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INDONESIA

Impact Monitoring of Hydrometeorological Hazards

Special Focus: Peak of Dry Season 2021



September 2021

a bulletin from



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Key Messages

Update on Climate Situation

Despite the absence of La Niña/El Niño events date to date, climate anomalies did occur. In Northern Indonesia, conditions were wetter than the long-term average, while conditions were drier than the long-term average in southern Indonesia. This anomaly led to hydrometeorological disasters including floods in northern Indonesia (especially in Kalimantan), and drought in southern Indonesia (particularly in Nusa Tenggara Timur).

Impact of Climate and Hydrometeorological Disaster

Livelihoods Impact

In comparison with the previous year the number of disasters in Indonesia was 4% to 6% lower during the period January - August 2021. However, the number of affected persons, including those displaced, increased by nearly 50% compared to the previous year. Thus far in 2021, 5.8 million people have been affected by disasters compared to 3.8 million as of this time in 2020.

Impact to agriculture

Despite pest and drought disturbances, paddy crop failure was lower in April to June 2021 compared to the same period last year. Floods in May 2021 were the dominant cause of the 5.300 ha paddy crop failure during this period. This is 65% lower in comparison to the same period last year (15,000 ha).

Government Hazard Preventive Actions and Interventions on Food Security

Hazard Prevention

The BAPPENAS and the Ministry of Agriculture continued supporting farmers through a subsidized agriculture insurance programme to mitigate the impact of climate hazards by utilising recently developed yield index.

In April 2021 the Ministry of Agriculture through its Agriculture Business Insurance (AUTP) scheme covered around 113,000 farmers with over 66,000 ha of paddy areas. In 2020, nearly 1 million ha of paddy areas were insured by the AUTP, with participation of 1,367,700 farmers from 29 provinces.

Increased socialization and marketing of the scheme among farmers and a complete detailed database is required to improve the coverage and facilitate the process of the programme implementation.

Interventions

Weekly food supply monitoring data from the Food Security Agency (BKP), providing near-real time data on markets, food supply conditions and prices has been utilised for planning, delivery, and distribution of extra supplies of food from surplus provinces to deficit provinces to ensure timely food availability and prices stability. In the second week of August 2021, BKP reported 15 provinces were experiencing food stocks deficit.

Development of climate Outlook Q4 2021

BMKG predicts that most areas of Indonesia will receive sufficient amount of rainfall for agriculture from November 2021. The International Research Institute for Climate and Society Columbia (IRI) and the European Centre for Medium-Range Weather Forecasts (ECMWF) predict higher than long term average rainfall for October - December 2021 in Indonesia, with the exception of northern part of Sumatera. Providing geographic specific climate predictions and monitoring of the situation will allow for improved anticipatory actions to mitigate the impact of hydro-meteorological impacts.

Media Brief

Erick Thohir sebut impor beras masalah kebijakan dan terkait satu data



(01/06/2021) ANTARA - Minister of State-Owned Enterprises Erick Thohir considers that rice imports are a problem related to policies and the condition of the absence of a single national data program.

The existence of this data is intended for the government to be able to collect data in one door that is accurate, up-to-date, integrated, and easily accessible. [1].

Punya Stok 1,3 Juta Ton, Bulog Yakin Tak Ada Impor Beras 2021

CNN Indonesia | Selasa, 18/05/2021 13:40 WIB

(18/05/2021) CNN Indonesia - Bulog President Director Budi Waseso confirmed that he would not import rice until the end of the year. The reason is, Bulog's rice stock still meets the supply for sales needs and availability for price stability program (KSPH), market operations (OP), and disaster emergency response programs [2].

Lima Langkah Kementan Mitigasi Kekeringan Musim Kemarau



(10/06/2021) Tempo - Minister of Agriculture Syahrul Yasin Limpo explained 5 steps being prepared related to mitigation in dealing with drought disasters due to dry season:

- 1) inventory of drought-prone areas as well as monitoring of crops in areas with potential for drought disaster,
- 2) improve coordination between central and regional agencies in the context of mitigating risk impacts,
- 3) utilization of water sources such as dams, reservoirs, use of pumps and agricultural machinery (alsintan) for drought mitigation,
- 4) utilization of Rice Farming Business Insurance (AOTP) or agricultural insurance, assistance for production tools, and utilization of dry land and swamps, dissemination of climate forecast information. [3]

Jasindo-Kementan kolaborasi siapkan asuransi usaha tani berbasis area

(16/07/2021) Antara - Jakarta - PT Asuransi Jasa Indonesia cooperates with the Ministry of Agriculture (Kementan) to provide Rice Farming Business Insurance based on the rice yield index or Area-Based Rice Yield Index Insurance (IHPPBA). [4]

BMKG Sebut Musim Kemarau Diprediksi Terjadi Sampai September 2021



(17/06/2021) Liputan6.com - The Meteorology, Climatology and Geophysics Agency (BMKG) Region IV Makassar predicts the dry season will still last until September 2021. Despite frequent light rains in several areas of Sulawesi Selatan and Sulawesi Barat. [5]

