Impacts of the COVID-19 pandemic on food and nutrition security in Indonesia

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Abstract. The COVID-19 pandemic has negative impacts on the achievement of sustainable development goals (SDGs) goal number 2: Zero Hunger. The poor and temporary unemployed, due to pandemic, experienced the hardest hit. Objective of this study is to analyze the impacts of the pandemic on the achievement of the SDGs goal 2, especially the targets 2.1 and 2.2 (universal access to safe and nutritious food and end all forms of malnutrition). The scope of this study was at the country level, and data used were from Badan Pusat Statistik (BPS/Statistics Indonesia) and related ministries for the 2015‒2020 period. Data were analyzed using a qualitative and quantitative descriptive approach. This study indicated that the pandemic disrupted the improvement of food and nutrition security in Indonesia that has been achieved until 2019. Compared to the previous year, in 2020, the prevalence of undernourishment (8.34%) and food quality consumed measured by the desirable dietary pattern (86.3) worsened, and the prevalence of food insecurity experience scale (5.12%) decreased but at a slower rate. The low-income households and families headed by a women or disabilities were among the most vulnerable groups in maintaining food security. The government social assistance programs distributed timely have resulted in positive impacts in easing the burden. Since the pandemic has not ended yet, the social safety net programs should be extended and the government's effort to maintain food supply and price stabilization should be continued.

1. Introduction

The COVID-19 pandemic has emerged in early 2020 and infected a lot of people around the world. The first case of an Indonesian infected with this virus was known on March 2, 2020, in Depok City, West Java Province, a city bordering the state capital Jakarta. This virus has spread rapidly on the islands of Java and Sumatra, and finally to all parts of Indonesia. To limit its spread, the Government of Indonesia issued a Large-Scale Social Restriction policy, which essentially limits the movement of people and goods and requires everybody to maintaining distance and wearing masks when outside the home.

The COVID-19 pandemic and government policies to limit its spread have disrupted all aspects of life, especially health, social, and economy. Several rapid studies done in the country show that national economic growth was disrupted, many workers were forced to temporarily lose their jobs, some of them has returned to their families in rural areas as a sanctuary, and food supply chains were disrupted and impacted by the sharp dropped in perishable food prices at the farm level [1–3]. Another study concluded...
that the hunger scale in Yogyakarta Province during the pandemic increased to 11%, while in the pre-
pandemic situation was 6% [4].

Due to the pandemic, in 2020 the world experienced an economic recession with the real gross
domestic product (GDP) was estimated to contract by -4.3%. In the same year, Indonesia's GDP also
was hit by a recession with estimated growth of -2.2% [5]. This effect in declining household income,
especially the bottom 20% of the income group. The subsequent impact is a decrease in the quantity and
quality of household food consumption.

The problems described above can disrupt efforts to achieve sustainable development goals (SDGs)
2030 goal-2, namely: Zero Hunger. This study aims to analyze the extent to which the impact of the
COVID-19 pandemic has disrupted the achievement of the Indonesia SDGs goal-2, especially target 2.1
(universal access to safe and nutritious food) and target 2.2 (end all form of malnutrition).

2. Materials and methods
The disruption to the progress towards the achievement of SDGs goal-2 is indicated by the dynamic
performance of several SDGs indicators. The indicators analyzed are the prevalence of
undernourishment (PoU) and prevalence of the Food Insecurity Experience Scale (FIES) of target 2.1
and score of the Dietary Desirable Pattern (DDP), which is a national (Indonesia) indicator as an
additional global indicator for target 2.2. The definition and calculation methods for these indicators
refers to publications from Bappenas and Badan Ketahanan Pangan (BKP/Indonesian Agency for Food
Security) [6,7].

Based on the definition used in the above SDGs metadata, PoU is the condition that on a regular
basis, a person has access to the amount of food that is insufficient to provide the energy (in kilo calories)
to live a normal, active, smart, and healthy life, given his or her own dietary energy requirement,
presented as the percentage of the total population. The prevalence of FIES is the percentage of
individuals who have experienced moderate or severe levels of food insecurity during the reference
period, on the total population. Meanwhile, the definition of DDP is the composition of the main food
groups that can meet the needs of energy and other nutrients. The maximum or best DDP score is 100.

