kalimantan, South Kalimantan, South Sulawesi, Central Sulawesi, West Sulawesi, West Papua, Papua, East Nusa Tenggara, West Nusa Tenggara) were being monitored for possible deterioration for its food security and nutrition situation.

Continued impact of El Niño anticipated: The National Research and Innovation Agency (BRIN) predicted that an El Niño event will likely have implications on rice planting and potentially increase the risk of drought in the second half of 2023. Additionally, an anticipated delay in the onset of the rainy season could potentially result in reduced rice production by late 2023 and early 2024. According to the BMKG and global meteorological and climatological agencies, the weak El Niño is transitioning to a moderate El Niño, which is expected to persist until end of 2023.

Media Reports

Dry season has started in 63% area in Indonesia

(01/08/2023) BMKG Press Release – Based on the latest 10-day analysis (July 2023), 63% of areas in Indonesia have started to experience dry season. BMKG predicted that the current dry season will be drier than the last three years. It is predicted that all areas within Java, Bali, and Nusa Tenggara will be impacted, as well as some provinces in Sumatera, Kalimantan, and Sulawesi. Agriculture is expected to be the most affected sector, chiefly due to limited rainfall. BMKG encourages sub-national governments to implement preventive measures to minimize potential damage [1].

NFA: Food Stocks are ready to anticipate El Niño Impacts

(31/07/2023) NFA Press Conference – The Head of National Food Agency (NFA), Arief Prasetyo Adi, stated that the national governments continue to implement strategic measures to prevent and mitigate the impact of El Niño on national food security. NFA has instructed the national bureau of logistics (Perum Bulog) to increase rice stocks by more than 1 million tonnes. In collaboration with various stakeholders, NFA also implements a set of activities to maintain the price level of foods through *Gerakan Pangan Murah* (GPM), *Fasilitasi Distribusi Pangan* (FDP), and rice support program for *Keluarga Penerima Manfaat* (KPM). The Head of NFA also reminded the public to minimize food loss/waste and overspending to fight potential impacts of El Niño [2].

BMKG Reminded the Threats of Harvest Failure and Forest Fire during the Drought, Dry Season

(24/07/2023) BMKG Press Release – The Head of the Meteorology, Climatology and Geophysics Agency (BMKG), Dwikorita Karnawati, reminded the public about the possibility of negative impacts from El Niño and the positive Indian Ocean Dipole (IOD). IOD describes the differences in ocean temperature between western and eastern Indian Ocean, where positive value may generate drier condition in Indonesia. With both El-Nino and positive IOD, Indonesia is predicted to experience significantly less rainfall. The drier condition is likely to increase the possibility of harvest failure and forest fires, particularly from August - early September when the peak of dry season is expected. [3].

As The Earth Gets Warmer, The Food Crisis Threats Are Not Fiction

(07/07/2023) BMKG Press Release– Head of the Meteorology, Climatology and Geophysics Agency (BMKG), Dwikorita Karnawati, said threats to food security as a result of climate change were real. She mentioned that global temperature has increased for about 1.2 degree Celcius since the mid-1800s, which has caused various hydro-meteorological disasters and extreme weather events. With a population of more than 10 billion people predicted globally by 2050, and a potential decrease in food production driven by climate change, a global food crisis will be a huge challenge. BMKG will continue to develop climate mitigation and adaptation measures to prevent and mitigate potential negative impacts. These include improving the climate and weather literacy of farmers through *Sekolah Lapang Iklim* (SLI)[1] [4].

[1] Sekolah Lapang Iklim (SLI) is a climate literation activities aim to improve the capacity of local farmers to use climatic data and information which can be directly used in agriculture. This is a collaborative action among BMKG, Ministry of Agriculture, sub-national governments, and NGOs.

SEASONAL MONITORING

CHANGES IN RAINFALL

VEGETATION MONITORING

TEMPERATURE MONITORING

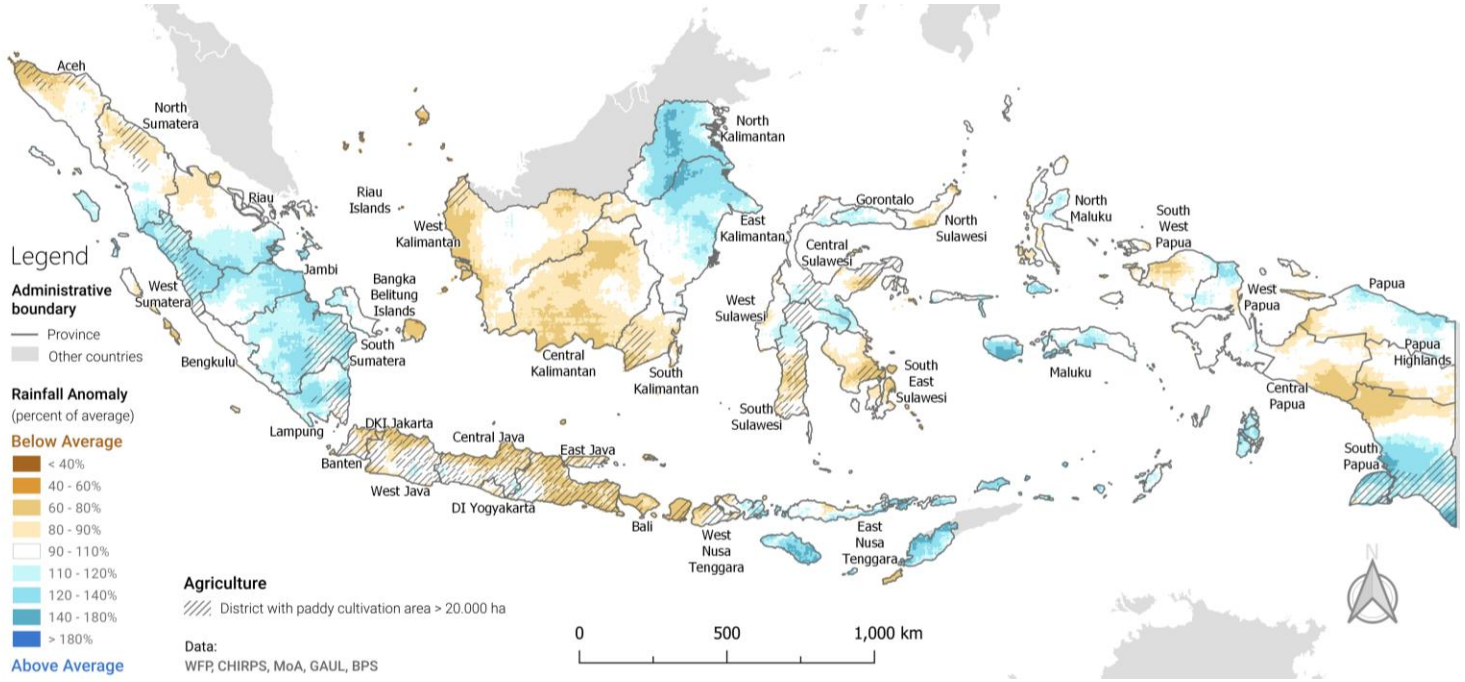
SEASONALITY STATUS

DROUGHT MONITORING

DISASTER MONITORING

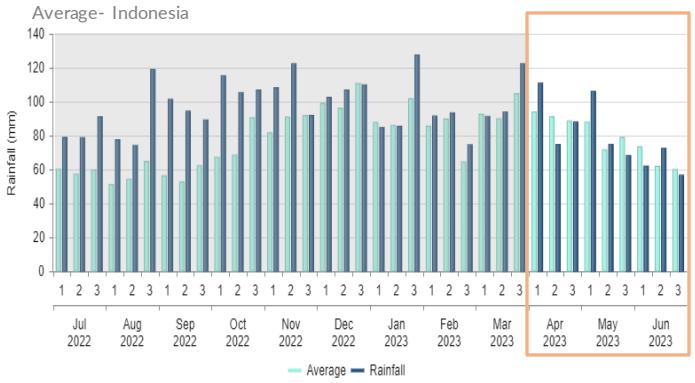
Changes in Rainfall: April – June 2023

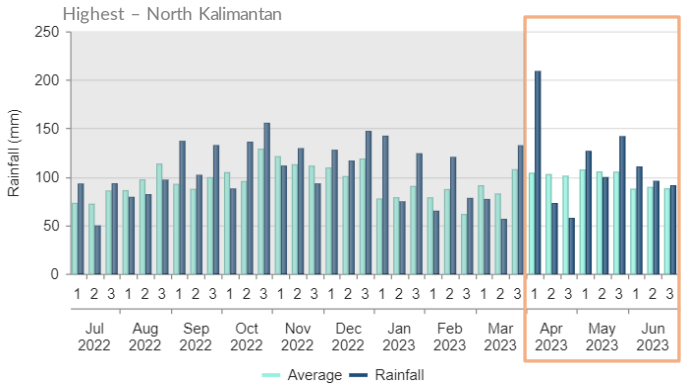
The accumulation of rainfall in comparison to 30-year average (1991-2020)

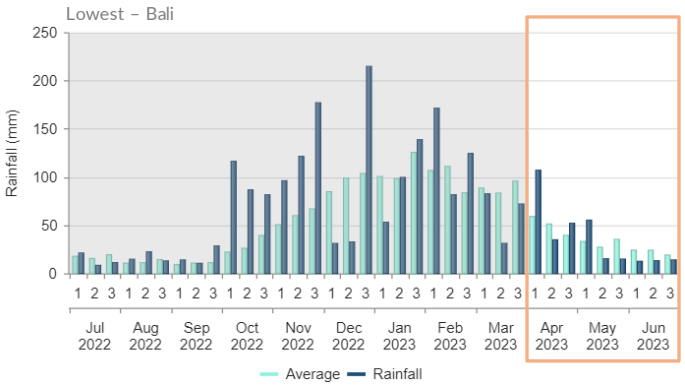


From April to June 2023, rainfall across Indonesia fluctuated between below- to above-normal, compared to the long-term average (30 years). Above-normal rainfall conditions were experienced in the following eight (8) provinces: West Sumatera, Jambi, South Sumatera, Lampung, North Kalimantan, East Kalimantan, East Nusa Tenggara, and Maluku. North Kalimantan recorded the highest rainfall anomaly among the provinces.