Produksi Padi Petani Rengasdengklok Meningkat Berkat Embung

Oleh: Tempo.co
Selasa, 22 Juni 2021 10:20 WIB

0 KOMENTAR

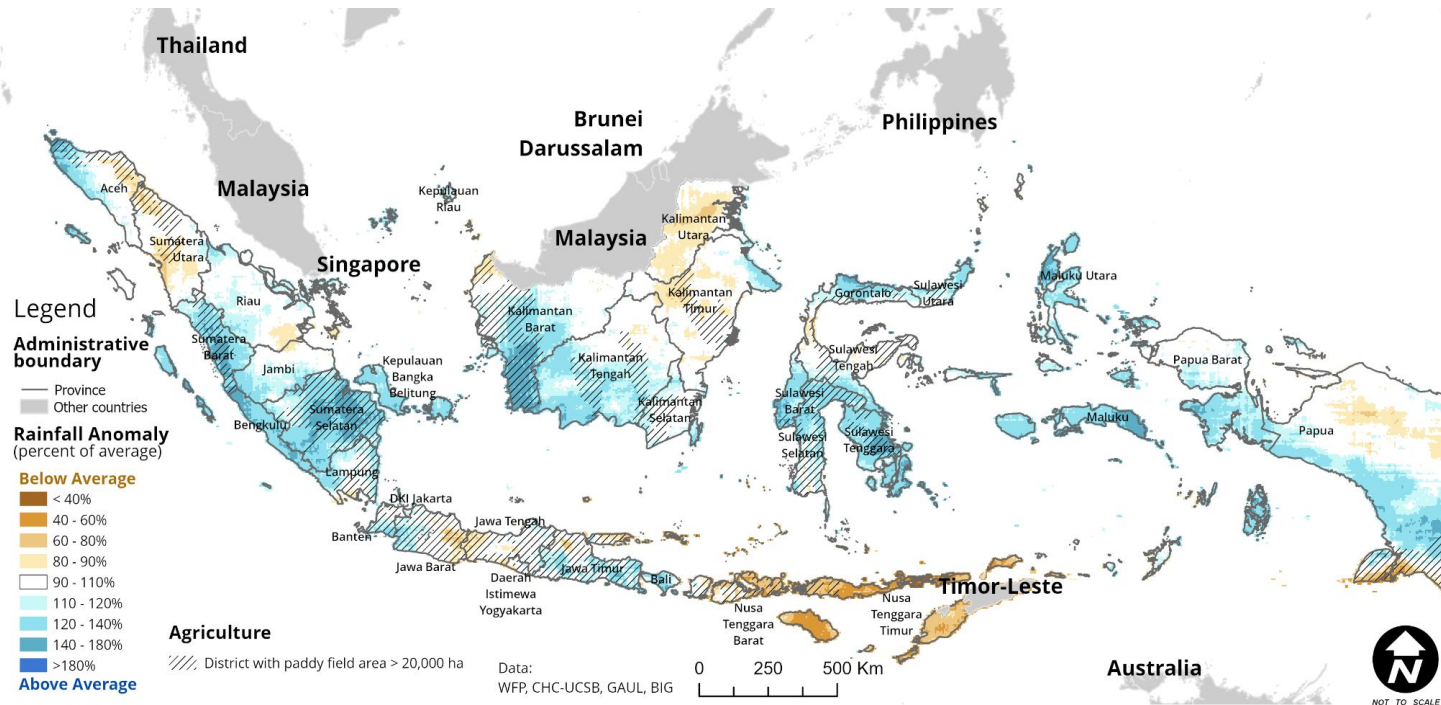


(22/06/2021) Tempo - Agricultural productivity in Karawang Regency continues to increase. This is in line with the increase in rice production by farmers in Karyasari Village, Rengasdengklok District. The farmers in Karyasari Village have recognized the increase in rice production was because of the existence of a reservoir built by the Ministry of Agriculture. [6]

Indonesia's Climate Update: May - July 2021

Rainfall Anomaly: May 2021 - July 2021

Comparison of Rainfall Accumulation with Long-Term Average



ENSO on the normal conditions, no La Niña/El Niño phenomenon occurs.

BMKG predicts the neutral ENSO phenomenon will last until February 2022.



As of July 2021 72% of Indonesia's territory has entered the dry season, 28% is still in the rainy season. BMKG predicts that 85% of Indonesia's territory will experience the peak of the dry season in August - September 2021.

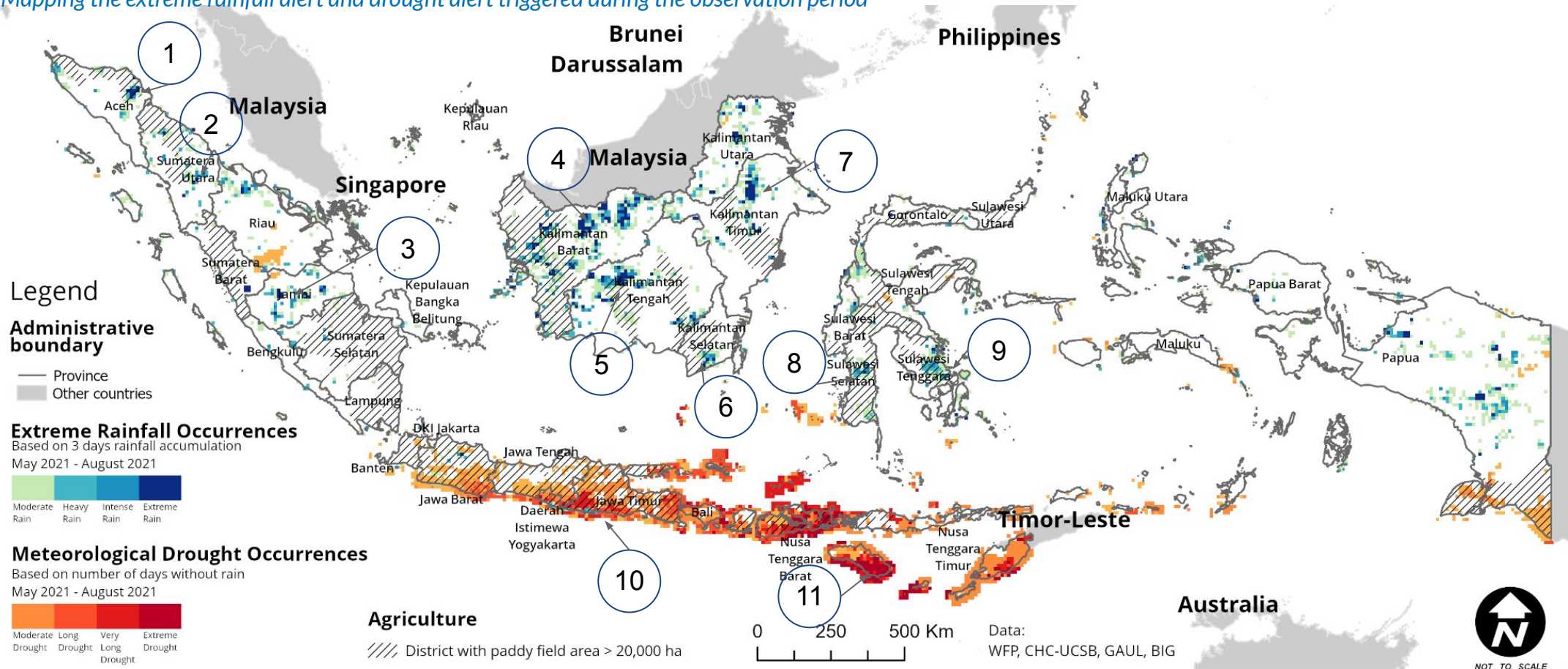
Climate change anomaly analysis showed primarily wetter than average conditions, with some geographic variations, across most of Indonesia between May and July 2021. In comparison to previous years, drier conditions were experienced in the northern areas of Sumatra, eastern areas of Kalimantan, northern areas of Papua, central areas of Java, and Nusa Tenggara.

