



Food Security Monitoring Bulletin

# INDONESIA

Special Focus: Fruit and vegetable consumption and production trends

Volume 8, November 2017





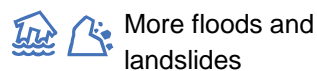
# CLIMATE & FOOD SECURITY



## July - October 2017



Overall, Indonesia received above-normal rainfall, BUT southern parts of the country experienced drought



More floods and landslides



Localized drought



Less paddy planted

## Outlook November 2017 - January 2017



[RAINY SEASON]

Normal to localized above normal rainfall expected



Good prospects for paddy planting



More floods and landslides



## SPECIAL FOCUS: Fruits and vegetables



[Recommended]



[Indonesia]

**Consumption** of fruits and vegetables in Indonesia is inadequate and declining. In 2016, Indonesians ate only 43% of the recommended intake



**Production** meets the current consumption requirement BUT would have to increase if Indonesians were to eat the recommended intake of fruits and vegetables



**Affordability is a key barrier.** Poorer Indonesians eat much less fruits and vegetables than wealthier Indonesians



But, even wealthier Indonesians do not eat enough fruits and vegetables.

## Recommendations



Preparedness for floods and landslides



- Ensure access to fruit and vegetable to the poor Indonesians through existing social safety nets, e.g. BPNT
- Raise awareness of the importance of fruit and vegetable consumption
- Address fruit and vegetables supply chain inefficiencies
- Ensure reliable data on fruit and vegetable supply and demand is available

# Key messages

## Climate

During the dry season, Indonesia experienced a combination of both above and below normal rains. Meanwhile, some parts of the country were affected by an unusually high number of floods and landslides, while southern parts of Indonesia experienced prolonged dry spells that led to localised drought. In October, the rainy season started in most parts of the country, but pockets of drought remained across NTT and NTB. Below normal rainfall across southern Indonesia was particularly significant for the island of Java, the country's rice-production centre, as dry season planting (September in particular) was lower than average.

Over the next three months, normal to above normal rains are expected, creating favourable conditions for planting, but also increasing the risk of floods, landslides and associated losses, damages and impact.

## Special Focus: Fruits and vegetables

Surprisingly, in spite of sufficient supply, Indonesians do not consume enough fruits and vegetables. Over the last 5 years, according to BPS data, the consumption has in fact further declined, now reaching less than a half of the minimum recommended consumption levels. The current production meets the consumption levels, however would have to increase, if Indonesians were to eat the recommended intake of fruits and vegetables. This represents an opportunity for horticulture farmers to meet the demand, especially if supply chain inefficiencies can be addressed.

In terms of access to fruits and vegetables, poorer Indonesians eat less fruits and vegetables than wealthier Indonesians. In addition, there is a widening consumption gap between the poorer and wealthier Indonesians in the last 5 years, with the consumption levels of the poorer Indonesians declining rapidly, while this is less apparent among the middle- to high-expenditure groups. This indicates affordability is a key barrier for sufficient fruit and vegetable consumption for the poorer Indonesians. Nevertheless, even wealthier Indonesians still do not eat sufficient quantities of fruits and vegetables.

## Recommendations

### Climate:

- Preparedness for floods and landslides as the country enters the rainy season

### Fruits and vegetables:

- Ensure access to fruits and vegetables by poor Indonesians through existing social safety nets, e.g. BPNT
- Raise awareness of the importance of fruit and vegetable consumption
- Address inefficiencies in fruit and vegetable supply chain
- Ensure reliable data on fruit and vegetable supply and demand is available for improved monitoring

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# Introduction

This is the third 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 2017. The special topic presented in this issue focuses on fruit and vegetable consumption and production trends.

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 November 2017 to January 2018.

The last section then examines fruit and vegetable consumption trends, in analysing expenditure and consumption patterns across different social/ income groups over the last years, and the latest production trends.

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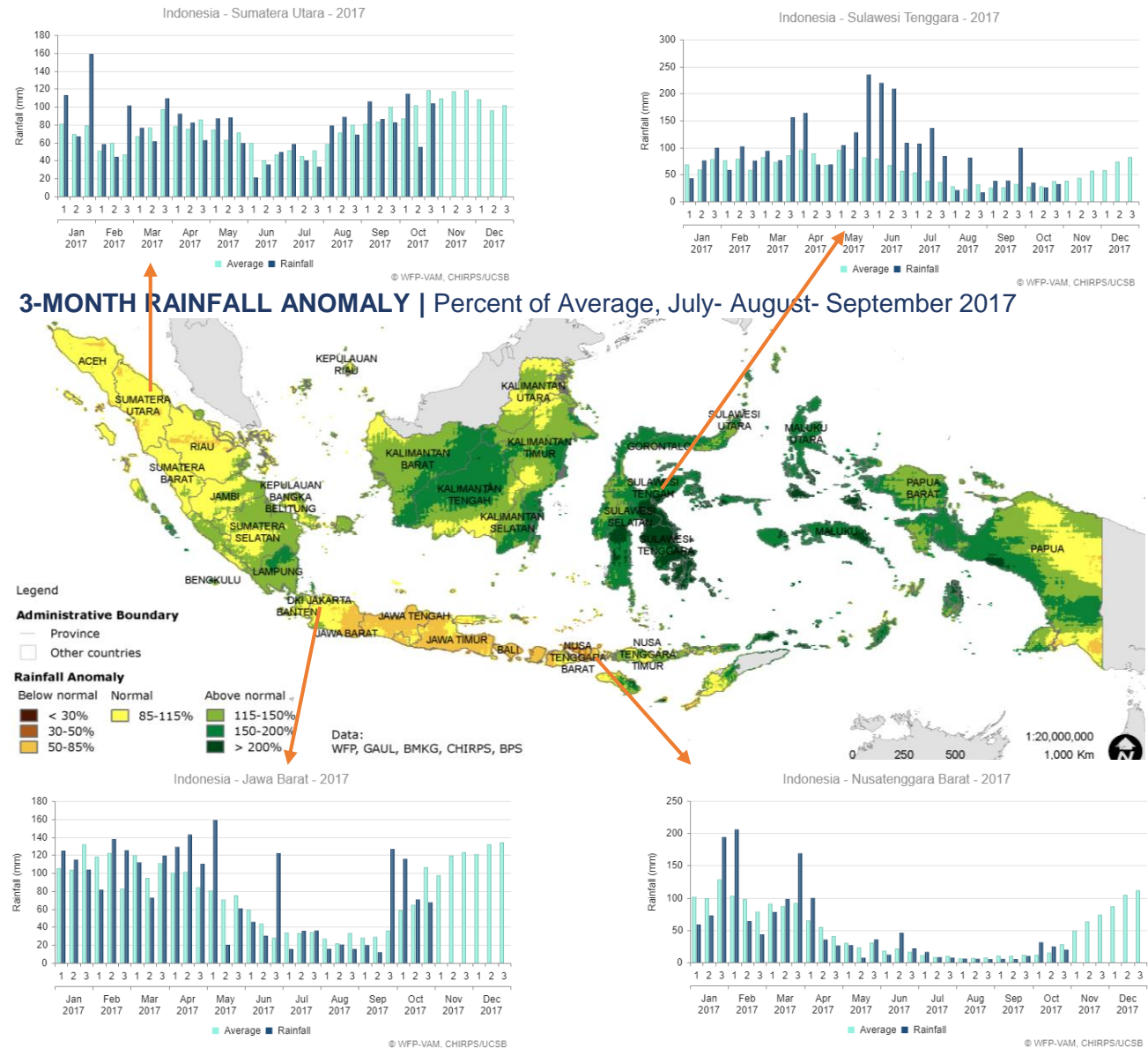
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**During the dry season, most of Indonesia received abnormally high rainfall, with localized below-normal rains.**

Between July and September 2017, while Indonesia received abnormally high precipitation, only around 8 percent of the country entered the rainy season during these 3 months. Above normal rains affected the northern parts of the country, especially Sulawesi and Maluku, Kalimantan and parts of Sumatera and Papua.

On the other hand, Central and East Java and West Nusa Tenggara experienced below-normal rainfall.