On the contrary, eleven (11) provinces experienced below-normal rainfall condition, namely parts of West Kalimantan, Central Kalimantan, South Kalimantan, Banten, DKI Jakarta, Central Java, East Java, Bali, West Nusa Tenggara, Sulawesi Tenggara, and Central Papua. Bali recorded the lowest rainfall anomaly among the provinces.



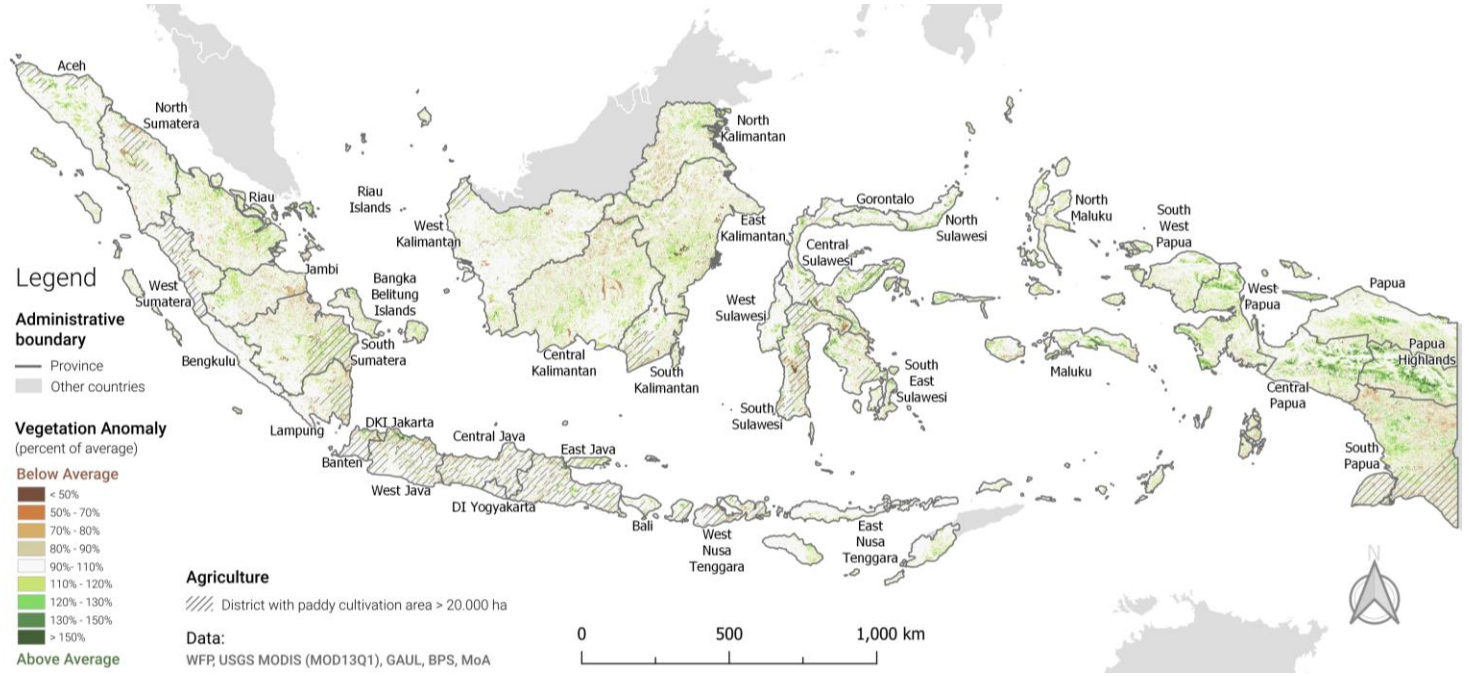


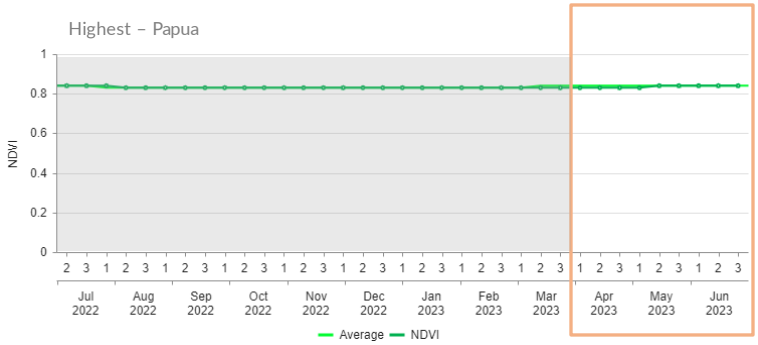


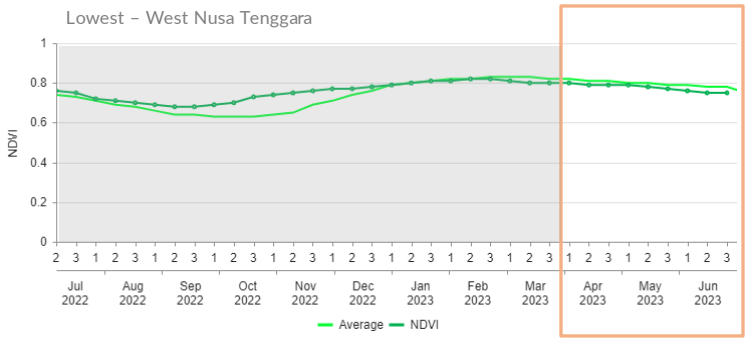
Rainfall data source: https://data.chc.ucsb.edu/products/CHIRPS-2.0/
Charts: https://dataviz.vam.wfp.org/seasonal_explorer/rainfall_vegetation/visualizations

Vegetation Monitoring: April – June 2023

Overall vegetation conditions in comparison to 20-years average (2001-2020)







NDVI data source: https://lpdaac.usgs.gov/products/mod13q1v061/
Charts: https://dataviz.vam.wfp.org/seasonal_explorer/rainfall_vegetation/visualizations

Between April and June 2023, the Vegetation Index (VI) throughout most of Indonesia was in-line with the long-term 20-year average.

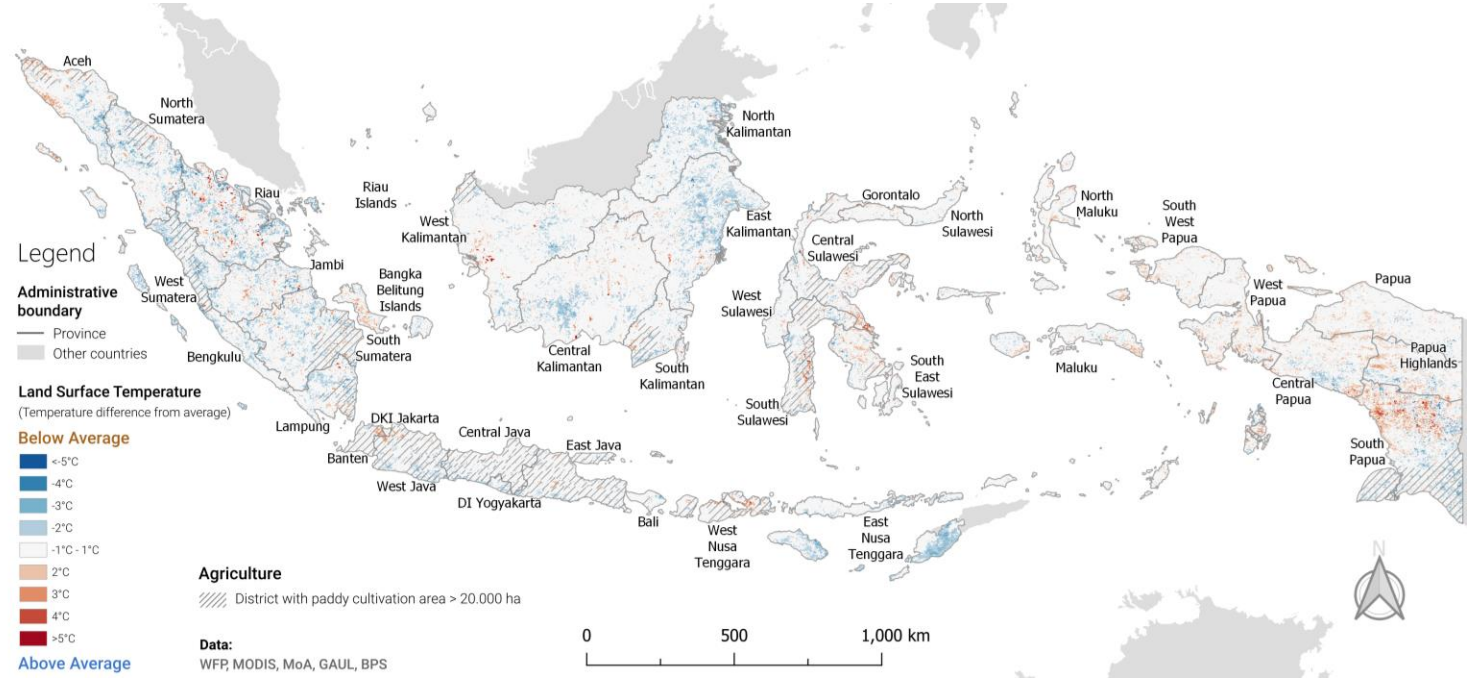
In Papua, an above-average VI was recorded, specifically in the central region. This is an indication of an increase in vegetation greenness, which correlates to healthy vegetation or crops.

In contrast, a below-average VI was observed in West Nusa Tenggara, the southern part of Sumatera, eastern part of Kalimantan, and across Java.

A below-average VI is an indicator of lower vegetation density and plant health due to environmental stressors, such as climatic hazards, land usage and land cover changes. This may be linked to an earlier onset of the dry season and below-average rainfall received during the second quarter of this year.