The driest conditions were experienced in Nusa Tenggara Barat and Nusa Tenggara Timur with rainfall 40-60% below average.

These anomalies resulted in hydrometeorological disasters including: floods in northern Indonesia, especially Kalimantan, and drought in southern Indonesia, especially Nusa Tenggara Timur. Low rainfall is expected through December 2021 in Nusa Tenggara Timur, increasing the risk for drought across the region.

Extreme Meteorological Events: Mapping Potential Hydro-Met Disasters

Extreme Rainfall and Meteorological Drought Events May 2021 - August 2021
 Mapping the extreme rainfall alert and drought alert triggered during the observation period



Data and analysis for the period of May through August 2021 indicate that Indonesia experienced a range of hydrometeorological disasters. This included floods (primarily in northern areas), and droughts (primarily in southern areas).








Extreme rainfall was experienced in several regions including Kalimantan, Aceh, Riau, Sumatera Utara, Sumatera Barat, Sumatera Selatan, Lampung, Banten, Jawa Barat, Jawa Tengah, Jawa Timur, Bali, Nusa Tenggara Barat, and Nusa Tenggara Timur. Localised extreme rains triggering floods were reported in several locations, including floods in Aceh Timur [1], Labuhanbatu [2], and Jambi [3]. Massive floods

occurred in several areas in Kalimantan [4] [5] [6] [7], Soppeng and Wajo [8]. Flash floods occurred in Konawe Utara [9].

However, in contrast to conditions in northern Indonesia, southern regions of Indonesia including Jawa Timur, Nusa Tenggara Barat, and Nusa Tenggara Timur received very low precipitation, resulting in extreme meteorological drought events. Similar observations have been made by the BMKG. [10], [11].

Impact of Disasters in Indonesia: January - August 2021

2021 Jan-Aug 2020 Jan-Aug

	Flood	733	+0.96%	726
	Whirlwinds	475	-8.82%	521
	Landslides	342	-6.81%	367
	Forest fire	205	-19.9%	256
	Earthquake	23	+91.6%	12
	Tidal wave	22	-8.33%	24
	Drought	5	-68.7%	16

Disaster Impact

	Impacted population	5.8 million	+52.6%	3.8 million
	Damaged house	129.585	+333%	29.916



Hydrometeorological disasters still dominate in Indonesia disasters events from January to August 2021, with floods (733 events), whirlwinds (475 events), and landslides (342 events). The largest proportion of events occurred Jawa Barat Province (464 events).

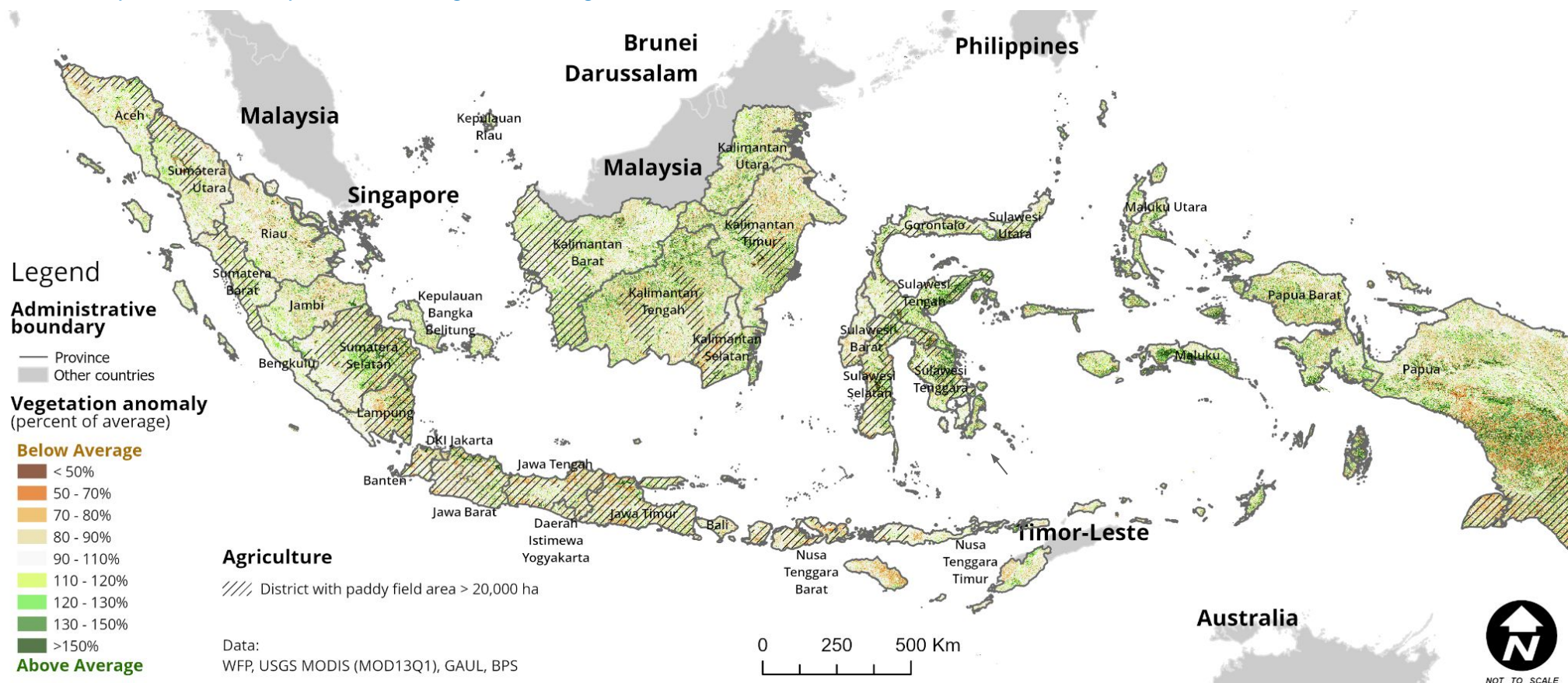
Compared to the January to August time period last year the number of Indonesia disasters events was 9.3% lower (1,932 events in January to August 2020), with exception of floods and earthquake.