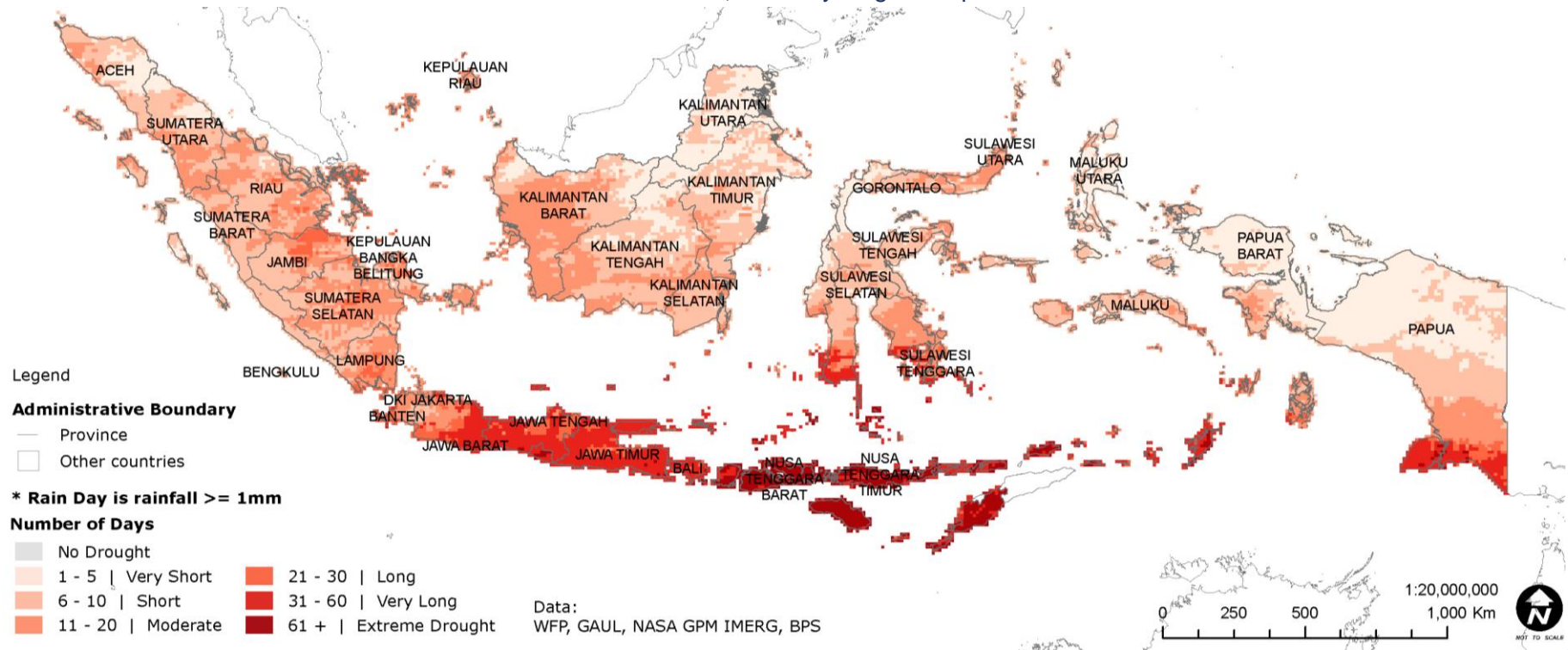


## Southern parts of the country experienced drought.

While rainfall levels were mostly above normal during the dry season, parts of south-eastern Indonesia experienced prolonged dry spells. As shown on the map below, there were more than 61 consecutive days without rains in NTT and NTB. Bali, southern parts of Sulawesi and Papua, and Java (except the western part of the island) also experienced dry spells, with around 31 to 60 consecutive days without rainfall.

The prolonged periods without rain resulted in drought in West, Central and East Java, DI Yogyakarta, and NTB, affecting more than 850 thousand people between June and September. The highest number of drought events (9) and affected population (640 thousand) was recorded in NTB, where the dry spell was the longest.

### MAXIMUM DAYS WITHOUT RAIN DURING THE DRY SEASON, Jun-July-August-September 2017



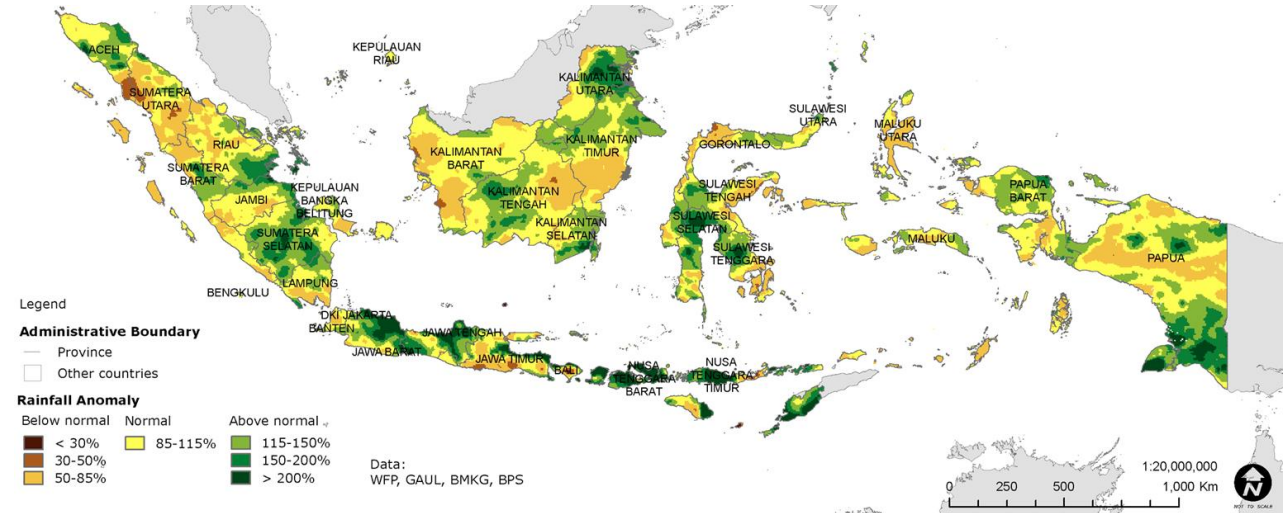


## In October 2017, the rainy season started in large parts of the country.

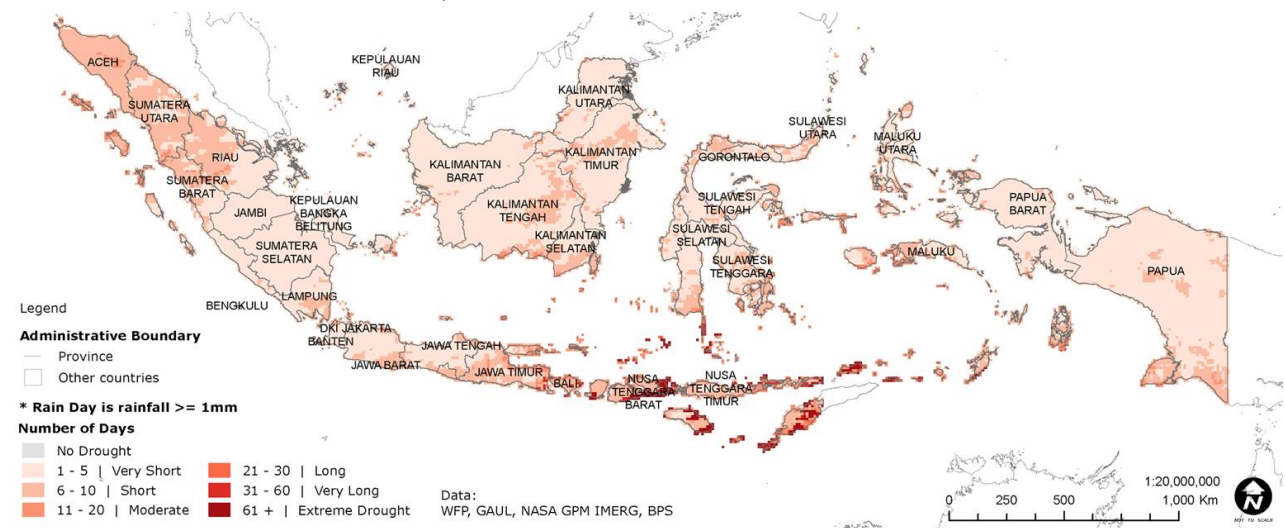
October 2017 marks the end of the dry season for large parts of the country, with around 38 percent of Indonesia entering the rainy season this month. In October, Indonesia experienced a combination of above normal and normal rainfall, with localized below normal rains. Higher rainfall across Java created favorable conditions for planting, however it also resulted in floods. This could pose a risk for crops later in the season, because of flooding, and lower quality rice due to higher moisture contents.

While some areas received 400 mm of monthly rainfall, dry spells continued to affect parts of eastern Indonesia. In NTT and NTB, pockets of drought remained throughout October, with more than 61 days without rainfall. The prolonged drought raises concern for water availability for both households and crops.