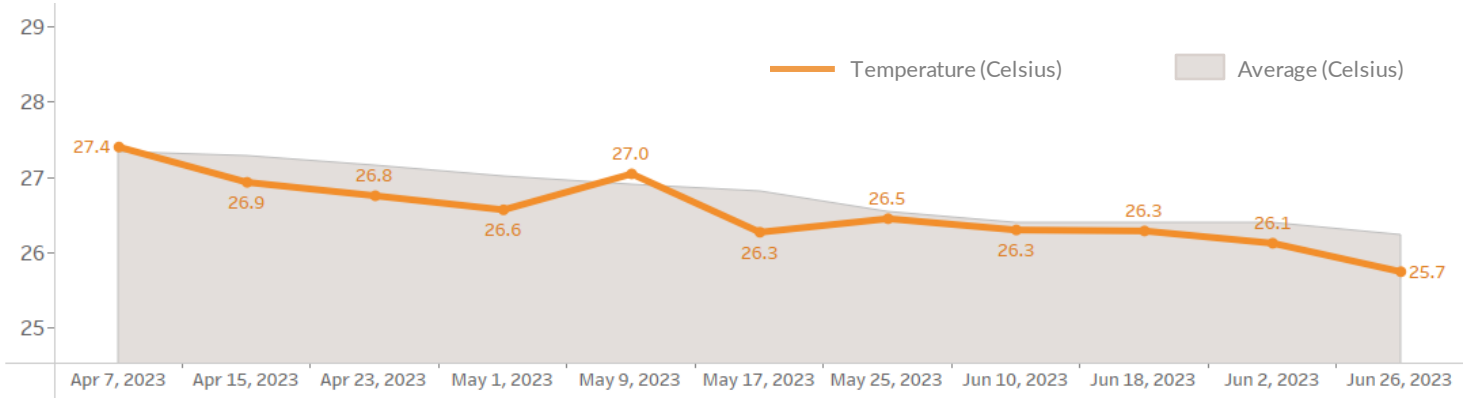
Temperature Monitoring: April – June 2023

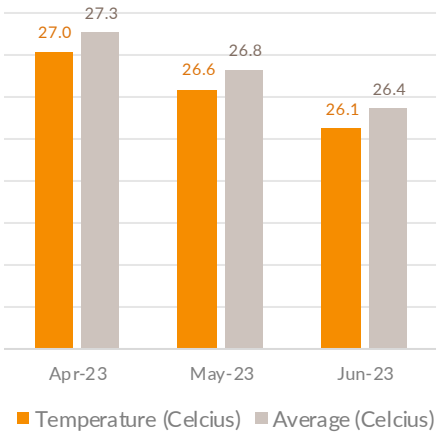
Surface temperature difference in comparison to 20 years of data average (2001-2020)



Throughout the second quarter of 2023, on average, the land surface temperature was slightly below normal in comparison to the long-term average across Indonesia. The week-to-week variation indicates that the first and third week of May experienced much lower temperature differences compared to the long-term average of the same period.

Below-average temperatures were observed in NTT, D.I. Yogyakarta, the western part of Sumatera, and the eastern part of Kalimantan. On the contrary, South Papua and the western part of Papua experienced slightly above-average temperatures.

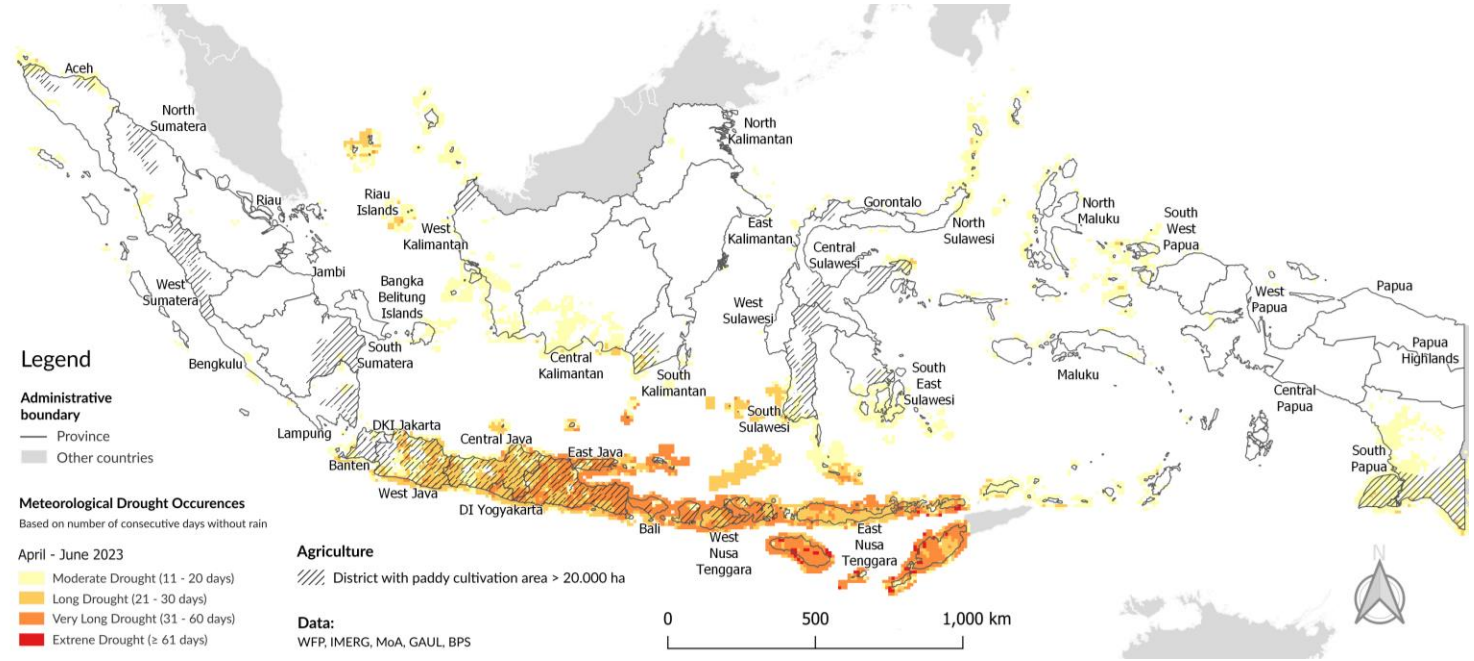




Surface temperature data source: https://lpdaac.usgs.gov/products/mod11a2v061/

Drought Monitoring: April – June 2023

Number of consecutive days since the last rainfall (above 1mm per day)

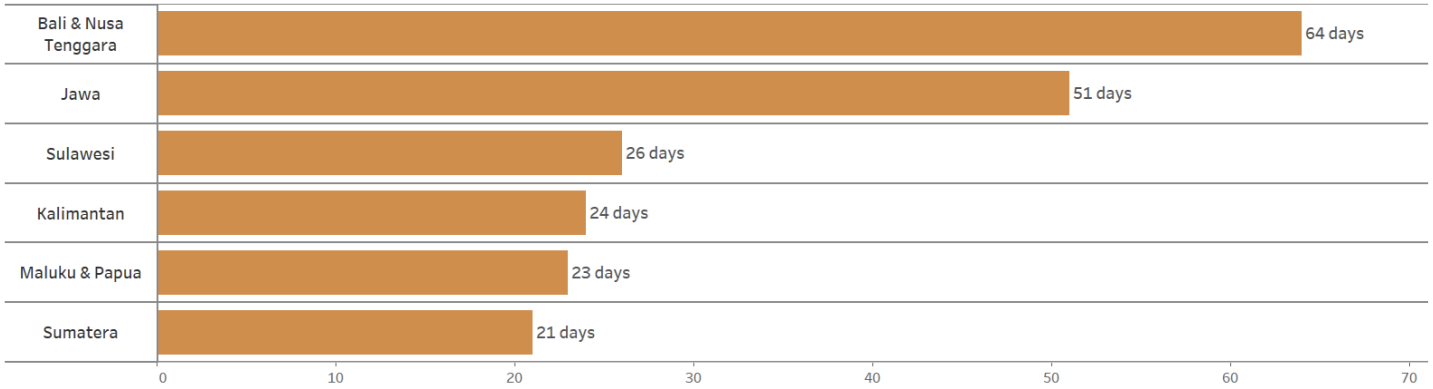


During the second quarter of 2023, the satellite observations indicated Java, Bali, and Nusa Tenggara islands experienced meteorological drought. The Meteorological, Climatological, and Geophysical Agency (BMKG) uses the number of consecutive days without rain as a proxy indicator of meteorological drought.

Eastern parts of Nusa Tenggara received no rainfall for up to 64 consecutive days, classifying the area as extreme drought category. This increases the risk of limited water availability and the threats to rainfed agriculture activities.

In comparison, Sulawesi, Kalimantan, Sumatera, Maluku, and Papua recorded fewer consecutive days without rain, thus facing minimal risk of drought.