However, in 2021, a significantly higher number of people were affected and displaced compared to the same period in 2020. Damage to people's houses also rose compared to the same period of previous year. This data suggests an increasing impact and severity of disasters in the over the past year.

Crop Monitoring: Overall Vegetation Situation

Vegetation Indices as of July 2021

Overall Crop Condition Compared to the Long-Term Average in the Same Period



The Vegetation Condition Index (VCI) compares the current vegetation conditions in range of values observed in the same period with the long-term average.

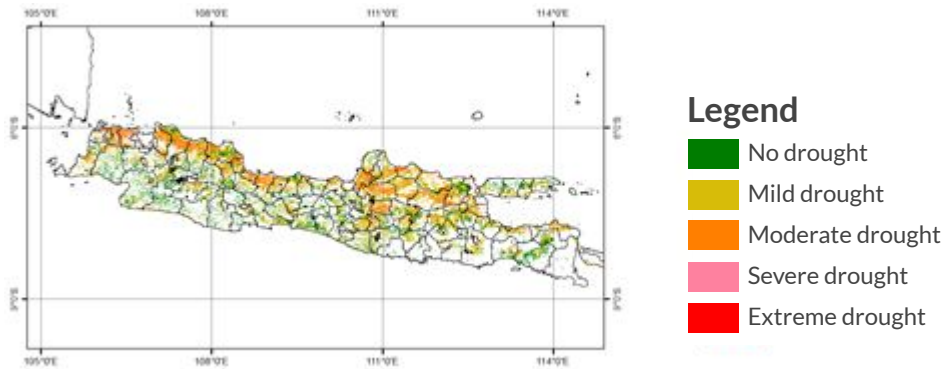
Vegetation conditions in July 2021 varied throughout Indonesia. Favourable vegetation conditions were observed in Sumatera Selatan, Jawa Barat, Kalimantan, Sulawesi, Maluku, and Papua.

Unfavourable conditions were detected in parts of Jawa Tengah, Jawa Timur, Bali, and Nusa Tenggara, especially in Sumba. This is to be expected given the lower-than-average rainfall in the preceding three months [page 5].

In Kalimantan Timur and Kalimantan Selatan where extreme rainfall occurred [page 6], the vegetation condition was also unfavourable, likely contributing to flooding and the decline in vegetation index.

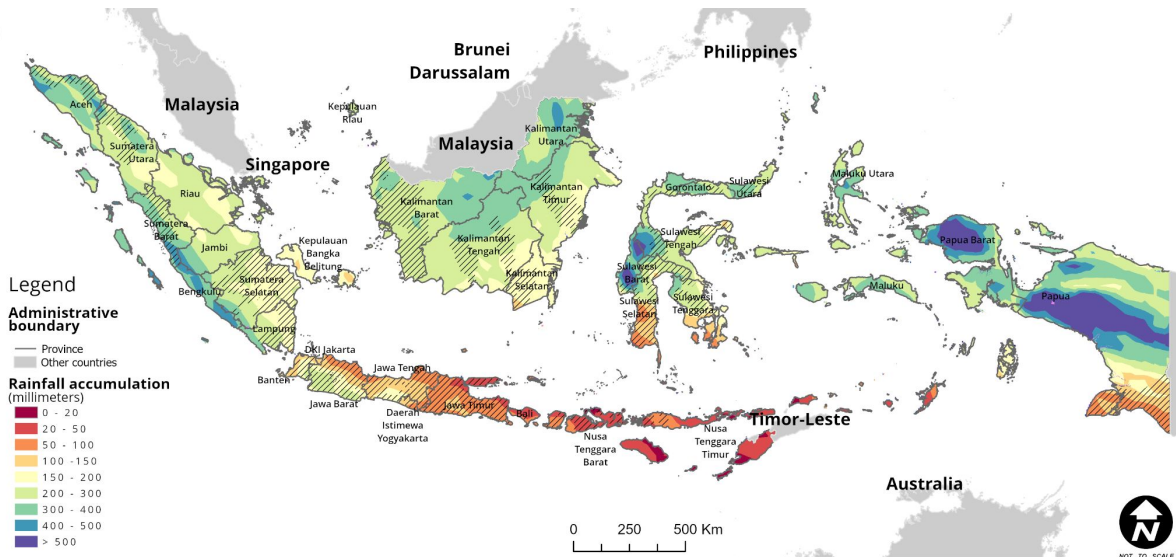
Crop Monitoring: Potential Impact of Dry Season for Agriculture

LAPAN Analysis on Drought Impact to Crops Analysis as of August 2021



LAPAN monitors the potential impact of low precipitation conditions in Indonesia on rice crops using remote sensing data. The results of the observations show the status of agricultural drought in the northern parts of Jawa Barat and Jawa Tengah which are categorized as mild - moderate agricultural drought.

Monthly Precipitation Accumulation Forecasts September 2021 BMKG Analysis of Monthly Precipitation Accumulation



Based on the BMKG 2021 rainfall analysis, low rainfall conditions are predicted to continue until end of September 2021 with southern part of Indonesia, including Jawa Timur, Bali, Nusa Tenggara Barat, Nusa Tenggara Timur, Sulawesi Selatan, and Merauke Regency experiencing low precipitation. This may increase the risk of an agricultural drought in these locations.

Based on data from the Ministry of Agriculture, around 1.3 million ha of crop fields could potentially not be planted with rice, corn, or soybeans at the peak of the dry season [[link](#)]. This is due to the very low rainfall in those areas that translate to insufficient water for planting.

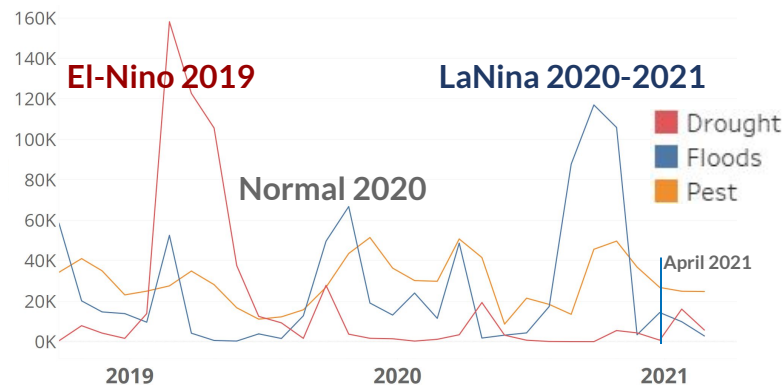
The potential of the rainfed fields could be maximized through Government's investments on increasing the capacities of irrigation systems and water reservoirs to facilitate crops planting in the dry season [[link](#)].