### RAINFALL ANNNOMALY, October 2017



### MAXIMUM DAYS WITHOUT RAIN, October 2017



## An unusually high number of floods and landslides continued to affected Indonesia.

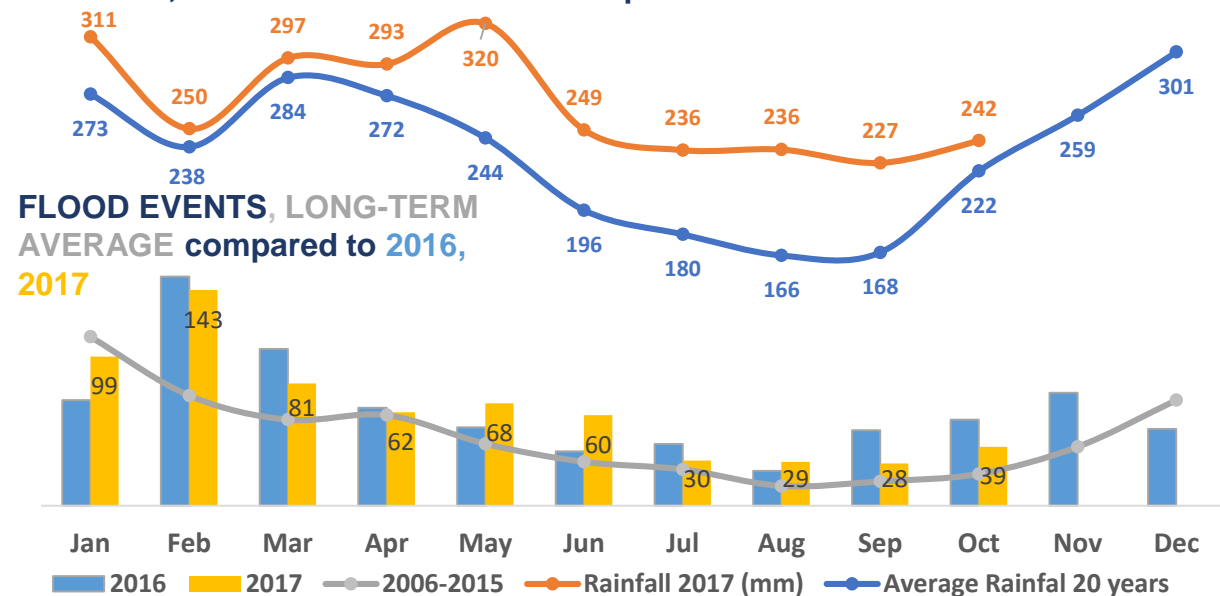
Apart from the localized drought, abnormally high rainfall levels continued to affect the country during the dry season and led to unusually high number of floods and landslides, compared to the long-term average. The occurrence of floods and landslides has been unusually high since mid-2016, mainly due to higher than normal rainfall levels.

Even before the start of the rainy season, the number of floods this year already exceeded the long-term average for the entire year, with 639 recorded events between January and October 2017, compared to about 555 events annually in the last 10 years. Similarly, there were 1.5 times more landslides this year until October, compared to the long-term average.

The high number of floods and landslides recorded from January to October 2017 led to high infrastructure and human loss: 1,959 houses were heavily damaged, 136 people died or remain missing and 256 people were injured.

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

#### RAINFALL, LONG-TERM AVERAGE compared to 2017



### 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	15
Aug	8	18	7
Sep	8	76	21
Oct	12	78	66
Nov	32	108	
Dec	40	67	
<b>Total</b>	<b>339</b>	<b>701</b>	

Data: BNPB DIBI

Data: BNPB DIBI, WFP



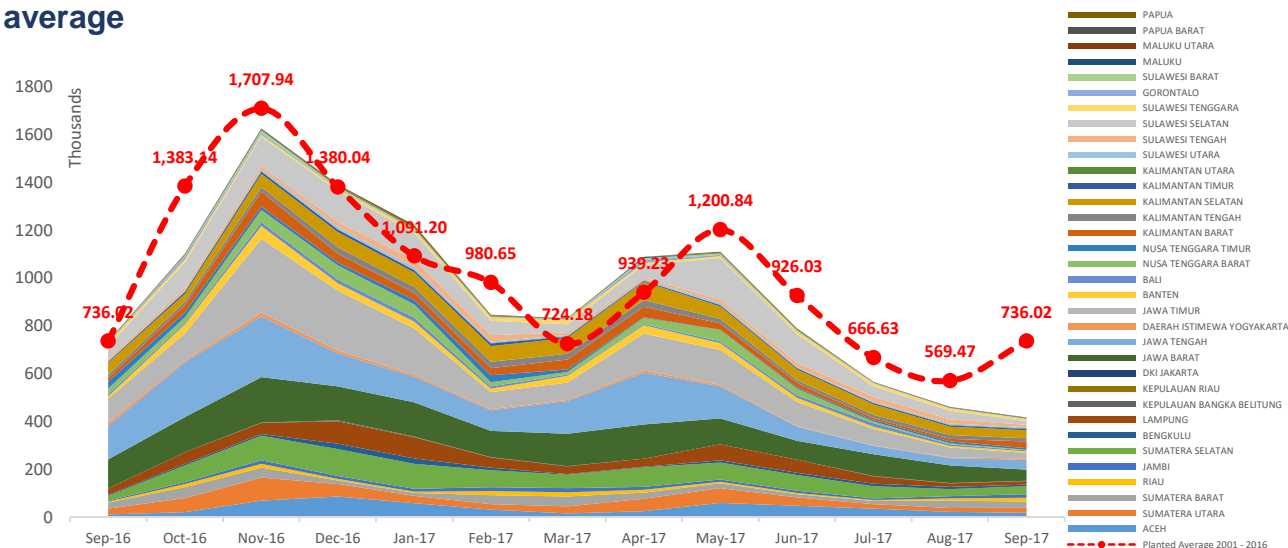
## Paddy planting slightly lower in September 2017.

To estimate planting and harvesting progress for paddy, remote-sensing data for vegetation (using MODIS, MOD13Q1) is analyzed over the growing seasons based upon the color spectrum observed in the satellite imagery. The analysis is made by province and combines the rain-fed and irrigated croplands.

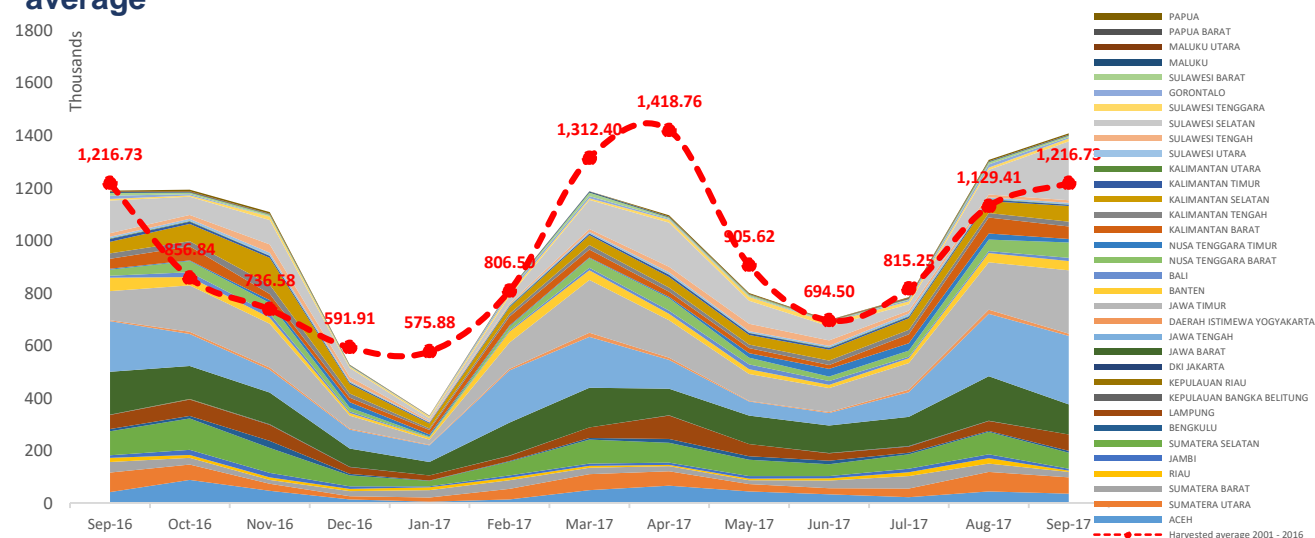
The results show that the national aggregate of the planted area in September 2017 is about 0.7 million ha lower compared to the average planted area in the same time period in the last 15 years.

Below normal rains across Java island, the rice production center of the country, and the late start of the rainy season, are the likely reason for the lower planted area during the dry season and September 2017.