The data used for PoU and FIES are from BPS and DDP from BKP. Other data and information were
mostly gathered from BPS and Indonesian Ministry of Agriculture. Data were analyzed using a
qualitative and quantitative descriptive approach supported by figures and tables. The coverage of this
analyses was at the country (Indonesia) level. Due to data availability, the year interval used for PoU
and DDP is 2015–2020 and for FIES is 2017–2020. To capture the impacts of the pandemic, analyses
were also done for the 2019-2020 disaggregated data based on of socio-economic characteristics, namely
rural-urban areas, gender and disability status of head of families, and household expenditure group.

3. Results and discussion
3.1. Trend of undernourishment and food insecurity at the national level
In the 2015–2019 period (five years development plan) prevalence of insufficient food consumption as
measured by PoU in Indonesia improved, from 10.73% to 7.63%. This achievement has not yet reached
the target set by the government of 6.69% [8] but the direction of progress is quite significant. This
positive trend was disrupted by the onset of the COVID-19 pandemic in early 2020. The 2020 PoU rate
again increased (worsened) to 8.34%, higher than the prevalence rate in 2017 (Figure 1).

Similar to the PoU figures, the prevalence of FIES for the 2017–2019 period improved from 8.66% to
5.42%. This achievement was better than the target set by the government of 5.79% [8]. In contrast
to the PoU figure, the prevalence of FIES in 2020 continued to improve from the previous year at 5.12%,
although the difference in the decline was small (0.3%) compared to the previous three-year average of
1.1%/year (Figure 2).

Based on the above discussion, the COVID-19 pandemic has a significant effect on food insecurity
in Indonesia. A similar situation was also found in several Indo-Pacific Countries, Jordan, and South
Africa [3,9,10]. This situation was predicted to occur globally, including child malnutrition. The
disruption of health services and decreasing in households’ income will increase child stunting and micronutrient malnutrition [11].

As stated above, the progress in achieving SDGs for targets 2.1 and 2.2 made until 2019 was disrupted in 2020 due to the COVID-19 pandemic. In general, this pandemic has impacted the decrease in income of households, especially those who work as laborers in the industrial and informal sectors [1,3]. The pandemic has made difficult for the bottom 40% of households to meet their adequate food consumption needs based on the principles of balanced nutrition. An online survey by BPS reported that 70.53% of households in the bottom 20% and 46.77% in the second 20% from the bottom of the income groups admitting to having decreased in their income [2]. To maintain the fulfillment of staple food consumption, the decline in household income was overcome by household heads through reducing the proportion of non-food expenditures, coupled with lowering the quality of the composition of food consumption [13]. A rapid observational study done in capital city Jakarta indicated that consumption behaviour of respondents were influenced by health, social, and psychological aspect, and their awareness of the importance of health, quality, and food safety in choosing food composition was increased [14].
The pandemic has significant impacts on household members, including children, to meet basic needs for nutritious food. This situation was confirmed by two rapid online study done in May 2020 with different set of provincial coverages and survey designs. The World Bank high-frequency monitoring showed that 31% of households surveyed experienced food shortages, and 38% ate less food than they should have[15]. Another study reported that 53% of households have limitations in providing nutritious food according to standard needs, and 96% of children under two years of age are unable to meet their minimum intake needs in terms of food frequency and diversity [16]. This condition, if not handled accurately and quickly, will have a severe prolong impact on child malnutrition, especially stunting and wasting.

The continuing decrease (better) in the prevalence of FIES during the COVID-19 pandemic indicates that the government's rapid and timely response to addressing the negative impacts of this pandemic on the aspects of health, economic recovery, and social protection is bearing fruit. The government budget for social assistance in 2020 was allocated of Indonesian rupiah (IDR) 220.39 trillion or US dollar (USD) 15.3 billion (exchange rate 1 USD equal to IDR 14 1400) or around 30% of the country's total handling cost of COVID-19. In 2020 the government expanded the beneficiaries of existing (2019) programs. Beneficiaries in the staple food card program (Kartu Sembako) was increased from 15.6 million to 20 million low-income households, with the provision of non-cash food assistance for every household increased from IDR 150,000 to IDR 200,000 per month. Coverage of social assistance recipients was expanded with new programs such as unconditional cash assistance for the most affected communities, the Pre-Employment Card program, which was a competency development program aimed at job seekers or those affected by layoffs, and the Village Direct Cash Assistance program [17].