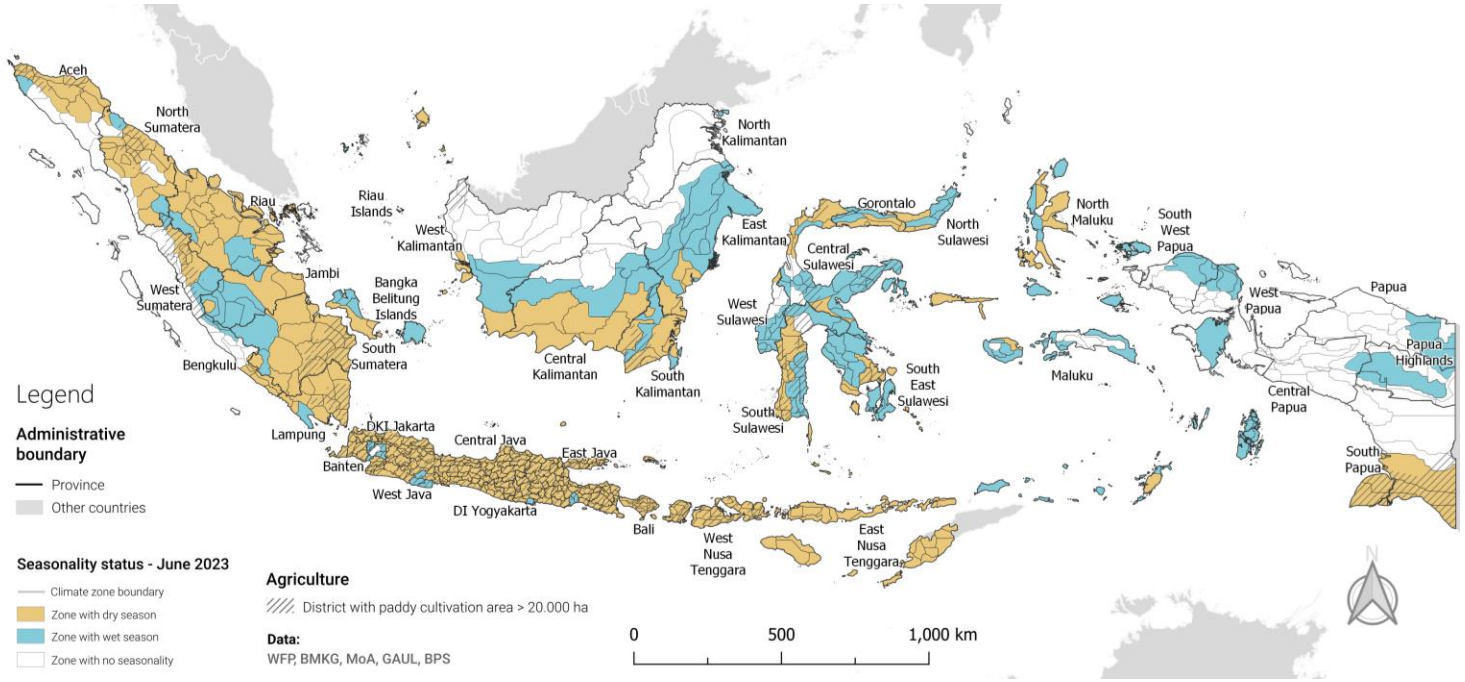
Maximum number of consecutive days without rain in each region



Rainfall data source: https://gpm1.gesdisc.eosdis.nasa.gov/data/GPM_L3/GPM_3IMERGDL.06/
Current drought situation: https://prism.wfp.or.id/app/?hazardLayerIds=dslr

Seasonality Status: June 2023

Climate zone that currently experience dry or rainy season

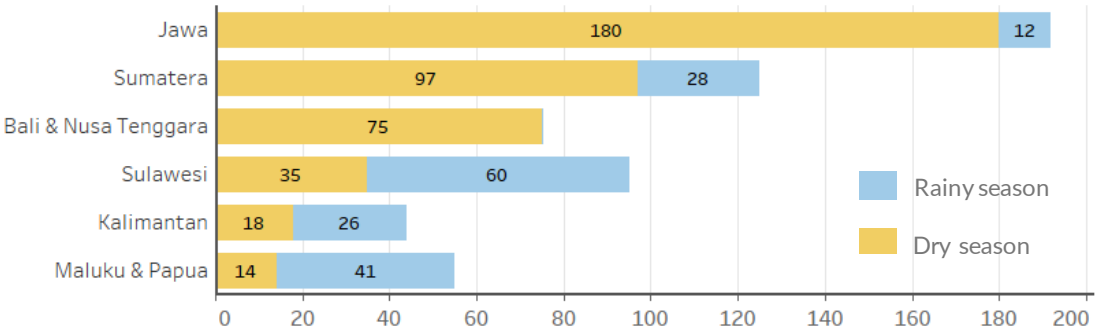


Rainfall patterns in Indonesia can be characterized as monsoonal, equatorial, and local climate zones. Rainfall patterns within each climate zone can vary based on regional and local factors.

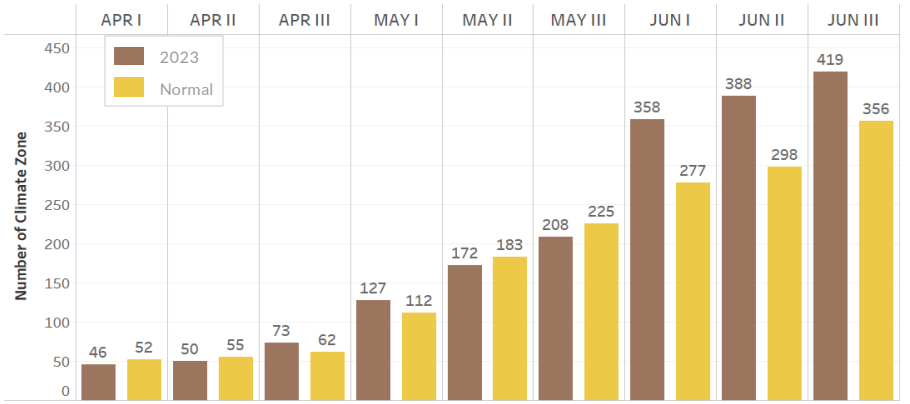
A report from the Meteorological, Climatological, and Geophysical Agency (BMKG) indicated 419 (60%) out of the total 699 climate zones had transitioned into the dry season by June 2023. Java has the maximum number (180) of climate zones experiencing dry season, followed by Sumatera (97), and Bali and Nusa Tenggara (75).

This number is relatively higher compared to the average normal condition, where only about 356 out of 699 zones experiencing dry season in June. On the contrary, 167 out of 699 climate zones remained in the rainy season by June 2023, with maximum number found in Sulawesi.

Seasonality Status: June 2023



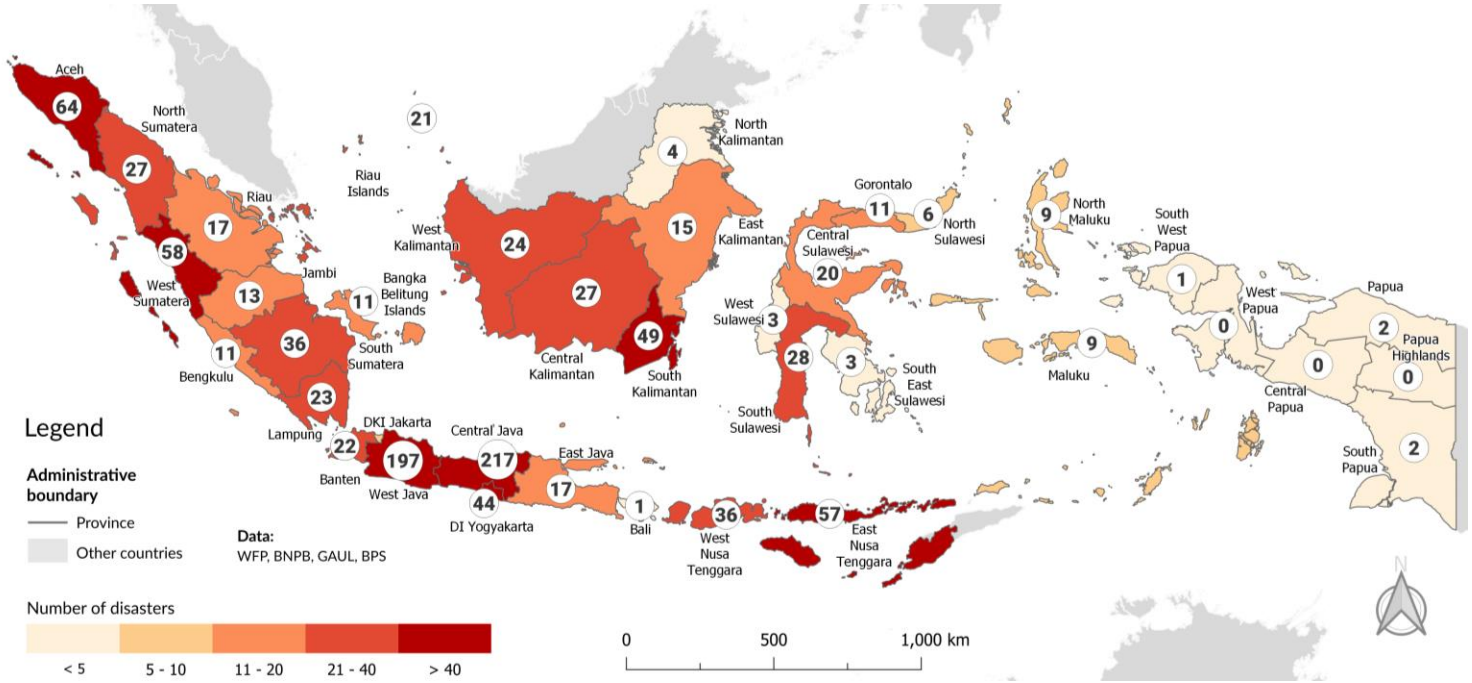
Climate Zones Experiencing Drought in 2023 and in Normal Condition



BMKG Seasonality Status: https://cdn.bmkg.go.id/web/18.-Dinamika-Atmosfer-Dasarian-III-Juni-2023.pdf

Disaster Monitoring: April – June 2023 (Q2)

Number of reported disasters by the National Disaster Management Agency



The National Disaster Management Agency reported 1094 disasters between April and June 2023. This represents a 39.5% increase compared to the same period in 2022 (784 disasters). The most affected provinces were Central Java and West Java, which experienced a total of 414 disasters.

Majority of the disasters were hydrometeorological (736 out of 1094). The hydrometeorological disasters happened this year are also higher in comparison to last year within the same time period.

The number of people impacted by disasters during this period increased by 31% compared to the same period in 2022. The disasters claimed 41 lives, 2 people missing, and 5381 physically injured.