**Planting progress for paddy (ha), Sep 2016- Sep 2017, compared to 15-year average**



**Harvested area for paddy (ha), Sep 2016- Sep 2017, compared to 15-year average**



## PART 2

# Climate and planting outlook: November 2017- January 2018

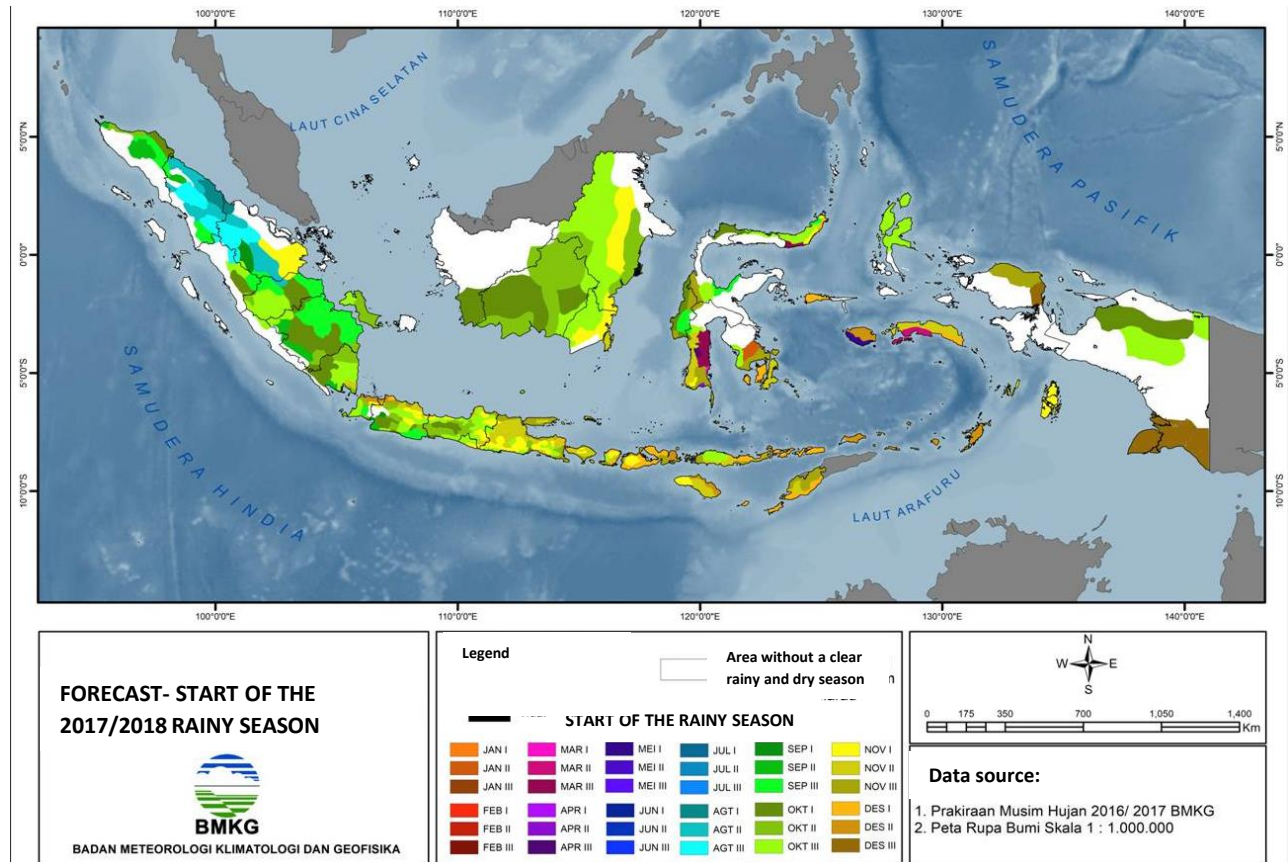
**The rainy season will spread across the country throughout November and December.**

The rainy season is expected to start in 38 and 11 percent of the country in November and December, respectively. By November, most of Sumatera and Kalimantan and western and central parts of Java have already started the rainy season. Eastern Indonesia will enter the rainy season throughout November and December.

Compared to the long-term average, around 39 percent of the country enters the rainy season later than usual, 23 percent earlier, and 38 percent on time, as shown in the table below. The delay could affect water availability across NTT and NTB, largely a rain-fed agriculture, where, after the prolonged dry spells, rains are expected to start 20-30 days later.

**Start of the 2017/2018 rainy season, compared to the long-term average**

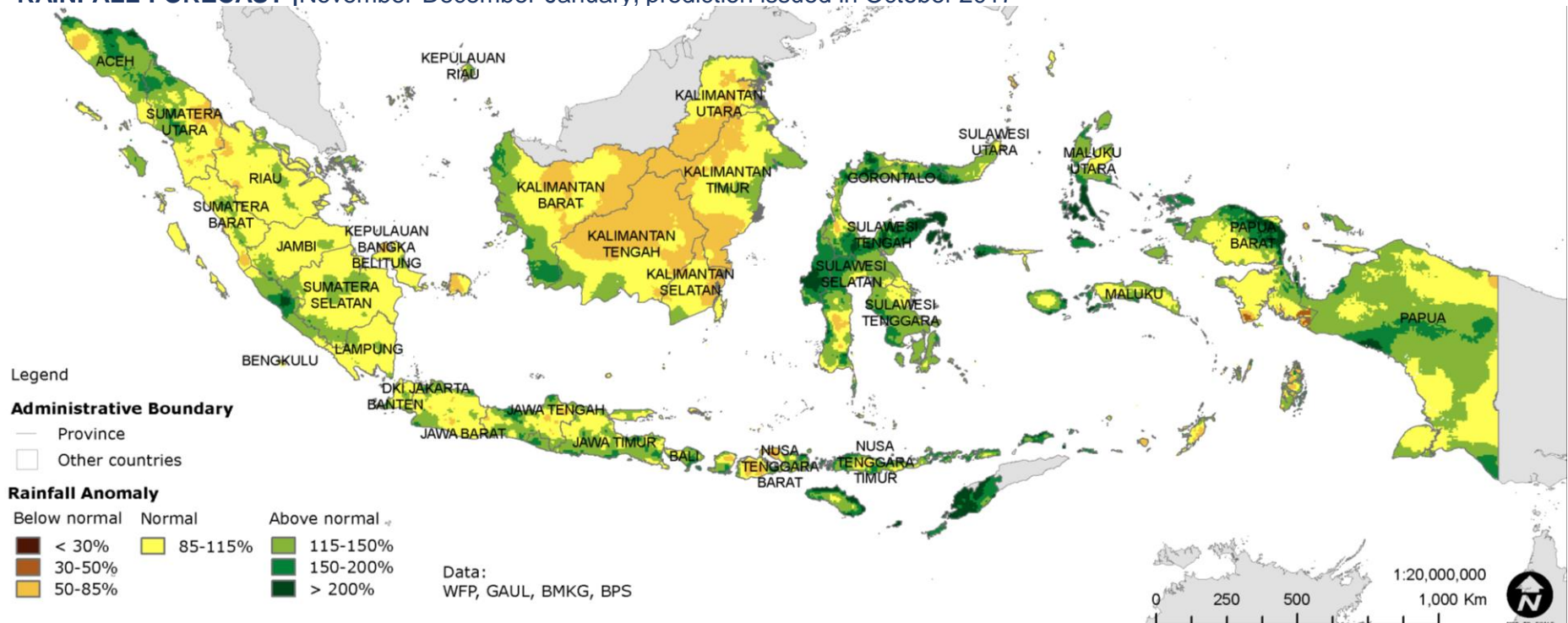
	Early	Same	Delay
<b>SUMATERA</b>	41%	35%	24%
<b>JAWA</b>	24%	39%	37%
<b>BALI</b>	0%	20%	80%
<b>NTB</b>	19%	38%	43%
<b>NTT</b>	13%	48%	39%
<b>KALIMANTAN</b>	5%	41%	55%
<b>SULAWESI</b>	21%	33%	45%
<b>MALUKU</b>	22%	56%	22%
<b>PAPUA</b>	0%	50%	50%



Between November and January, normal to localized above normal rainfall is expected.

Relatively low rainfall is expected in the southern parts of Indonesia- Java island, Bali, Nusa Tenggara, and southern parts of Papua, reaching up to 100 mm of monthly rains. These areas should receive higher rainfall from December onwards, with around 150-300 mm of monthly rains. High rainfall, up to 400 mm is predicted in western parts of Java, Sumatera, Kalimantan and Sulawesi, and most of Maluku and Papua. The increasing rainfall, and higher than normal rainfall in parts of the country increases the risk of floods, landslides and the associated impact, and highlights the need for preventive and preparedness action.