A survey reported that more than 90% of low-income households received at least one social assistance from the government and more than 60% received cash assistance. About two-thirds (67.4%) of government social assistance recipients said the assistance was helpful in dealing with the impact of the decline in household finances following the COVID-19 pandemic [18]. Without those economic recovery and social assistance programs, the World Bank estimated additional 5.5 million people (under mild shock) to 8.0 million people (under severe shock) could be pushed into poverty [19].

3.2. Disparity of undernourishment and food insecurity
Disaggregated data of the PoU and prevalence of FIES in 2019 and 2020 showed disparities between households based on place of residence and characteristics of the household heads. In line with the country level data, the disaggregated data based on socio-economic characteristics of PoU in the pandemic year (2020) were consistently higher (worse) than the year before the pandemic (2019) and for the prevalence of FIES the figure in 2020 were lower (better) compared to those in 2019 (Table 1).

| Social economic characteristics                | PoU (%) | FIES (%) |
|-----------------------------------------------|---------|----------|
| Place of residence                            |         |          |
| Urban areas                                   | 5.64    | 4.77     |
| Rural areas                                   | 10.11   | 6.57     |
| Gender of household heads                     |         |          |
| Male                                          | 7.41    | 5.06     |
| Female                                        | 9.20    | 7.35     |
| Disability status of household heads           |         |          |
| Non-disabilities                              | 7.52    | 5.46     |
| Disabilities                                  | 11.47   | 10.85    |

Source: BPS [12]
The disaggregated data shows that the PoU and the prevalence of FIES of households in urban areas were better than in rural areas and households headed by male were better than those headed by female. Furthermore, households headed by non-disabilities were better compared to those with disabilities, which was almost 50% higher (49.9%) for PoU and almost twice (96.7%) for FIES. This finding confirms that people who have more opportunities and abilities to take advantage of economic opportunities have better chances of avoiding food insecurity events. In addition, this can also reflect the lack of inclusiveness for people with disabilities and gender equality in employment opportunities.

The value of PoU and FIES by household expenditure groups (quintiles) showed a pattern that the higher the level of expenditure groups, the smaller the percentage of PoU and FIES. The pattern was similar before (2019) and during the COVID-19 pandemic (2020), as shown in Table 2. In 2020, the percentage of PoU in quintile 1 (bottom 20%) household expenditure was 14.72%, then dropped sharply in quintile 2 to 9.54% and decreased again for each subsequent quintile. In quintile 5 (top 20%), the PoU was quite low at 2.27%. Likewise, for the prevalence of FIES, the percentage in quintile 1 (bottom 20%) household expenditure was 10.64%, decreased about half to 6.75% in quintile 2, dropped steadily in each quintile 3 and 4, and in quintile 5 was 1.32% (Table 2). The World Bank online survey explained that 30-50% of households experiencing income shocks were also facing food insecurity, depending on the type of the shocks (such as stopped working, reduced income) and type of food insecurity (such as shortage of food or ate less) [15]. Social protection and food assistance programs are needed to mitigate the negative and prolong impacts on human health, especially for children under five years of age.

Table 2. PoU and prevalence of FIES by income group in Indonesia, 2019 and 2020.

| Expenditure group | PoU (%) | FIES (%) |
|-------------------|---------|----------|
|                   | 2019    | 2020     | 2019    | 2020     |
| Quintile 1 (top 20%) | 13.98 | 14.72 | 10.90 | 10.64 |
| Quintile 2       | 8.60   | 9.54   | 7.21  | 6.75   |
| Quintile 3       | 5.59   | 6.72   | 5.01  | 4.82   |
| Quintile 4       | 3.74   | 4.42   | 3.12  | 3.03   |
| Quintile 5 (bottom 20%) | 1.95 | 2.27 | 1.62 | 1.32 |

Source: BPS [12]

3.3 Quality of food consumption

DDP score was calculated using the average energy adequacy rate of 2,000 kcal/cap/day. DDP scores showed an improving trend from 85.2 to 91.3 during 2015-2018 and dropped slightly in 2019 to 90.8. In 2020 the DDP score decreased again to 88.3, lower than the 2017 score. During the 2015–2020 period, the DDP score in urban areas was consistently better than that in rural areas, and the 2020 scores in urban and rural areas decreased compared to those in the previous year. In 2020 DDP scores in urban and rural areas were 88.6 and 85.4, respectively (Figure 3). This information indicated that (i) the quality of household food consumption has decreased due to the COVID-19 pandemic and (ii) the quality of food consumption in urban areas has always been better than in rural areas. There are better opportunities to find paid work and better access to food markets in urban areas creating opportunities for households to consume a better composition of food than those living in rural areas.