	Flood	Extreme Weather	Landslide	Land & Forest Fire	Tidal Wave & Abrasion	Earthquake	Drought	TOTAL DISASTERS	Damaged Infrastructures	Impacted Population
2023 Apr-Jun	334	389	198	146	9	5	13	**1094**	11,288	1,015,104
2022 Apr-Jun	294	282	165	35	3	4	1	**784**	4,714	741,089
	+13,6%	+37,9%	+20,0%	+317,1%	+200%	+25%	+1200%	+39,5%	+139%	+36.9%

BNPB Disaster Monitoring: https://gis.bnpb.go.id/

FOOD SECURITY AND NUTRITION

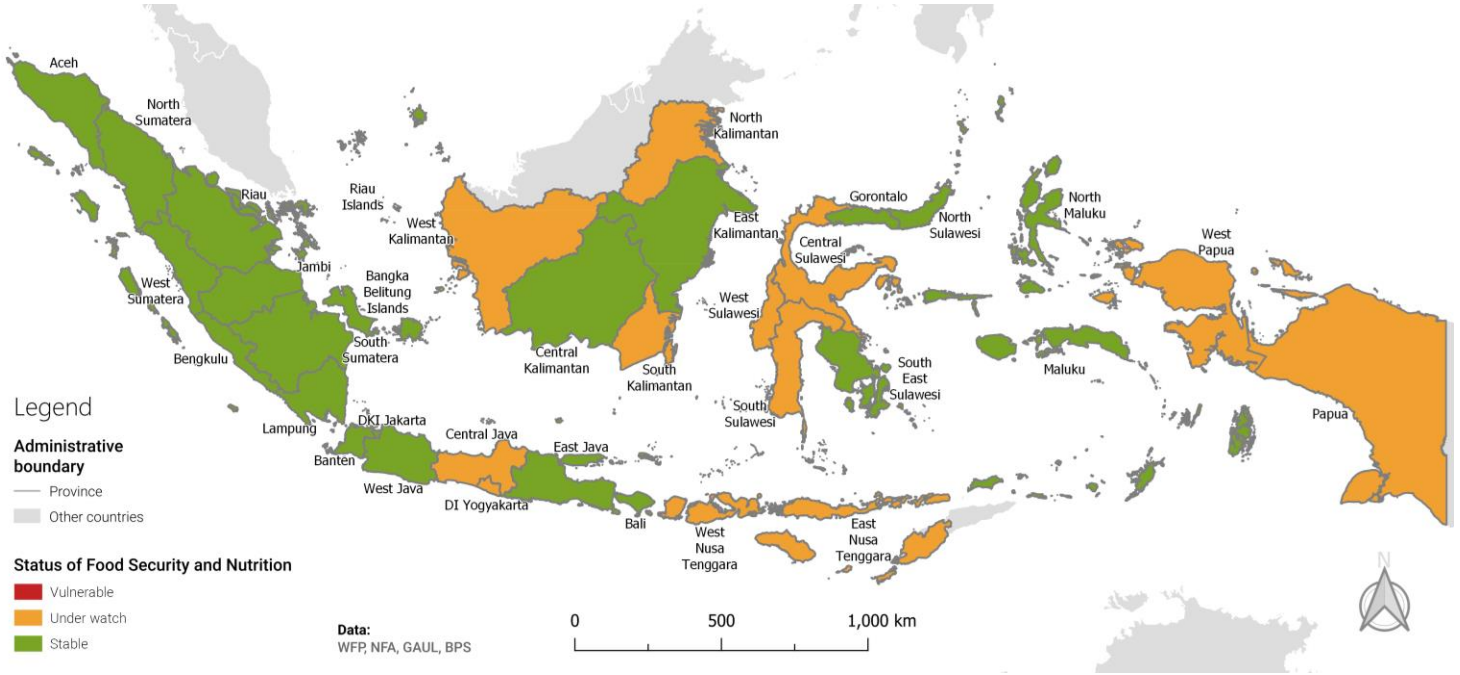
STATUS OF FOOD SECURITY AND NUTRITION

DISTURBANCES TO PADDY CROPS

AGRICULTURAL MONITORING AND FORECAST

Status of Food Security and Nutrition: June 2023

SKPG: Composite Food Security Index Map



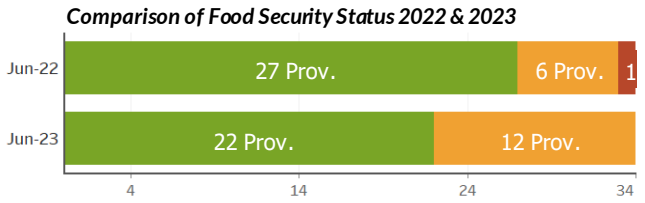
Based on the June 2023 analysis of the Nutrition Surveillance System (SKPG), 12 provinces were categorised as under watch for possible degradation of food and nutrition security. This included West Kalimantan, North Kalimantan, South Kalimantan, Central Sulawesi, West Sulawesi, South Sulawesi, North Maluku West Papua, Papua, East Nusa Tenggara, West Nusa Tenggara, Central Java, and DI Yogyakarta. The remainder are considered stable.

Compared to June 2022, the number of Vulnerable status in June 2023 reduced by 1 province (NTT). On the other hand, the number of "Under Watch" provinces doubled (12 provinces), while "Stable" status decreased by 18.5% (5 province).

Food access remained stable across all of Indonesia. However, in 26 of 34 provinces **food availability** is under watch.

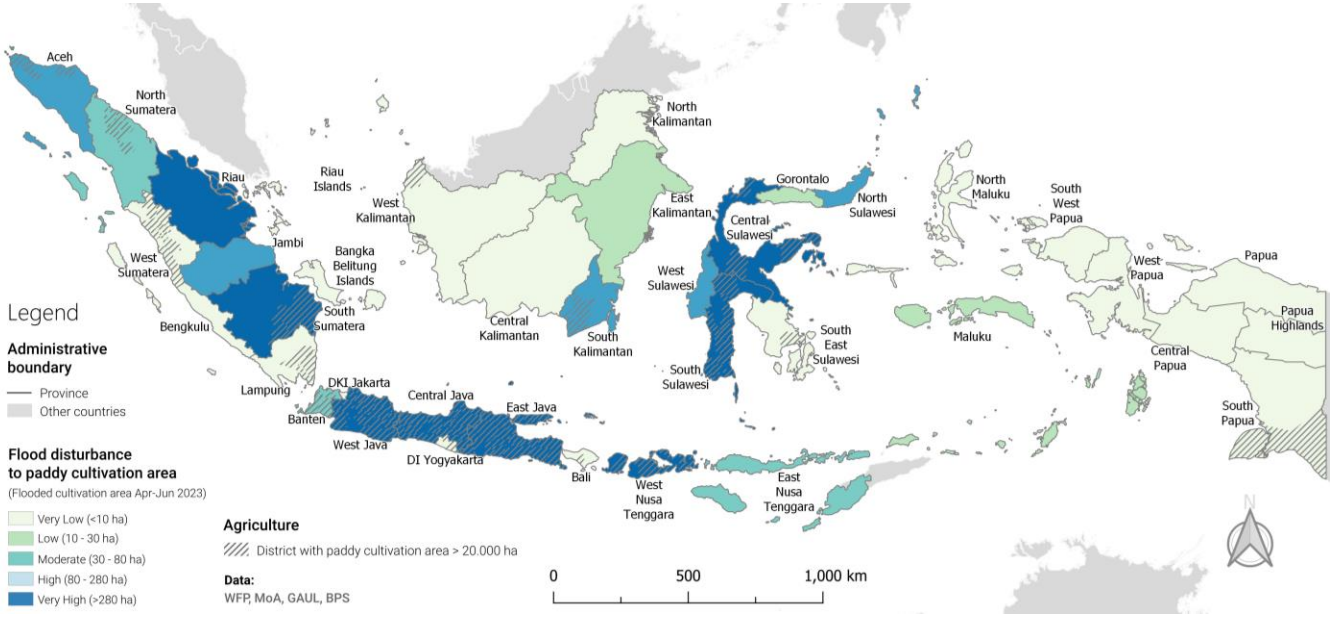
In terms of **food utilization**, Central Java, DI Yogyakarta, West Nusa Tenggara, Central Sulawesi, South Sulawesi, Maluku, North Maluku, Papua and Kalimantan (North, West, South, East) were categorized as 'under watch', while East Nusa Tenggara, West Sulawesi, and West Papua were categorized as 'vulnerable'.

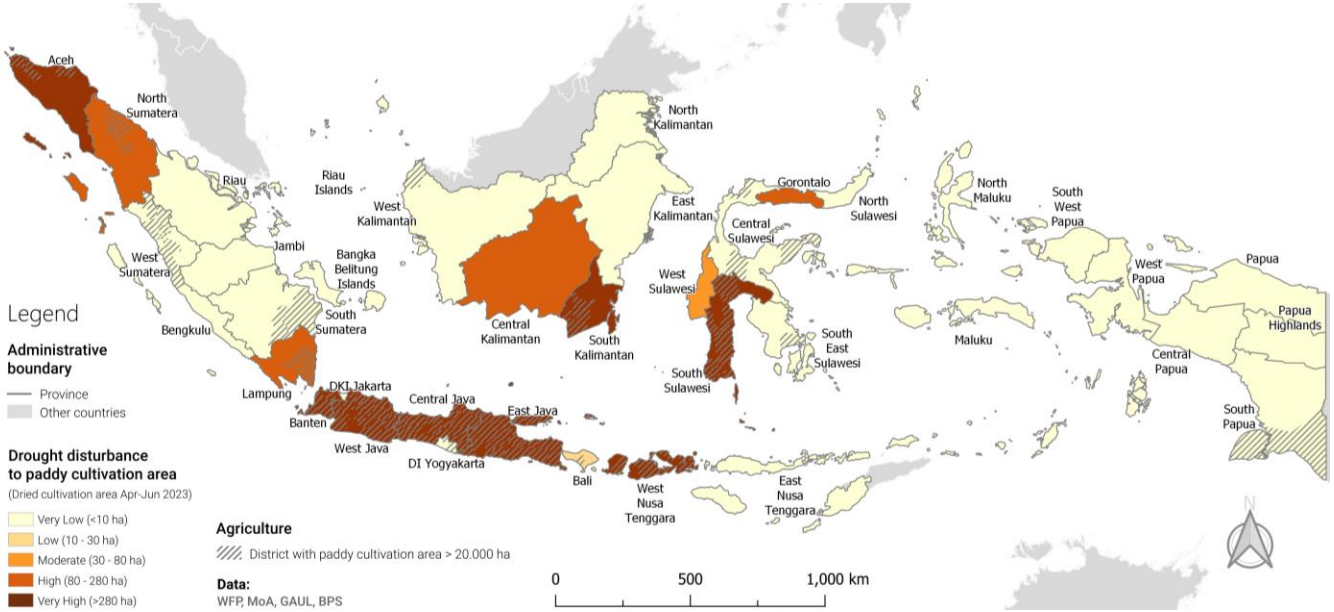
**Statistics by number of provinces, regions are groups for the purpose of the analysis*