Crop Monitoring: Potential Climate Impact on Paddy Production

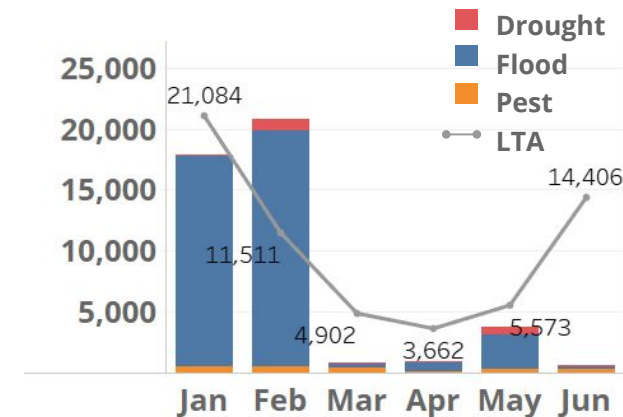
Graph 1. Total paddy crops affected by climate disturbances and pests per provinces (ha)
January 2021 - June 2021



Graph 2. Total paddy crops affected by climate disturbances and pests (ha)
2019 - 2021



Graph 3. Paddy crops failure per month (ha)
January - June 2021 vs Long-Term Average (LTA)
2010 - 2020



The largest paddy crops affected by hydrometeorological disasters and pests during January - June 2021 per province were in Jawa Barat, Jawa Tengah, and Kalimantan Selatan. Jawa Barat and Jawa Tengah represent the largest paddy crops. In Kalimantan Selatan crops were impacted by a large flood in January 2021 [\[link\]](#).

In comparison with normal conditions in 2020 (as shown in graph 2), the 2019 El-Nino and 2020/2021 La-Nina anomalies highly correlated with an increased disturbance of paddy crops, resulting from drought and flooding respectively.

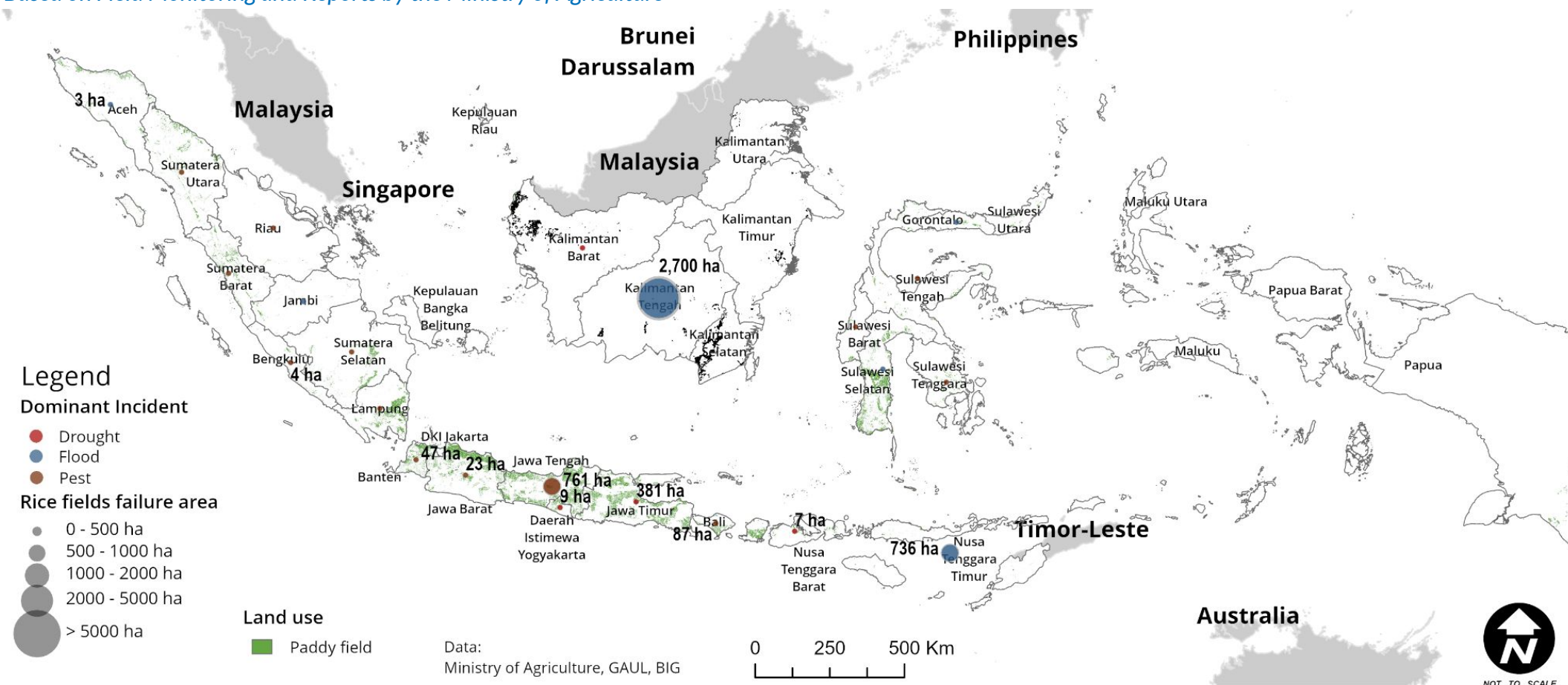
In the period April - June 2021, the main disturbance of the paddy crops were pest infestation, followed by flood and drought. However, it worth noting that not all disturbance led to paddy crop failures.

La Niña in early 2021 was clearly visible in the graph 3 of paddy crop affected due to hydrometeorological disasters. The impact of La Niña at the beginning of the year can be seen in the magnitude of the impact of the flood disaster in January-March 2021 compared to 2020. In February 2021 the number of crop failures exceeded the long-term average.