**RAINFALL FORECAST** | November-December-January, prediction issued in October 2017





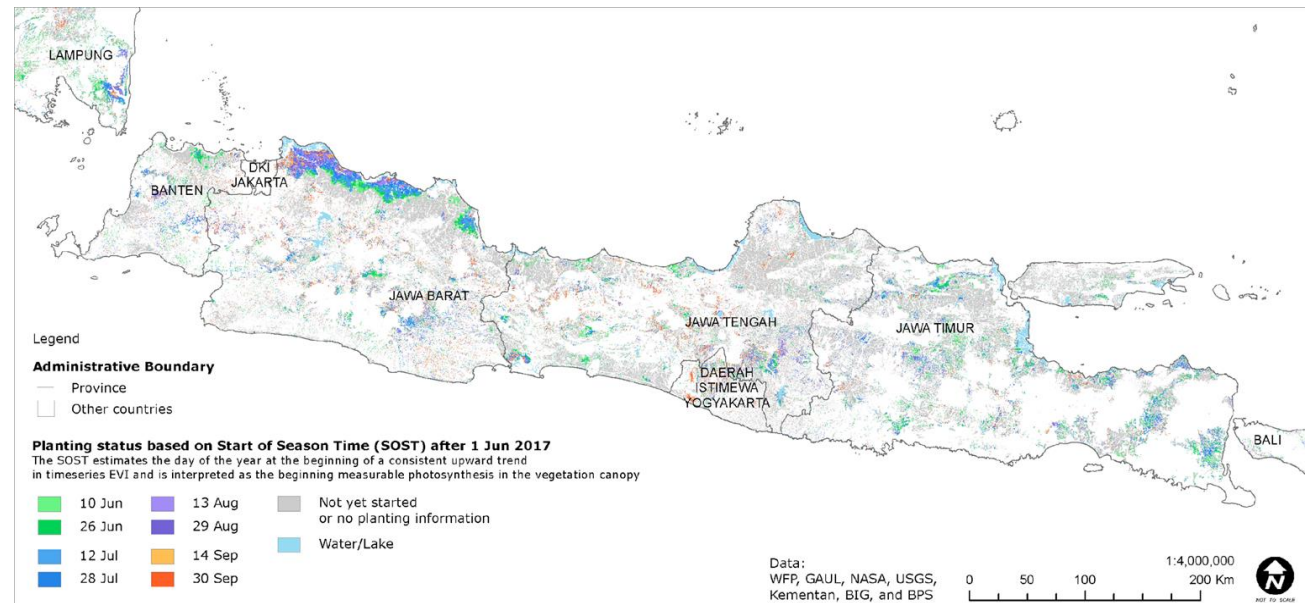
## Above normal paddy planting from November- December 2017.

Based on the rainfall forecast for the upcoming season and the planted area in the previous season, paddy planting potential for the period between October 2017 and March 2018 is estimated.

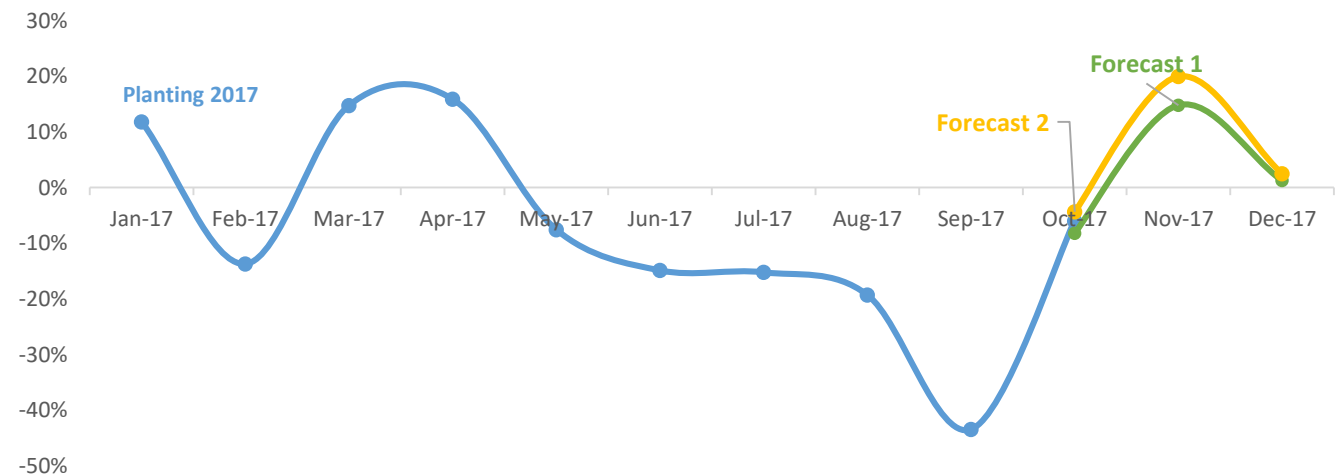
The planting status during the dry season is depicted on the map above. This data is used to estimate expected harvest time for the dry season crops, and subsequently the time when the land will be available for the main season planting.

The graph below then shows the planting potential in the upcoming period, presented as a change against the long-term average. Two forecasts, using two rainfall outlooks\*, show an above normal planting potential between October and December 2017.

### Start of the 2017 dry season planting across Java, June- September 2017



### The main season paddy planting potential, anomaly, at national level, October- December 2017

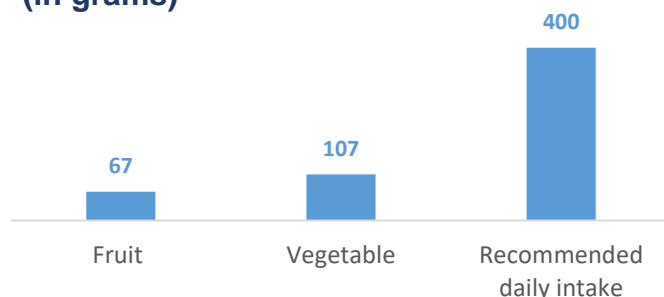


\* The Forecast 1 uses CCROM rainfall forecast, while the Forecast 2 is based on the BMKG rainfall outlook.

## PART 3 Special focus: Fruit and vegetable consumption and production trends

### Fruit and vegetable consumption in Indonesia is inadequate and declining.

Comparing daily per capita consumption of fruits and vegetables and the minimum daily recommended intake at national level in 2016 (in grams)



Data: BPS, Susenas March 2016

### Daily per capita consumption of fruits and vegetables as a proportion to the recommended intake in Indonesia, 2012- 2016

Fruit & Vegetable Consumption as a Proportion of the Recommended Intake	
Year	Intake
2012	45%
2013	43%
2014	46%
2015	46%
2016	43%

Data: BPS, Susenas March 2012- 2016

Fruits and vegetables are an important part of a healthy diet. The benefits of the daily consumption of fruit and vegetables for human health are supply of a range of vitamins and minerals as well as dietary fibers. When consumed in appropriate amounts, they could help prevent micronutrient deficiency and non-communicable diseases. Low intake of fruit and vegetables is among the top 10 risk factors for mortality in the world.

In 2016, consumption of fruits and vegetables in Indonesia was less than a half of the minimum daily recommended level\*. An average Indonesian consumed 173 grams of fruits and vegetables a day, while the recommended intake for fruits and vegetables consumption is 400 grams per person per day. Fruit consumption was lower than vegetable consumption, with 67 and 107 grams per person per day, respectively. In addition, not all Indonesians eat fruits and vegetables- in 2016, 97.3 percent reported to eat vegetables, and 73.6 percent consumed fruits. Over the last 5 years, the overall consumption of fruits and vegetables has declined. The fruit consumption has decreased less, by 3.5 percent, compared to the vegetable consumption that declined by 5.3 percent.

In terms of the specific fruit and vegetable preferences, water spinach, spinach and long beans were the most eaten vegetables in 2016. Banana, orange and rambutan were the most eaten fruits.

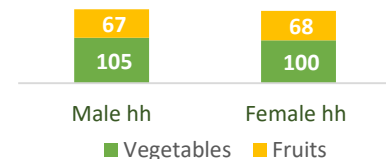
Low consumption of fruits and vegetables may contribute to the low achievement in desired dietary pattern (PPH) scores which have declined since 2010-2013 i.e. 85.7 (2010), 85.6 (2011), 83.5 (2012) and 81.4 (2013) in Indonesia. However, in its Medium-Term National Development Plan for 2015-2019, the Government of Indonesia has identified nutrition improvement as one of its key targets. It seeks to improve the country's dietary diversity pattern to 92.5 in 2019.

\* The minimum recommended level as per WHO/FAO Expert Consultation 2003, also used by the Ministry of Health.