Disturbances to Paddy Crops: April-Jun 2023

Impacted paddy cultivation area by floods and droughts

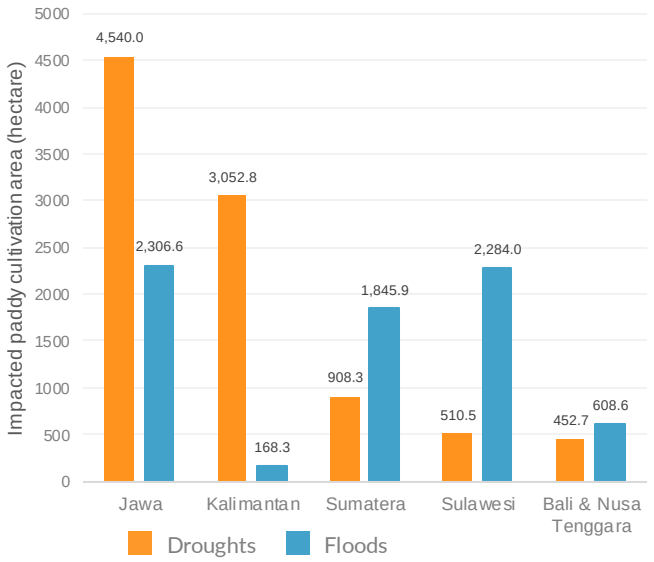




As reported by the Ministry of Agriculture, floods and droughts caused disturbances to paddy crops in several areas across Indonesia, between April and June 2023.

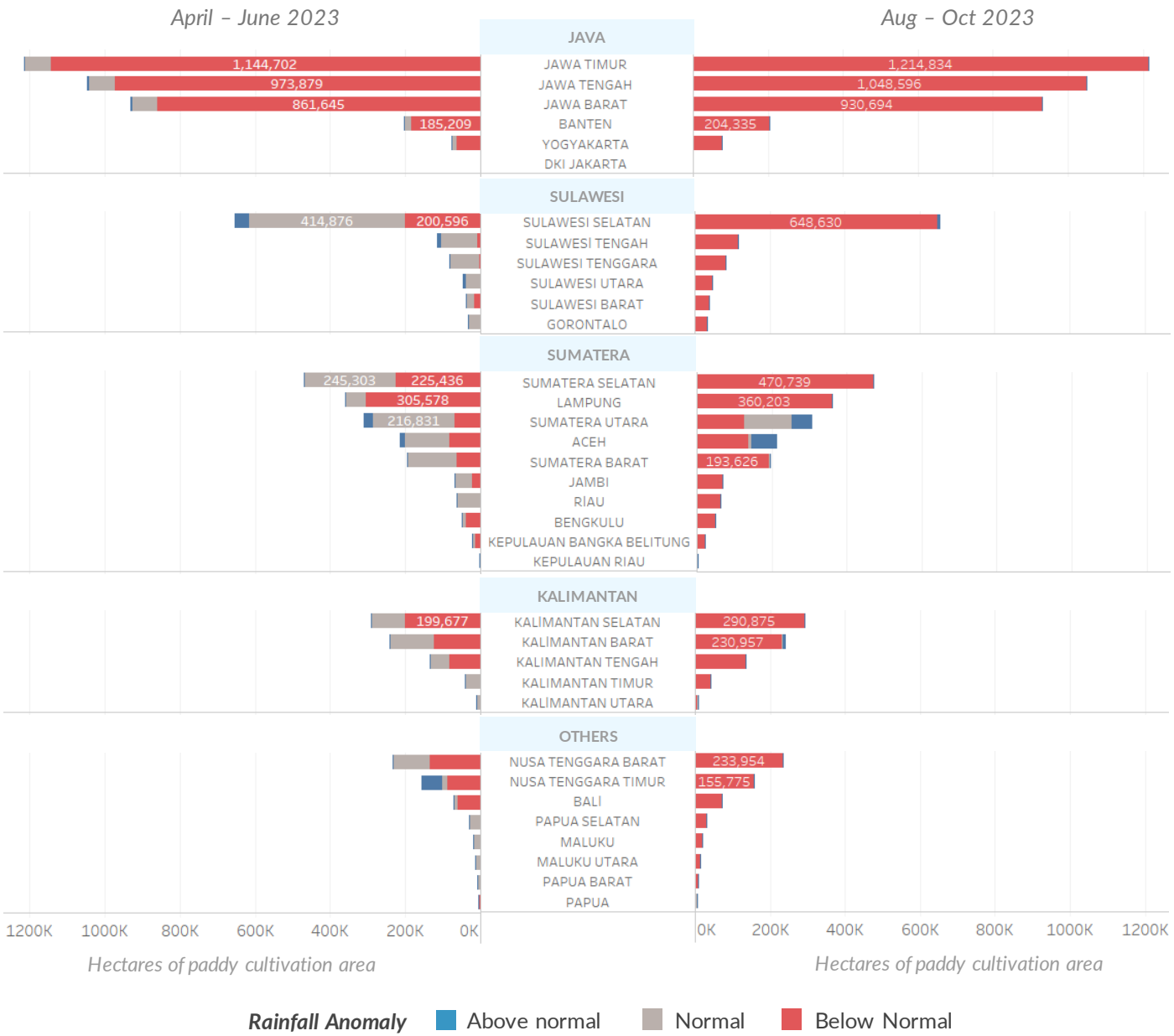
Floods impacted 7,233 hectares of paddy cultivation areas, with approximately 20% of the damage occurring in Central Sulawesi (1,389 hectares).

In addition, droughts impacted 9,464 hectares of paddy cultivation areas. South Kalimantan was the worst affected province, accounting for 2,777 hectares (29%) of the total.



Agricultural Monitoring and Forecast

Rainfall in Paddy Cultivation Areas



According to the Center for Climate and Atmospheric Research (PRIMA) of the National Research and Innovation Agency (BRIN), 67% of paddy cultivation areas received below-normal rainfall between April and June 2023.

PRIMA models indicated that most paddy cultivation areas will receive less rainfall between August and October 2023, in comparison to previous years. This drier condition has the potential to impact rice production across - more than seven million hectares of paddy cultivation areas.

BRIN's forecast indicated that the onset of El Niño is likely to occur in the second half of 2023, thus potentially negatively impacting rice planting season. An anticipated delay in the onset of the rainy season may result in reduced rice production by the end of 2023 or early 2024.

CLIMATE FORECAST

ENSO OUTLOOK

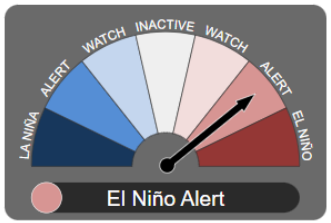
BMKG EARLY WARNING INFORMATION

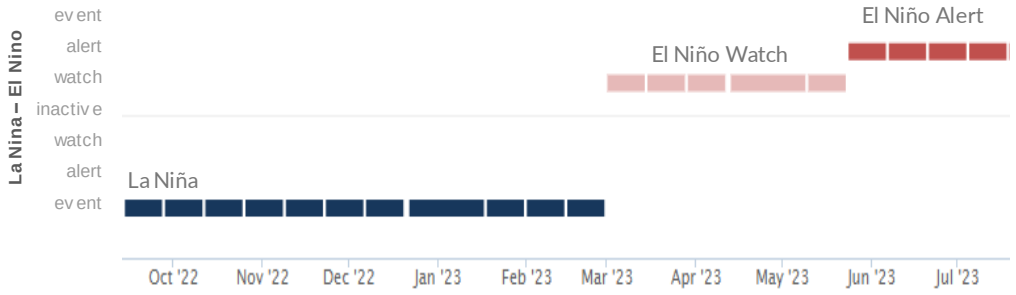
BMKG RAINFALL FORECAST

CLIMATE OUTLOOK

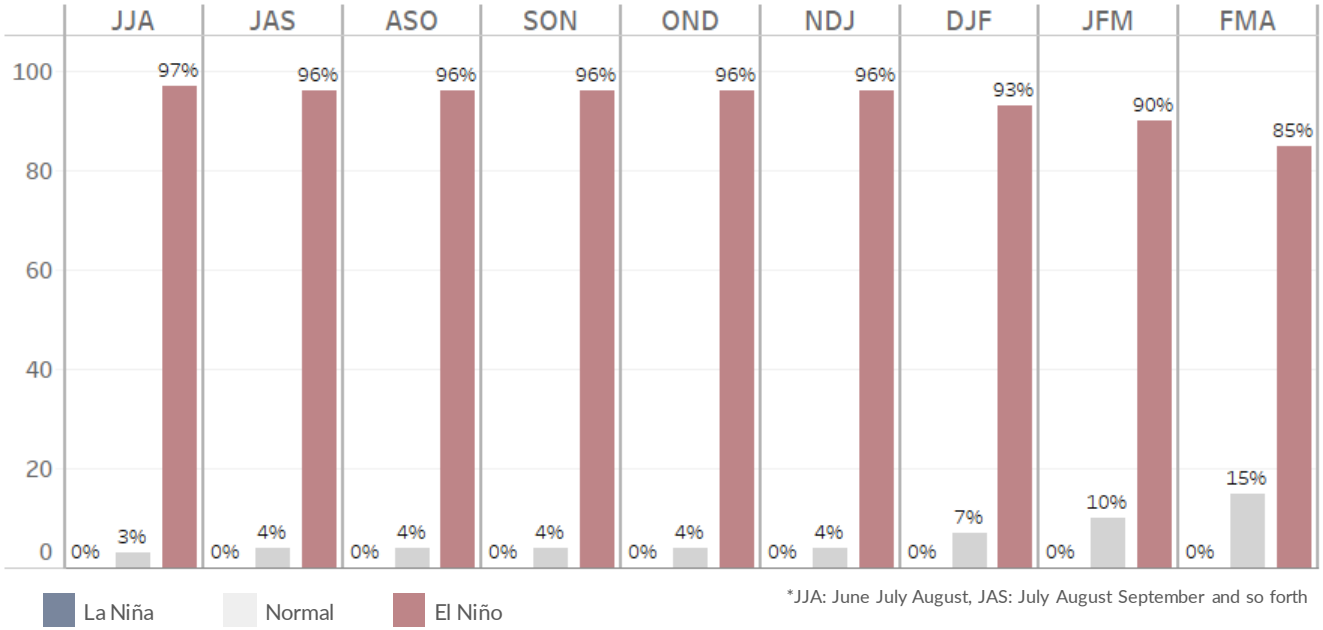
GOVERNMENT RECOMMENDATIONS

ENSO Outlook: July 2023





ENSO Probabilities (%)



*JJA: June July August, JAS: July August September and so forth

The El Niño–Southern Oscillation (ENSO) outlook indicates the persistence of weak El Niño conditions, likely to continue into the second half of 2023. The International Research Institute for Climate and Society (IRI) modelling indicates likely persistence of El Niño until early 2024.