Crop Monitoring: Paddy Cultivation Failure by Disasters and Pests

Areas of Rice Cultivation Failure due to Floods, Droughts, and Pests April 2021 - June 2021

Based on Field Monitoring and Reports by the Ministry of Agriculture



Flooding was the primary cause of paddy crops failure between April - June 2021, followed by pests infestation and drought.

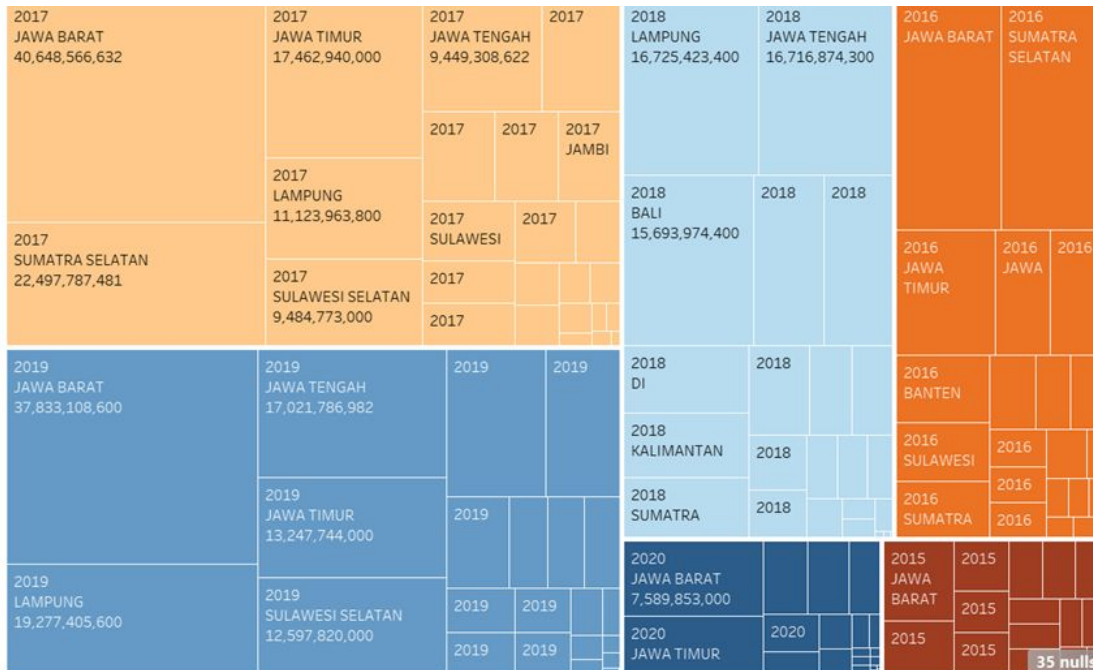
The map shows most crop failures that occurred in Kalimantan Tengah which were caused by heavy flooding in the area [\[link\]](#). Another notable event was Cyclone Seroja in April 2021, resulted in 736 ha of paddy crop failure in Nusa Tenggara Timur [\[link\]](#).

The Ministry of Agriculture reported paddy cultivation failure in 5,298 ha from April to June 2021. This will lead to the estimated loss of around 27,100 tons of dry unhusked rice (according to paddy productivity data calculation by the Indonesia's Statistics Agency (BPS) in 2020, indicating failure of harvest in 1 ha of paddy area being equivalent to loss of 5.12 tons of unhusked rice).

The paddy cultivation failure remains much lower compared to the previous year which was reported in 15,189 ha of paddy fields.

Government Prevention and Intervention on Food Security

Number of Insurance Claims on Agricultural Insurance Program



Prevention Action: Agricultural Business Insurance

As a preventive action against climate hazards since 2015 the Government of Indonesia has been supporting farmers through subsidized agricultural insurance program.

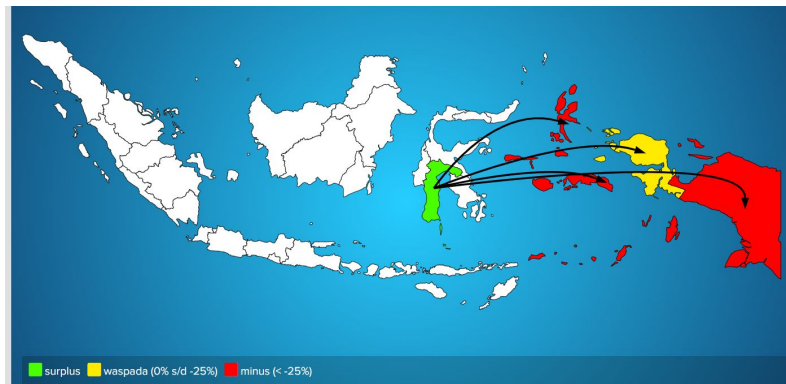
However, the low participation of farmers is limiting the programmes success. Many farmers are not familiar with insurance, and assume there will be no benefit if crops fail.

To increase farmers' interest in participating in the program, Bappenas and the Ministry of Agriculture have developed an agricultural insurance scheme based on the yield index. This initiation allows farmers to get a guarantee of the value of harvest profits in accordance with the determined value per area, thus minimizing the possibility of the farmer's claim being rejected due to condition of paddy fields not meeting the criteria for crop failure (damaged partially). Improved socialization and marketing of the scheme across Indonesia with completed and detailed databases required to increase the coverage.

Number of Deficit Provinces Map of Bird's Eye Deficit Intervention Action By BKP by Commodity