Due to the Large-Scale Social Restriction policy issued by the government, the middle-upper income group households bought some of their food needs through online shopping and consumed more fruits and vegetables that they perceive as healthy food [1]. Meanwhile, the low-income households make adjustments to their food consumption pattern to meet their staple food needs by reducing the quality of food composition through lowering consumption of protein and vitamin sources, which are relatively expensive [13]. These behavioral changes in food purchase and consumption pattern also found in
several countries. In Sarawak Malaysia, most households were food secured before and during the pandemic, but in the latter situation, among others, they have to switched their food sources and consumed without their preferred food [20]. An online survey in Qatar reveals that consumers shifted their food diets toward healthier diets and increased the proportion of food purchased through online shopping [21]. A study in the US revealed reductions in food-away-from home expenditures and increases in online grocery shopping [22].

![DDP score at national, urban and rural areas, 2015–2020.](image)

Source: BKP [23]

**Figure 3.** DDP score at national, urban and rural areas, 2015–2020.

The problem of decreasing food security in 2020, as discussed above, was in line with the dynamics of the poverty rate. Data from BPS showed that the number and percentage of people under poverty since more than ten years ago have been declining consistently. In 2019 (March figure) the number of people under poverty line was (March figures), 25.14 million people, or 9.41% of the total population. In 2020 the number of the poor increased to 26.42 million people (9.78%). Meanwhile, in the same year, the percentage of poverty in rural areas continued to improve, although with a slight percentage only from 12.85% to 12.82%.

The food and agriculture sector, which dominates the rural economy, has high resilience in facing crises caused by external shocks such as the economic and political crisis in 1997/1998, the international monetary crisis in 2008, and the COVID-19 pandemic in 2020 [1]. Food production in 2020 is not expected to be affected by the pandemic, among others, as a result of the government's special efforts through farmers’ empowerment and incentives provision for farming activities. Indonesian Ministry of Agriculture reported that the 2020 preliminary figure of positive production growth from previous year of paddy, corn, sugar cane by 1.02%, 11.52%, and 7.24%, respectively. Meat and eggs production were estimated to increase by 0.14% and 5.56%. While soybean production is expected to decline sharply by about a third from the previous year, however this is not due to the pandemic but because this crop farming is not competitive compared to other food crops, such as corn, seasonal fruit and vegetables.

4. **Conclusion**

The COVID-19 pandemic has affected food security in Indonesia. Progress made until last years towards achieving the SDGs 2030 goal 2 has been disrupted by the pandemic. In 2020 the PoU and DDP score decreased and the prevalence of FIES increased slightly from the previous year. The most affected segment of the population by the pandemic were the poor and near-poor families and households headed by female and with disabilities.
With the COVID-19 pandemic situation still affecting the dynamics of life that hamper the growth of economic and job opportunities, various forms of social assistance programs are still needed. The distribution of social assistance packages needs to be evaluated and sharpened in terms of the smoothness and speed of distribution, accuracy and transparency of target recipients, suitability of aid packages, and accuracy in utilizing the aid packages by the beneficiaries. In addition, the government's efforts to maintain food supply and price stabilization should be continued, among others, by doubling the effort to increase food production and removing barriers along the food supply chains.