## Indonesians in urban areas eat more fruits and vegetables than Indonesians in rural areas.

### No significant difference in consumption of fruits and vegetables by male and female headed households

In 2016, there wasn't a significant difference in the consumption of fruits and vegetables between male and female headed households. The male headed households consumed slightly more fruits and vegetables than female headed households (by 4 grams/person/day), however this difference was marginal.

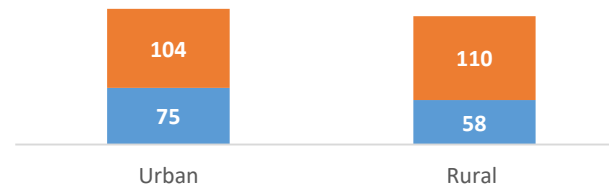


Data: BPS, Susenas March 2016

In 2016, consumption of fruits and vegetables was slightly higher among the urban population compared to the rural population as shown in the graph below. However, until 2015 the opposite was the case, with consumption of fruits and vegetables higher among rural Indonesians and lower in urban areas. Analysis of the consumption trend in the last 5 years also shows that the overall consumption of fruits and vegetables at national level has increased in urban area (by 1.8%), while it has declined in rural Indonesia (by 10.7 %).

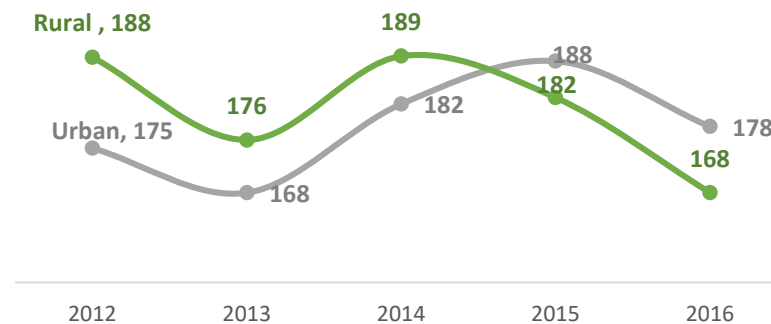
Fruit consumption tends to be higher in urban area, and more vegetables are consumed in the rural parts of Indonesia.

### Daily per capita consumption of fruits and vegetables in urban and rural Indonesia in 2016 (in grams)



Data: BPS, Susenas March 2016

### Comparing daily per capita fruit and vegetable consumption trend between 2012 and 2016 (in grams)



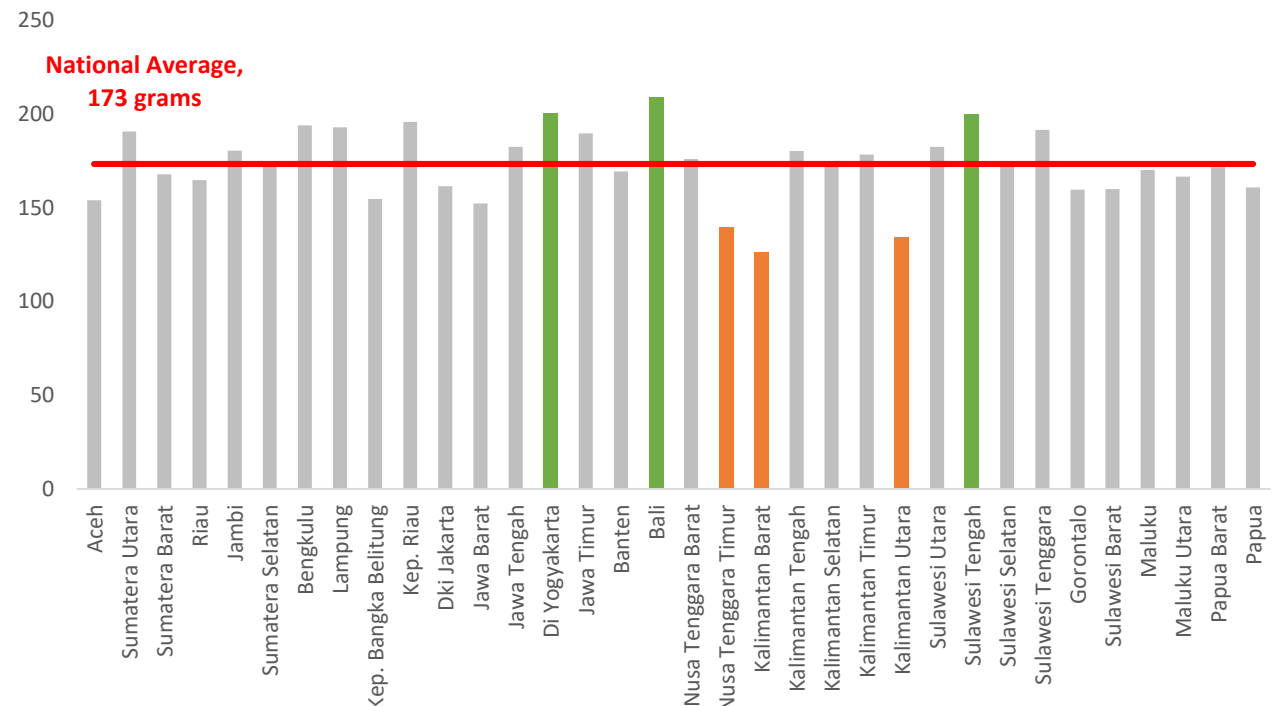
Data: BPS, Susenas March 2012- 2016



**Consumption varies substantially across provinces, yet no province reached the minimum recommended daily levels.**

In 2016, in half of all provinces, consumption of fruits and vegetables was below the national average (173 grams per capita per day). Consumption levels varied substantially across the provinces- highest in Bali, Yogyakarta and Central Sulawesi, nearly double the consumption compared to East Nusa Tenggara, North Kalimantan and West Kalimantan where the consumption levels were the lowest. Nevertheless, none of the provinces reached the minimum recommended daily levels.

**Daily per capita fruit and vegetable consumption (in gram) by province in 2016**



Data: BPS, Susenas March 2016

## Poorer Indonesians eat less fruits and vegetables than the wealthier Indonesians.

### Proportion of daily per capita fruit and vegetable consumption to the recommended intake, by expenditure decile, in 2016

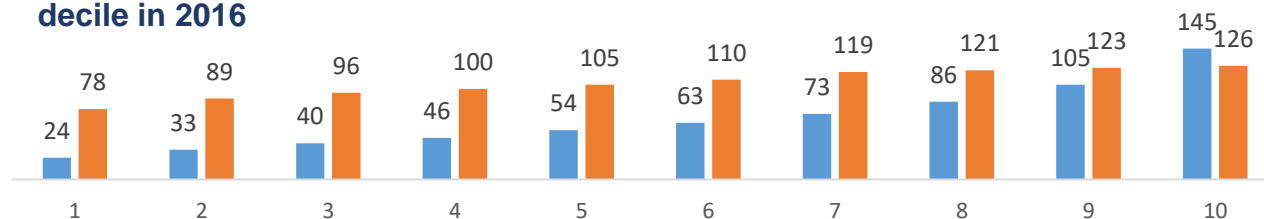
Decile	% of the recommended intake
1	25%
2	31%
3	34%
4	37%
5	40%
6	43%
7	48%
8	52%
9	57%
10	68%

Data: BPS, Susenas March 2016

Consumption of fruits and vegetables varies substantially across expenditure deciles. Low expenditure deciles represent higher levels of economic vulnerability and poverty, while higher expenditure deciles higher income groups. In 2016, fruit and vegetable consumption for those in the first expenditure decile reached only around 1 quarter of the minimum recommended daily intake (400grams/capita/day), while Indonesians in the highest expenditure decile ate 68 percent of the recommended levels. To further illustrate, Indonesians in the first expenditure decile ate 61.6 percent less vegetables than Indonesians in the last expenditure decile. This difference was even more prominent for fruit consumption- Indonesians in the first decile ate around 24 grams of fruits per person per day, equivalent to one rambutan, and about 6 times less fruits than Indonesians in the last expenditure decile.

Trend over the last 5 years shows a widening ‘consumption gap’ between the economically vulnerable groups in the low expenditure deciles and the more prosperous Indonesians in the high expenditure deciles. The difference between vegetable consumption of the first and the last decile nearly doubled between 2012 and 2016, increasing from 35 to 62 percent. Similarly, over time, consumption of vegetables declined the most among the poorer Indonesians, while less among the wealthier people. To illustrate, Indonesians in the first decile consumed around 14.2 percent less vegetables in 2016 than in 2012, while Indonesians in the tenth expenditure decile increased vegetable consumption by 3 percent. Nevertheless, only Indonesians in this decile increased their vegetable consumption in the last 5 years, all other deciles show a decline.