2nd week of August - Source: SIMONSTOK BKP - Ministry of Agriculture

2nd week of August - Source: SIMONSTOK BKP - Ministry of Agriculture



Normalization of Food Supply through Food Distribution Subsidies

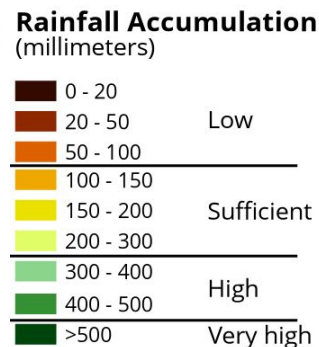
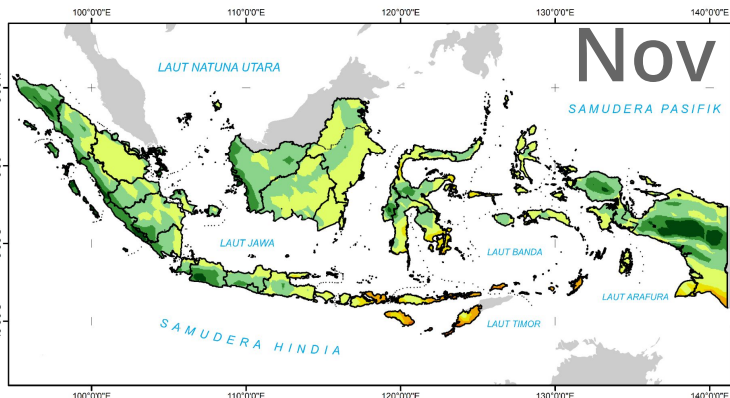
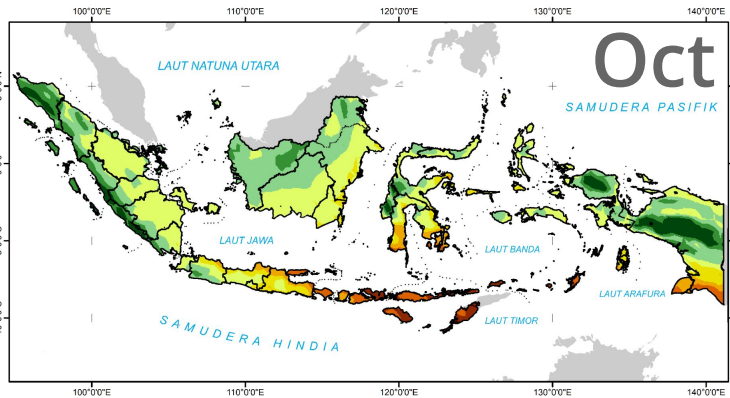
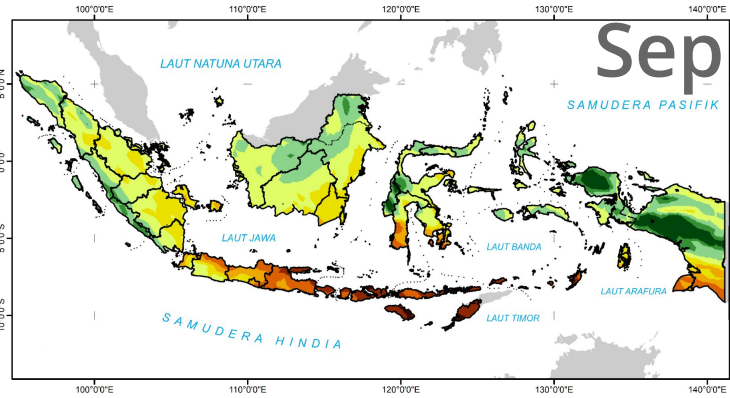
The Ministry of Agriculture, through the Food Security Agency (BKP), continues to monitor trends in selected food commodities supplies and prices in all provinces in Indonesia. Analyses are carried out on weekly basis to observe the status of food supplies, availability and markets needs, and the balance of food supplies.

When disparity in food supply detected, BKP initiates an intervention action through providing subsidies for the distribution of food from surplus provinces to deficit provinces, thus keeping food available in the markets and prices stable. For example in the second week of August, BKP reported that 15 provinces experienced stock deficit and should be fulfilled by trade / supply from other regions with help of intervention from BKP [\[link\]](#).

Climate Outlook for Q4 2021: BMKG Analysis Forecast

Monthly Precipitation Accumulation Forecasts Sep - Nov 2021

BMKG Analysis of Monthly Precipitation Accumulation



BMKG Analysis of Monthly Precipitation Accumulation

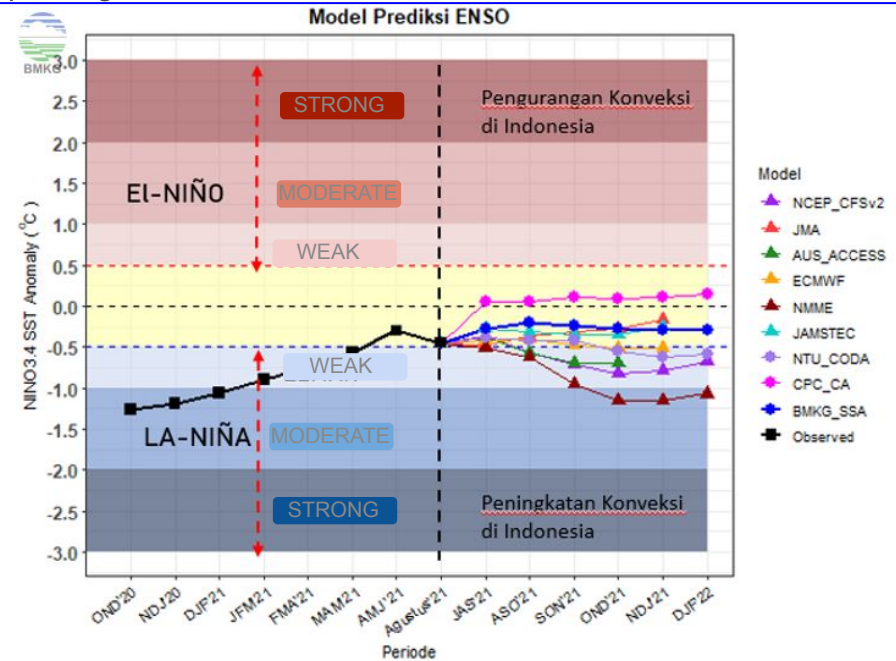
BMKG predicts in the transition period of dry to rainy season 2021/2022, rainfall in Indonesia will gradually increase, especially from September to November.

According to the forecasts, in October 2021 several regions of Jawa, Bali, Nusa Tenggara, southern parts of Sulawesi, and Papua/Merauke will experience low rainfall. In November 2021 most parts of Indonesia are forecasted to have moderate rainfall.

In November 2021 the conditions predicted to improve with all of Jawa - Bali Island receiving good amount of rainfall, sufficient to start with the planting season. However the prediction for some localities in Nusa Tenggara Barat, and Nusa Tenggara Timur is lower rainfall until end November.