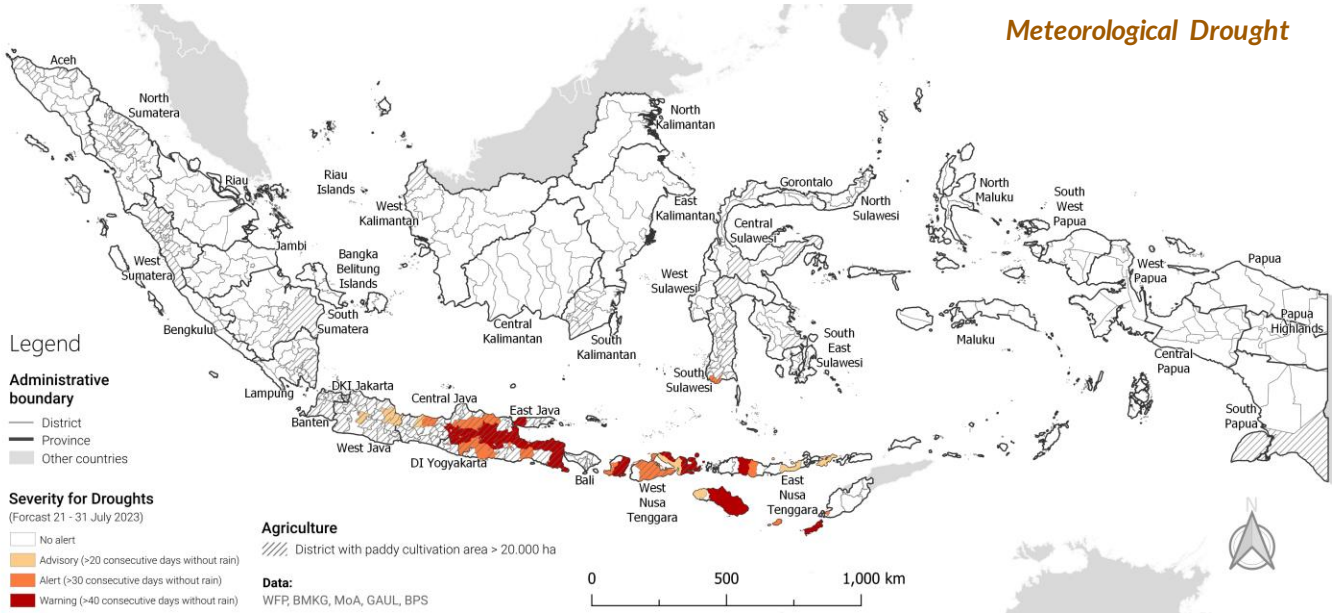
El Niño typically causes drier and warmer conditions across Indonesia, due to less rainfall, which can lead to drought conditions. Although it is important to note that the impact on the amount and distribution of rainfall might vary across different provinces.

BMKG ENSO Analysis: https://cdn.bmkg.go.id/web/19.-Dinamika-Atmosfer-Dasarian-I-Juli-2023.pdf
Historical ENSO Outlook: http://www.bom.gov.au/climate/enso/outlook/
ENSO Probabilities: https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-cpc_plume

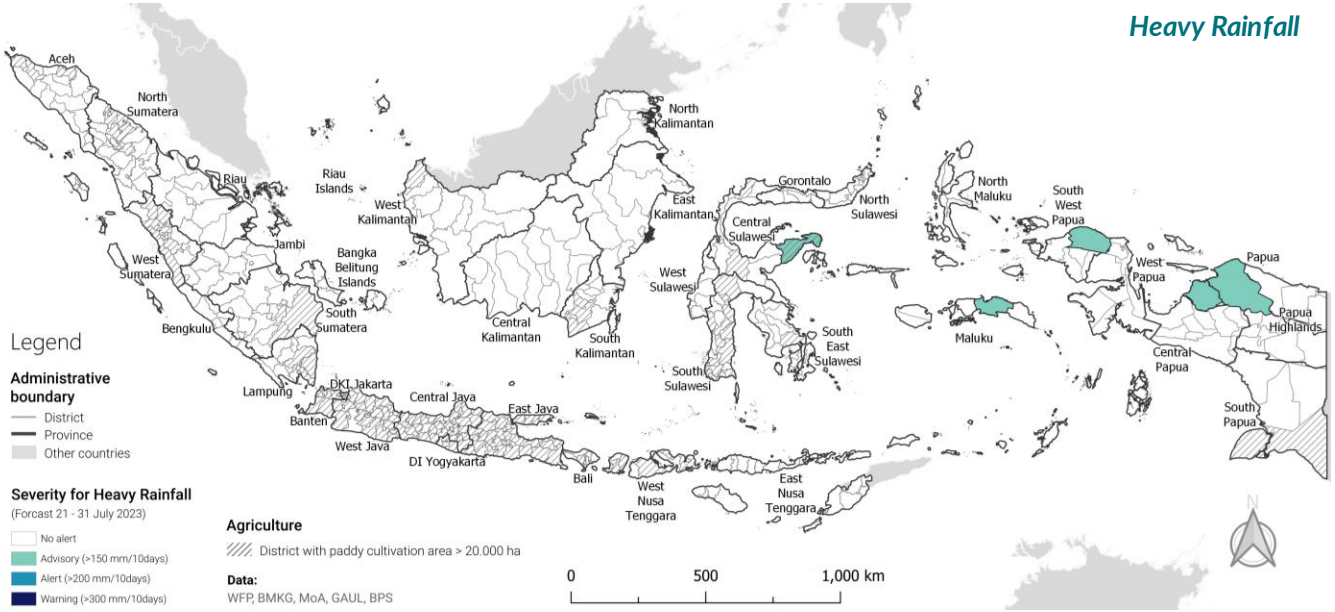
BMKG Early Warning Information: July 2023

Early warning on meteorological drought and heavy rainfall events

Meteorological Drought



Heavy Rainfall



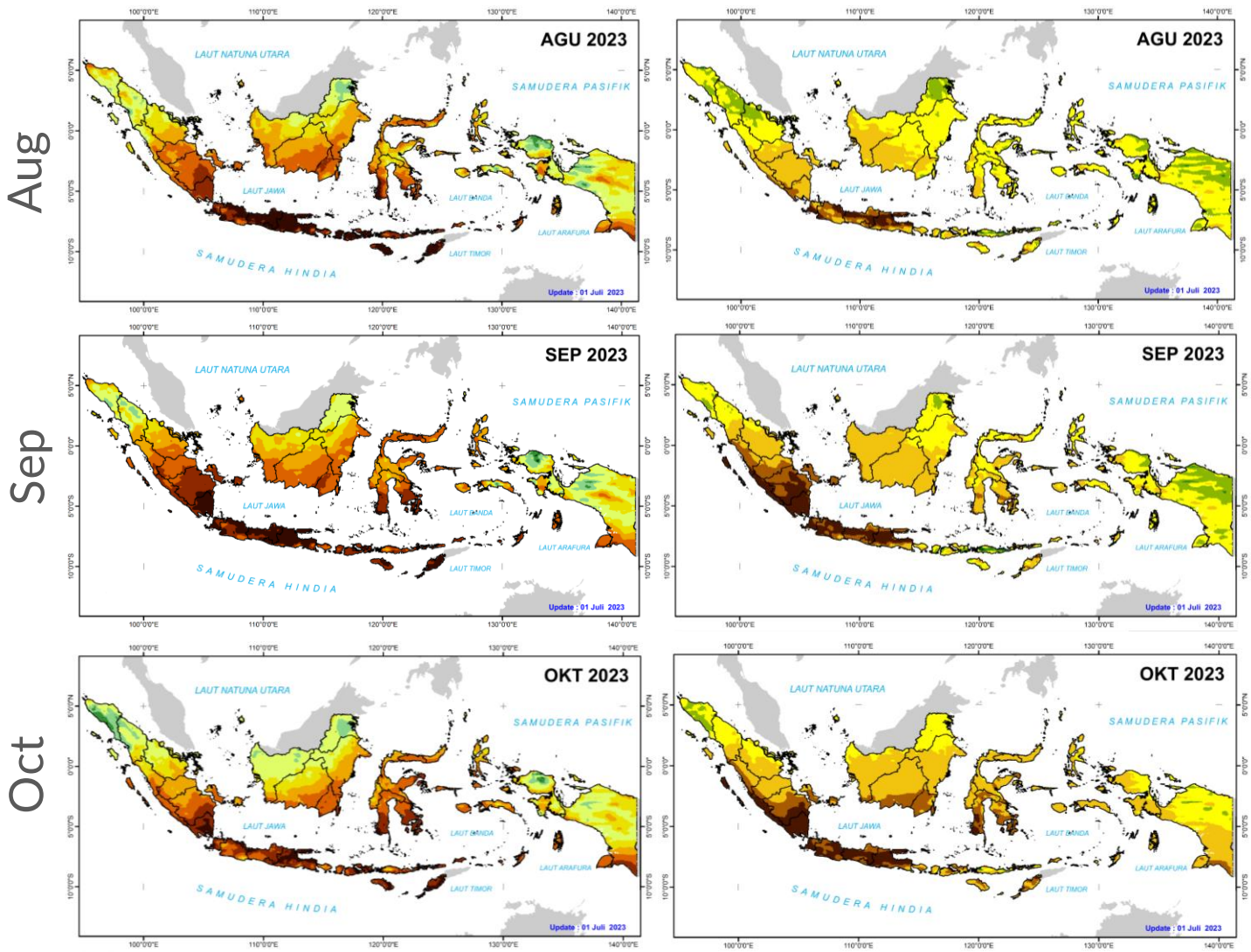
Early warning information (20 July 2023) from the Climate Early Warning System of Meteorological, Climatological, and Geophysical Agency (BMKG) indicates high risk of meteorological drought in East Java, West Nusa Tenggara, and East Nusa Tenggara. The Labuhan Pandan sub-district of West Nusa Tenggara has not received rainfall for 101 consecutive days, which poses a significant threat of drought. Meteorological drought may lead to a decrease in water supply for agricultural and household needs.