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References
[1] Pusat Sosial Ekonomi dan Kebijakan Pertanian 2020 Dampak Pandemi COVID-19: Perspektif Adaptasi dan Resiliensi Sosial Ekonomi Pertanian ed A Suryana, I W Rusastra, T Sudaryanto and S M Pasaribu (Bogor: IAARD Press)
[2] Badan Pusat Statistik 2020 Hasil Survei Sosial Demografi Dampak COVID-19 (Jakarta: Badan Pusat Statistik)
[3] Robins L, Crimp S, van Wensveen M, Alders R, Bourke R M, Butler J, Cosijn M, Davila F, Lal A, McCarthy J, McWilliam A, Palo A S M, Thomson N, Warr P and Webb M 2020 COVID-19 and Food Systems in Indo-Pacific: an Assessment of Vulnerabilities, Impacts and Opportunities for Action (Canberra: ACIAR)
[4] Purnasari N, Juwitangtyas T and Sabarisman I 2020 Household food security during COVID-19 pandemic in Daerah Istimewa Yogyakarta, Indonesia Sustinere J. Environ. Sustain. 4 132–43
[5] World Bank 2021 Global Economic Prospects, January 2021 (Washington DC: World Bank Group)
[6] Badan Perencanaan Pembangunan Nasional 2020 Metadata Indikator Tujuan Pembangunan Berkelanjutan (TPB)/Sustainable Development Goals (SDGs) Indonesia Pilar Pembangunan Sosial, Edisi II (Jakarta: Kementerian PPN/Bappenas)
[7] Badan Ketahanan Pangan 2015 Panduan Perhitungan Pola Pangan Harapan (PPH) (Jakarta: Badan Ketahanan Pangan Kementerian Pertanian)
[8] Badan Perencanaan Pembangunan Nasional 2017 Peta Jalan SDGs Indonesia Menuju 2030 (Jakarta: Kementerian PPN/Bappenas)
[9] Elsahoryi N, Al-Sayyed H, Odeh M, McGrattan A and Hammad F 2020 Effect of COVID-19 on food security: a cross-sectional survey Clin. Nutr. ESPEN 40 171–8
[10] Arndt C, Davies R, Gabriel S, Harris L, Makrelov K, Robinson S, Levy S, Simbanegavi W, van Senevert D and Anderson L 2020 COVID-19 lockdowns, income distribution, and food security: an analysis for South Africa Glob. Food Sec. 26 100410
[11] Headey D, Heidkamp R, Osendarp S, Ruel M, Scott N, Black R, Shekar M, Bouis H, Flory A, Haddad L and Walker N 2020 Impacts of COVID-19 on childhood malnutrition and nutrition-related mortality Lancet 396 519–21
[12] BAPPENAS 2021 Indonesia’s Voluntary National Review (VNR) 2021 (Jakarta: BAPPENAS)
[13] Saliem H P, Agustian A and Perdana P R 2020 Dinamika Harga, Permintaan, dan Upaya Pemenuhan Pangan Pokok pada Era Pandemi COVID-19 Dampak Pandemi Covid-19: Perspektif Adaptasi dan Resiliensi Sosial Ekonomi Pertanian ed A Suryana, I W Rusastra, T Sudaryanto and S M Pasaribu (Bogor: IAARD Press) pp 361–80
[14] Sandi W S and Wiweka K 2020 The changes in food consumption behavior: a rapid observational study of COVID-19 pandemic Int. J. Manag. Innov. Entrep. Res. 6 77–87
[15] World Bank 2020 Indonesia High-frequency Monitoring of Covid-19 Impacts vol 26 (Jakarta: World Bank)
[16] Wahana Visi Indonesia 2020 COVID-19 Pandemic and Its Impacts on the Children of Indonesia,
A Rapid Assessment for Early Recovery Initiation (Jakarta: Wahana Visi Indonesia)

[17] Kedereitjan Bidang Ekonomi Bappenas 2021 Ketika Semua Aktivitas Terhenti: Pandemi COVID-19 dan Kilas Balik Ekonomi (Jakarta: BAPPENAS)

[18] SEMERU Research Institute, PROSPERA, UNDP and UNICEF 2021 Executive Summary Report: The Social Impacts of COVID-19 on Households and Strategic Policy Recommendations for Indonesia (Jakarta: SEMERU Research Institute)

[19] The World Bank 2020 Indonesia COVID-19 Observatory: Ex-ante Poverty & Distributional Impacts of COVID-19 in Indonesia (Jakarta: World Bank)

[20] Abdullah R G, Mersat N I and Wong S K 2021 Implications of COVID-19 pandemic on household food security: experience from Sarawak, Malaysia Int. J. Bus. Soc. 22 1–13

[21] Ben H T, El Bilali H and Allahyari M S 2020 Impact of COVID-19 on food behavior and consumption in Qatar Sustain. 12 1–18

[22] Ellison B, McFadden B, Rickard B J and Wilson N L W 2021 Examining food purchase behavior and food values during the COVID-19 pandemic Appl. Econ. Perspect. Policy 43 58–72

[23] Badan Ketahanan Pangan 2021 Direktori Perkembangan Konsumsi Pangan (Jakarta: Badan Ketahanan Pangan)