### Daily per capita consumption of fruits and vegetables (in grams) by expenditure decile in 2016



<sup>1</sup> One expenditure decile represents 10% of the population

Data: BPS, Susenas March 2016

**Over the last 5 years, there is a widening consumption gap between the poorer and wealthier Indonesians.**

**Change in consumption of fruits and vegetables in 2016, compared to 2012, by expenditure decile**

Decile	Fruits	Vegetables
1	-20.8%	-14.2%
2	-14.4%	-10.9%
3	-3.1%	-8.0%
4	-4.2%	-8.0%
5	-2.1%	-7.6%
6	-2.2%	-5.0%
7	-5.1%	-2.1%
8	-6.7%	-2.8%
9	-0.9%	-1.2%
10	3.2%	3.0%

Data: BPS, Susenas March 2012- 2016

Fruit consumption shows the same trend, a rising gap between Indonesians in the first and the last expenditure decile. While in 2012 Indonesians in the tenth decile consumed 4 times more fruits than Indonesians in the first decile, it was 6 times more in 2016. Similar to vegetable consumption, fruit consumption declined more among the low expenditure groups, and less among the higher ones. As shown in the table below, Indonesians in the first decile consumed 20.8 percent less fruits in 2016 compared to 2012, while Indonesians in the tenth decile increased their fruit consumption by 3.2 percent. Compared to vegetable consumption, the association between fruit consumption and income is less consistent, with the consumption decline for seventh and eight decile exceeding the decline in third to sixth decile. This implies that while affordability can explain the low and declining fruit consumption for lower expenditure deciles, it alone does not explain this variation for the middle-expenditure groups..

The overall fruit and vegetable consumption trend indicates an association between income and people's diet. People from low economic background eat very little fruits and vegetables, and the consumption increases with increasing income. However, economic access alone is not the key barrier for all Indonesians. Even the most prosperous Indonesians (in the tenth decile), who are progressively eating more fruits and vegetables, did not reach the minimum recommended daily intake for fruits and vegetables in 2016. Indonesians in the middle-income groups eat less fruits and vegetables than they used to.



## Production exceeds the current consumption levels, however would not suffice if Indonesians ate the adequate amount of fruits and vegetables.

### Annual production of the most produced and the most consumed fruits and vegetables in 2016 (ton)

Commodity	2016
<b>VEGETABLES</b>	
Chilli	1,961,598
Cabbage	1,513,326
Shallot	1,446,869
Water spinach	297,130
Spinach	160,267
Long beans	388,071
<b>FRUITS</b>	
Banana	7,007,125
Orange	2,138,474
Mango	1,814,550
Rambutan	572,193

Data: BPS, Indonesia Statistics 2017

In 2015, production of fruits and vegetables in Indonesia reached 29.96 million tons. The total annual consumption at national level was 16.38 million tons, based on the per capita consumption and the total population estimate\*. The total annual exports in 2016 exports reached around 1 million ton.

Chili, cabbage and onion were the most produced vegetables in Indonesia, with more than 1 million ton of annual produce for each. On the other hand, production of the most eaten vegetables (water spinach, spinach and long beans) was lower, not reaching 1 million ton in total for all three. The top produced fruits were bananas, oranges and mangos. Bananas and oranges are also the most eaten fruits, followed by rambutans.

The total production of fruits and vegetables currently exceeds the consumption levels, leaving the country with a large annual surplus- 11.1 million tons for fruits, and 1.45 million tons for vegetables. Given the 2016 population size and the minimum recommended daily intake of 400 grams per person, the consumption need would amount to around 37.7 million tons of fruits and vegetables. This represents an opportunity for fruit and vegetable farmers who could, with adequate support, meet this demand to see greater profits.

In terms of the Government's horticulture commodity priorities, the focus in 2017 is on chili, onion, garlic and oranges. Except for oranges, the most commonly eaten fruits are not prioritized, raising concerns for supporting the adequate consumption of fruits and vegetables in the country. In addition, aligning consumption and production is critical for supporting Indonesians in eating adequate amount of fruits and vegetables, as well as for producers to meet the demand. Finally, a large annual surplus of fruits and vegetables warrants a review of the production data and improvement of the post-harvest processes to minimize losses.

### Annual consumption, production and export of fruits and vegetables at national level in 2016 (in thousand ton)



Data: BPS 2016

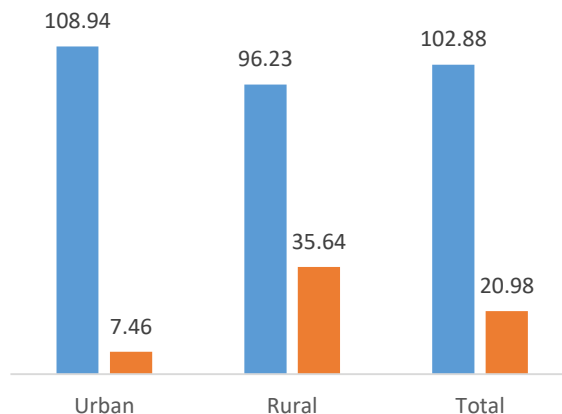
\* Using the BPS population estimates for 2016- 255.462 million people

## Indonesians are net buyers of fruits and vegetables.

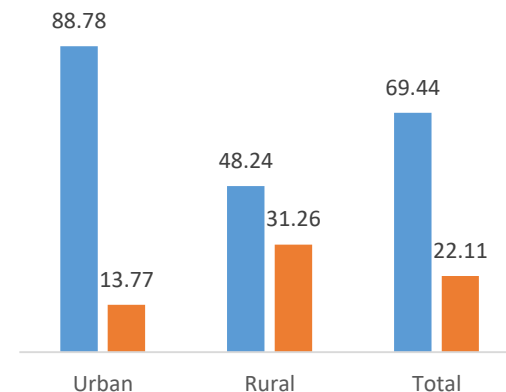
Indonesians, in both rural and urban areas, are net buyers of fruits and vegetables. On average, 82.9 percent of the consumed vegetables and 76.3 percent of the consumed fruits was from purchase in 2016. Indonesians in urban areas consumed around 6.4 percent of vegetables they produced, while it was 27 in rural Indonesia. On the other hand, consumption from own production is slightly higher for fruits compared to vegetables- 13.4 percent of fruits consumed by Indonesians in urban area was from own production, while rural Indonesians produced nearly 40 percent of fruits they consumed.

As even in rural Indonesia majority of the consumed fruits and vegetables is procured through purchase, income and affordability of fruits and vegetables is crucial for achieving the desired consumption levels and ultimately healthy and prosperous life for Indonesians.

**Vegetable consumption by purchase or own production in urban and rural Indonesia, in 2016 (in grams)**



**Fruit consumption by purchase or own production in urban and rural Indonesia, in 2016 (in grams)**



Data: BPS, Susenas September 2016

## Affordability is a key barrier to adequate fruit and vegetable consumption for the poorest Indonesians.

### Change in expenditure on fruits and vegetables in 2016, compared to 2012, by expenditure decile

Change in expenditure in 2016 compared to 2012			
Decile	Fruit	Vegetable	Food
1	2.5%	27.0%	30.6%
2	5.0%	29.5%	37.2%
3	15.8%	31.1%	36.5%
4	16.0%	40.0%	41.3%
5	27.0%	43.6%	45.1%
6	25.1%	48.4%	46.5%
7	27.7%	52.6%	46.4%
8	25.3%	48.8%	45.2%
9	28.1%	47.2%	42.1%
10	27.8%	49.0%	41.7%
Average	24.8%	44.1%	42.4%

Data: BPS, Susenas March 2012- 2016

In 2016, an average Indonesian spent around 11.6 percent of their total food expenditure on fruits and vegetables. In comparison, expenditure on cigarettes constitutes 13.8 percent of the total food expenditure.

In nominal terms, an average expenditure on vegetables was 8,051 IDR per person per week, however it varied substantially across expenditure deciles. Indonesians in the first decile spent around 3700 IDR a week (per person) for vegetables, 3.5 times less than Indonesians in the tenth decile who spend around 13,200 IDR. An average weekly expenditure on fruits was lower compared to the expenditure on vegetables, at around 4,500 IDR per person, but with an even larger variation across expenditure deciles. Indonesians in the first decile spent 834 IDR per person per week. In comparison, Indonesians in the tenth decile spent 14,037 IDR on fruits, 16.8 times more than Indonesians in the first decile.

Over the last 5 years, average expenditure on fruits and vegetables has grown, with expenditure on fruits increasing less than expenditure on vegetables, by 24.8 percent and 44.1 percent respectively. The overall increase in food expenditure (42.4 percent) is in line with the vegetable expenditure trend, however is nearly double the increase in fruit expenditure, as shown in the table below.