Extreme weather accompanied by heavy rainfall can increase the chance of floods and landslides. The probability of heavy rainfall (>200mm/10 days) is predicted during the first ten days of August in several districts in the provinces of Central Sulawesi, Maluku, Southwest Papua, and Central Papua.

BMKG Climate Early Warning System: https://cews.bmkg.go.id/

BMKG Rainfall Forecast: August – October 2023

Monthly rainfall accumulation and anomaly forecasts



BMKG Climate Bulletin: https://www.bmkg.go.id/iklim/buletin-iklim.bmkg

According to the latest forecasts by Meteorological, Climatological, and Geophysical Agency (BMKG) , Indonesia is expected to have low- to moderate rainfall between August and October 2023. Approximately 40% of the regions in Indonesia are experiencing below-normal rainfall as of June 2023. The anticipated below-normal rainfall conditions from August to October are likely to aggravate the impact of the drought conditions.

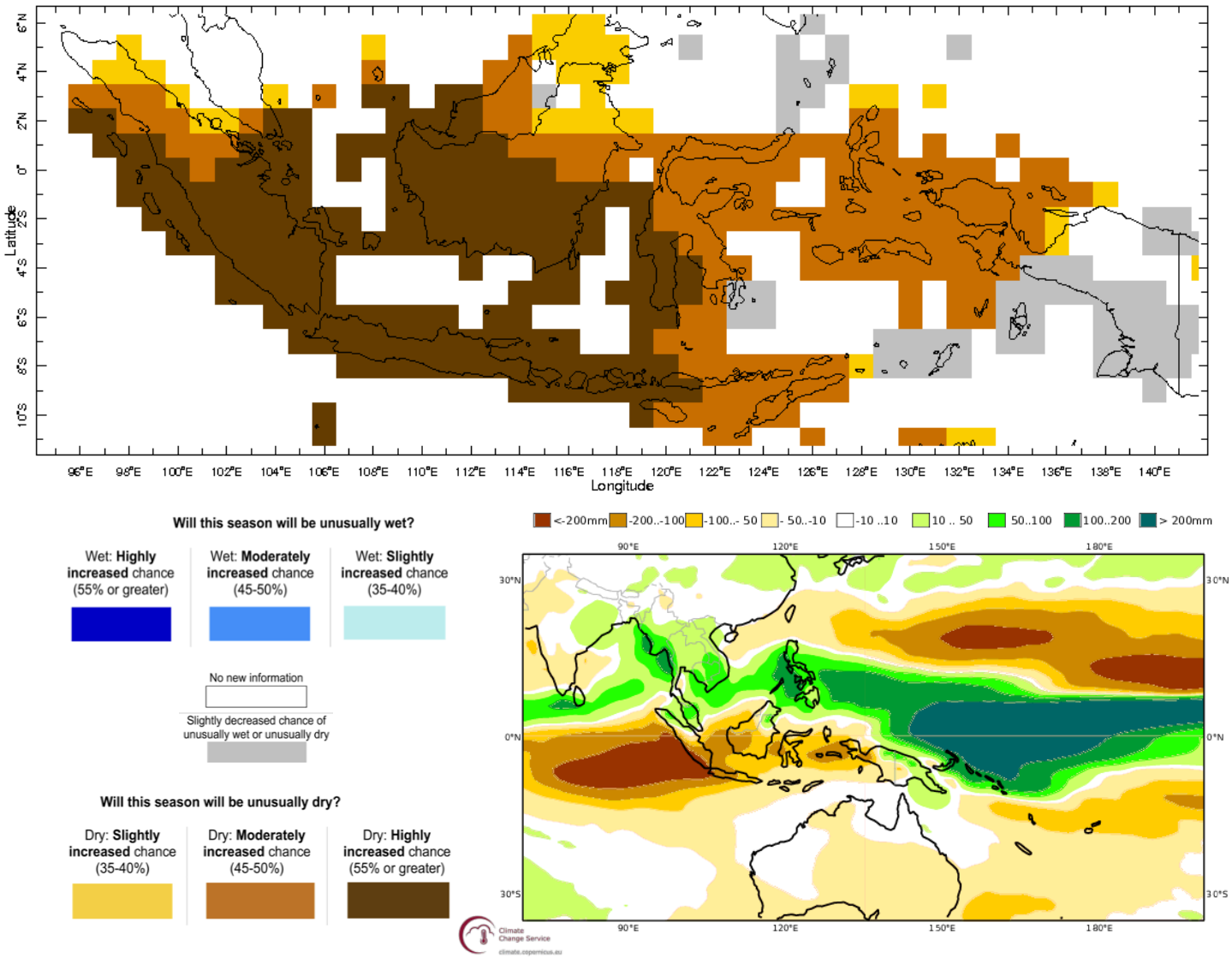
In **August**, 35% of the regions in Indonesia are expected to receive low rainfall, characterized by monthly accumulated rainfall ranging between 0 to 100 mm. Below-normal rainfall is expected in Java, Nusa Tenggara, southern Sumatera, and the western part of Kalimantan and Sulawesi.

By **September**, a significant increase in regions receiving low rainfall is anticipated. It is expected to increase to approximately 45% of the total Indonesia's territory. Below-normal rainfall is anticipated in Sumatera, Java, Kalimantan, Nusa Tenggara and Sulawesi.

By **October**, 35% of the regions in Indonesia are likely to receive low rainfall. Southern Sumatera, Java, Kalimantan, Sulawesi and southern Papua are expected to have below-normal rainfall.

Climate Outlook: August – October 2023

Seasonal rainfall anomaly forecast



IRI: http://iridl.ldeo.columbia.edu/maproom/IFRC/FIC/prcp_fcst.html?bbox=bb%3A94.584%3A-11.255%3A141.811%3A6.308%3Abb
ECMWF: https://climate.copernicus.eu/charts/packages/c3s_seasonal/products/c3s_seasonal_spatial_mm_rain_3m?area=area12&base_time=2023070 10000&type=ensm&valid_time=202308010000

The three-month seasonal rainfall outlook from IRI Columbia University (top) and ECMWF (bottom-right) indicates a moderate to high chance of below normal rainfall for most provinces during the period of August to October 2023.

Dry conditions are generally expected across Indonesia except in eastern and southern part of Papua. The provinces with highest likelihood of dry conditions are Riau, West Sumatera, Jambi, Bengkulu, South Sumatera, Lampung, West Kalimantan, Central Kalimantan, South Kalimantan, South Sulawesi, Bali, West Nusa Tenggara and all of the provinces in Java.

There is a slight to moderate chance of dry conditions in Aceh, North Sumatera, East Kalimantan, North Kalimantan, North Sulawesi, Gorontalo, Central Sulawesi, West Sulawesi, Southeast Sulawesi, East Nusa Tenggara, Maluku, North Maluku, West Papua, and Southwest Papua.

These forecasts show the probability of accumulated rainfall over the next three months, either situated above or below normal conditions compared to the long-term average. It does not indicate chances of individual heavy rainfall events and should not be used to forecast local conditions or floods.

Government Recommendations

In anticipation of the dry season and prolonged drought

BMKG advises the technical ministries, local government, and related institutions, as well as local communities to be prepared for the potential impacts of the dry season and El Niño, which could result in severe and prolonged drought conditions -- particularly in areas experiencing below-normal rainfall. Adequate preparations and proactive measures are essential to mitigate the potential impacts of drought in this intensified dry period.

BRIN highlights the importance of monitoring the climate information from BMKG. Potential measures to anticipate the negative impacts of reduced rainfall in agricultural land may include normalisation of drainage channels to increase water supply in low-rainfall areas, cultivating drought-resistant crop seed varieties, and improving the management for agricultural areas affected by drought, such as implementing an adaptive planting schedule.

Bappenas advocates the utilization of geospatial data to strengthen the food system, particularly in decision support for boosting agricultural productivity through the analysis of land suitability and crop monitoring. Additionally, this data can support local governments in market mapping, understanding consumption preferences, and in the promotion of food distribution efficiency.

NFA suggests that the provinces categorized as vulnerable in terms of food security and nutrition should closely monitor rice prices and stocks for the next four months. They should also oversee local food reserves and coordinate market operations, as well as allocate food from surplus regions to deficit areas. Additionally, NFA advises local governments to collaborate with the department of agriculture in implementing pest control strategies to address the impact of flood and drought on crops.

MoA recommends adopting more precise planting arrangements using information from MoA WebGIS, such as Siperditan, Simotandi, and Siscrop. MoA also advises local governments to distribute seeds with disease- and drought-resistant characteristics and to effectively utilize reservoirs and dams for water management in agricultural areas.

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