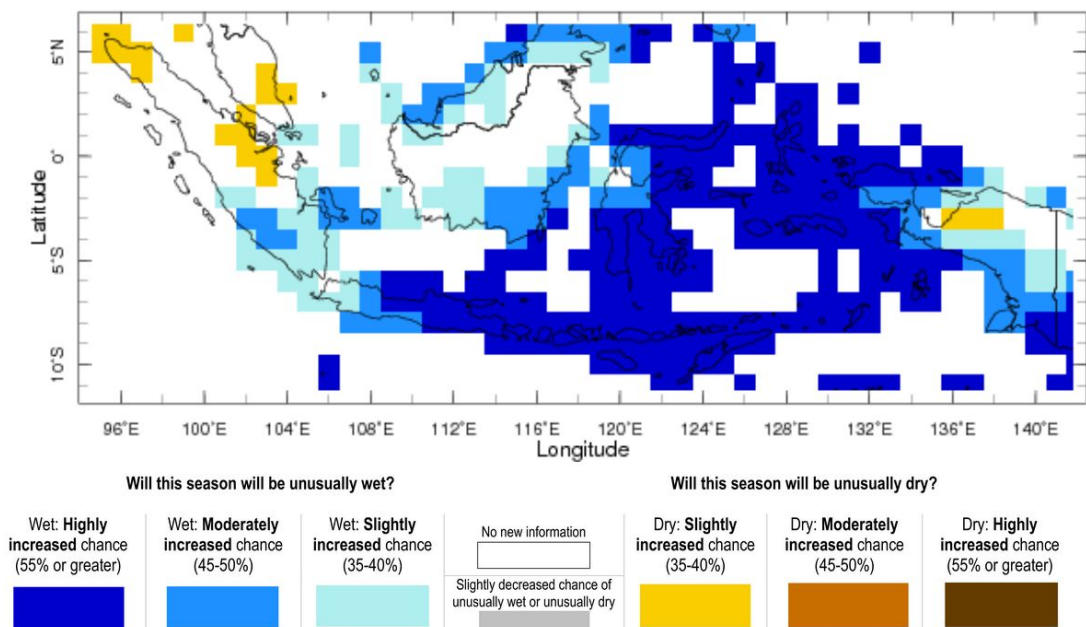
ENSO Development

In the context of climate anomalies, monitoring and predictions on the development of El Niño–Southern Oscillation (ENSO) indicates the conditions will stay in normal range or moving to weak La-Nina until February 2022. This normal condition will reduce the potential of floods during the main agricultural planting season.



Climate outlook for Q4 2021: Indonesia in Global Forecasts

Forecast for Oct-Dec 2021, Forecast Issued Jul 2021

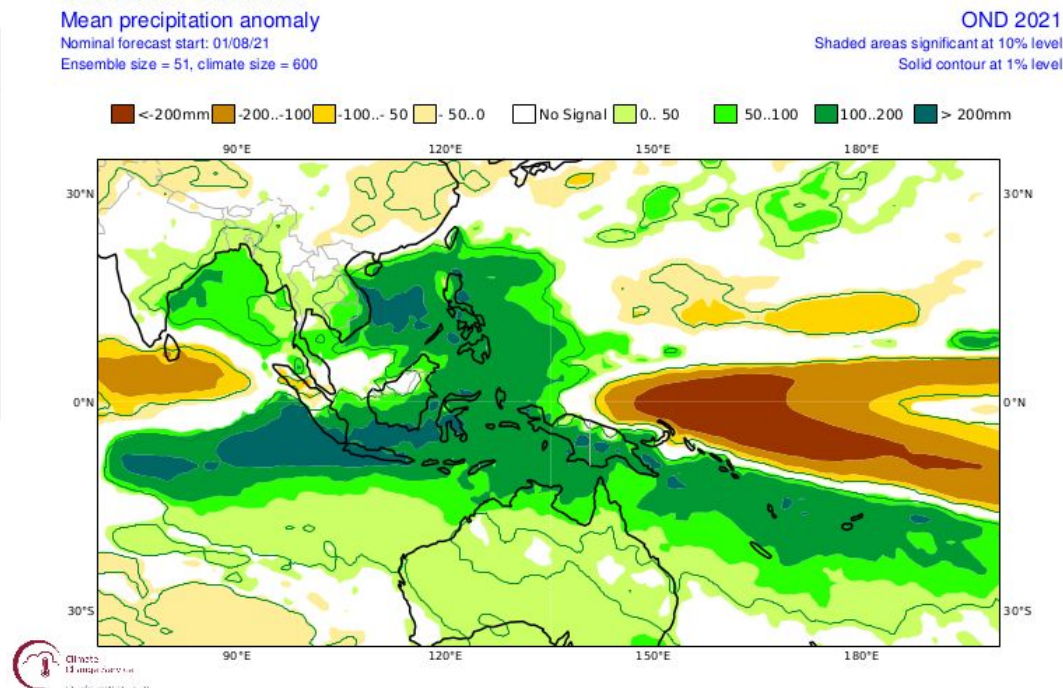


The global rainfall predictions from IRI Columbia and ECMWF for October - December 2021 show similar conditions.

Almost all areas of Indonesia are expected to experience above normal rainfall, especially Jawa, Nusa Tenggara, southern part of Sulawesi, Maluku, and Papua. Meanwhile, below-normal rainfall predicted to occur in the northern part of Sumatera, from Riau to Aceh.

Higher than normal precipitation in Jawa and Nusa Tenggara is expected to improve the vegetation situation following the long dry condition reported in these areas. Normal and/or above normal precipitation also help in preparation for the main paddy planting season 2021/2022, starting in the country around November - December 2021.

C3S: ECMWF contribution
Mean precipitation anomaly
Nominal forecast start: 01/08/21
Ensemble size = 51, climate size = 600



Left: IRI Columbia University likelihood seasonal forecast for October-December 2021 indicates the likelihood of total 3 months of precipitation to be unusually high or low:

http://iridl.ldeo.columbia.edu/maproom/IFRC/FIC/prcp_fcst.html?bbox=bb%3A94.584%3A-11.255%3A141.811%3A6.308%3Abb

Right: ECMWF seasonal forecast for October-December 2021:

https://climate.copernicus.eu/charts/c3s_seasonal/c3s_seasonal_spatial_ecmf_rain_3m?facets=Parameters,precipitation&time=2021060100,720,2021070100&type=ensm&area=area12



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