Similarly, expenditure growth across income groups differs for fruits, vegetables and the overall food expenditure. Expenditure on vegetables for lower income groups has grown less than for the higher income groups represented in the upper expenditure deciles. As with the consumption trend, the difference for expenditure growth for fruits between the lower and the higher income groups is even more prominent, as illustrated in the below table. On the other hand, this difference is less apparent for the overall food expenditure, where growth is more even across the deciles. Interestingly, the data shows that the middle-expenditure groups increased their expenditure on vegetables more than on the overall food expenditure.

Declining fruit and vegetable consumption, slower growth of fruit and vegetable expenditure combined with the higher growth of the overall food expenditure among the poorer Indonesians implies the poorest Indonesians are opting for other foods, likely more affordable, yet less healthy and nutritious.

On the other hand, high increase in vegetables expenditure for middle-expenditure groups, exceeding the overall increase in food expenditure, yet still declining fruit and vegetable consumption, might signal preferences for certain types of produce, emphasizing quality, or certain type of produce. This offers an opportunity to raise awareness of balanced and healthy diet and advocate for increased consumption of fruits and vegetables.

With the already high malnutrition levels, and inadequate consumption of macronutrients, especially protein, this trend rises concern for addressing the remaining challenges in food security and nutrition in the country, and ultimately in securing healthy and productive life for all.

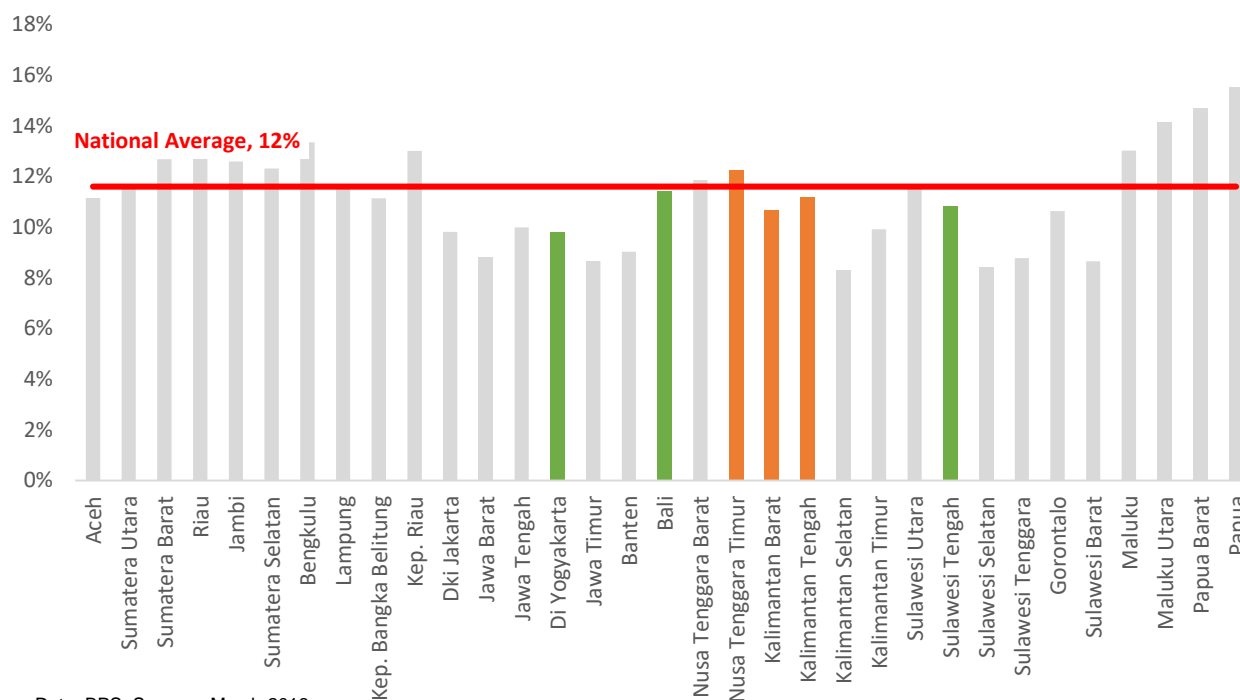


## High expenditure and low consumption signal affordability issues in the provinces with the lowest consumption.

In March 2016, the average Indonesian spent 11.6 percent of their total food expenditure on fruits and vegetables. As with consumption, expenditure varied substantially across provinces. In the provinces with the highest consumption, expenditure remained below the national average. On the other hand, provinces with the lowest consumption levels had equally high or higher expenditure, signaling higher prices of the commodities in these areas.

Sufficient supply to keep the prices at affordable levels or an alternative access to fruits and vegetables for economically vulnerable people, through existing food assistance and social safety schemes, provide an opportunity to increase the consumption of fruits and vegetables among these groups.

**Proportion of weekly expenditure on fruits and vegetables to the total food expenditure per person, in 2016**



Data: BPS, Susenas March 2016

## Consumption of fruits and vegetables by agricultural households has declined the most.

When comparing fruit consumption among the different employment types, those employed in services had the highest consumption while agricultural households the lowest. Vegetable consumption on the other hand is the highest for households dependant on remittance, second highest for agricultural households, while lowest for service employees.

Over the last 5 years, there is an overall decline in consumption of fruits and vegetables. This decline is the most prominent among the agricultural households both for fruits and vegetables, while there is an increase for the other industry for vegetables, and for manufacture and the other industry for fruits as show in the table below.

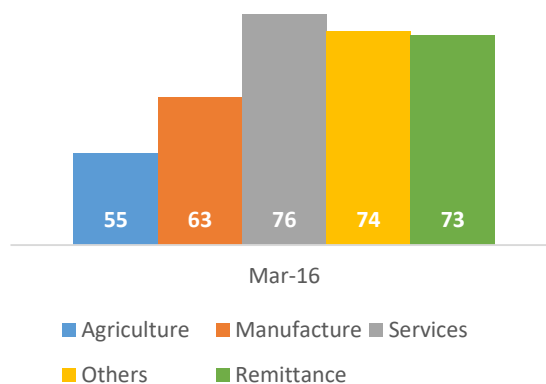
### Change in consumption of fruits and vegetables in 2016, compared to 2012, by employment type

#### Change in consumption in 2016, compared to 2012

	Vegetable	Fruit
<b>Agriculture</b>	-10.58%	-14.03%
<b>Manufacture</b>	-1.30%	3.81%
<b>Services</b>	-2.52%	-1.56%
<b>Others</b>	6.92%	8.51%
<b>Remittance</b>	-5.63%	-9.10%

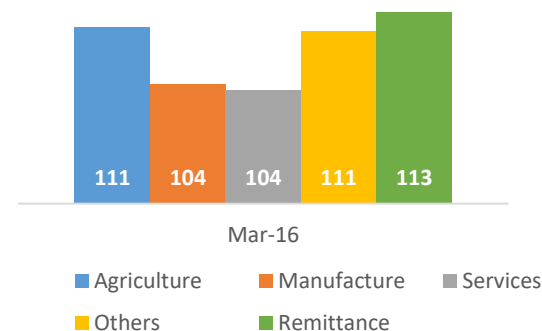
Data: BPS, Susenas March 2012- 2016

### Daily per capita fruit consumption by employment type at national level in 2016 (in grams)



Data: BPS, Susenas March 2016

### Daily per capita vegetable consumption by employment type at national level in 2016 (in grams)



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# 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 Jul-Aug-Sept 2017 is derived from BMKG and CHIRPS long-term average dataset. Actual rainfall for Oct 2017 and forecast for Nov 2017 to Jan 2018 uses BMKG data. Thresholds for anomaly follows a standard protocol.

The number of maximum consecutive days since last rain (DSLRL) is calculated as a count of the most recent days since a day had more than 0.5 mm of rain. The DSLRL 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.

State of planting and harvesting estimates were determined by importing MODIS Vegetation (MOD13Q1 - 16 days and 250m resolution) data into TIMESAT – a program for analyzing time-series satellite sensor data. TIMESAT conducts pixel-by-pixel classification of satellite images to determine whether or not planting has yet begun. This process was followed for all of Indonesia over multiple years in order to evaluate current planting vis-à-vis historical years from 2001 - 2016.

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).

Fruits and vegetables expenditure and consumption trends are based on the March 2012 to March 2016 National Socioeconomic Survey data from the National Statistics Agency (Susenas-BPS). The total sample of the March Susenas is 300,000 households, covering the entire country. All fruits and vegetables recorded in March Susenas, including 29 vegetables and 23 fruits, was used for the analysis. Apart from individual vegetables, the analysis also includes vegetable soups, categorized under vegetables in the survey. The detailed explanation of the Susenas dataset and methodology is available via BPS publication, accessible through the BPS website. Fruit and vegetable production data, including exports, is based on the official BPS data release.

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# 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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