

Research article

Addressing the Twin Threats: Combating Child Stunting and Poverty Among Indonesian Farmworker Families

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Abstract: This study identifies the underlying factors contributing to child stunting and poverty among Indonesian farmworker households. We use logistic regression and the Indonesian Family Life Survey to measure this study. The findings indicate that social and demographic factors significantly influence poverty among farming families. Families with more farming businesses and land ownership are less likely to be poor. However, there is no significant link between agricultural productivity and child stunting. Positive factors for child nutrition include exclusive breastfeeding for at least two years and a father's higher education level. In contrast, older maternal age and larger household size increase the likelihood of child stunting. The study highlights the importance of social and demographic factors in addressing poverty and child health in agricultural settings. Parental education and breastfeeding practices play crucial roles in preventing stunting. To address these issues, policies should focus on educating parents about the benefits of exclusive breastfeeding and early childhood nutrition. Supporting farming families by increasing agricultural productivity and land ownership is essential. Developing targeted nutritional programs for children in larger households and those with older mothers can help prevent stunting.

Keywords: stunting, poverty, agricultural households, Indonesia

JEL Classification: I12, I15, Q12

Abstrak: Penelitian ini mengidentifikasi faktor-faktor mendasar yang berkontribusi terhadap stunting pada anak dan kemiskinan di kalangan rumah tangga pekerja pertanian di Indonesia. Kami menggunakan regresi logistik dan Survei Kehidupan Keluarga Indonesia untuk mengukur penelitian ini. Temuan ini menunjukkan bahwa faktor sosial dan demografi berpengaruh signifikan terhadap kemiskinan di rumah tangga petani. Keluarga yang mempunyai lebih banyak usaha pertanian dan kepemilikan lahan mempunyai peluang lebih kecil untuk menjadi miskin. Namun, tidak ada hubungan yang signifikan antara produktivitas pertanian dan stunting pada anak. Faktor positif gizi anak antara lain pemberian ASI eksklusif minimal dua tahun dan tingkat pendidikan ayah yang lebih tinggi. Di sisi lain, usia ibu yang lebih tua dan jumlah anggota rumah tangga yang lebih besar meningkatkan kemungkinan terjadinya stunting pada anak. Studi ini menyoroti pentingnya faktor sosial dan demografi dalam mengatasi kemiskinan dan kesehatan anak di lingkungan pertanian. Pendidikan orang tua dan praktik menyusui memainkan peran penting dalam mencegah stunting. Untuk mengatasi masalah ini, kebijakan perlu fokus pada pendidikan orang tua tentang manfaat ASI eksklusif dan nutrisi anak usia dini. Pembuat kebijakan perlu mendukung keluarga petani dengan meningkatkan produktivitas pertanian dan kepemilikan lahan. Adanya program nutrisi yang ditargetkan untuk anak-anak di rumah tangga yang banyak anggota rumah tangga dapat membantu mencegah stunting.

Kata kunci: stunting, kemiskinan, rumah tangga petani, Indonesia

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1. INTRODUCTION

The prevalence of poverty in Indonesia has remained significantly high over the past two decades, particularly in rural areas reported by *Badan Pusat Statistik* (BPS) (BPS, 2017). In 2000, the number of impoverished individuals was 12.30 million, which marginally declined to 12.18 million by 2021. Addressing poverty in rural Indonesia necessitates a focus on the agricultural sector (Suryahadi et al., 2009), underscoring the critical role of agricultural productivity in enhancing the welfare of farmers. Despite this, the wages of landless farmers remain unsupportive, as they earn the lowest incomes compared to workers in other sectors (BPS, 2021). The persistently low wages indicate that many workers in Indonesia's agricultural sector continue to struggle to achieve economic prosperity.

The high poverty rate is accompanied by poor nutrition among children in Indonesia. According to basic health survey, approximately 13.8% of toddlers are undernourished. Overall, the prevalence of malnutrition and poor nutrition is higher in rural areas compared to urban areas (Kementerian Kesehatan RI, 2018). Malnourished children are at risk of earning lower wages as adults (McGovern et al., 2017). The measurement of nutrition for children is usually categorized by the prevalence of stunting. Stunting in children is a health problem characterized by stunted physical growth due to chronic malnutrition, especially in the first thousand days of life, from conception until the age of two. Stunting can seriously impact a child's quality of life and future productivity. In Indonesia, stunting is still a significant public health problem, with high prevalence rates in several areas, especially rural areas.

Several studies have found a link between the agricultural and health sectors. The agricultural sector can strengthen health by meeting nutritional and environmental needs (Tenriawaru et al., 2021). The level of public health is one measure of human development and multidimensional poverty (UNDP, 2010). In Indonesia, what needs to be considered is that there are still many children who experience stunting. Around 36% of children in Indonesia experience stunting (Worldbank, 2015). Mehraban and Ickowitz (2021) obtained study results showing a positive relationship between agricultural production diversity and food consumed. This study, followed by Moeis et al. (2020), found that moving farmers from the agricultural sector to the non-agricultural sector is not the right solution to improve farmer welfare, especially for farmers who do not have land. They need to find a way to afford to enter the non-agricultural sector, which requires workers with minimum skills and a certain level of education. For farmers who own land, the amount of harvest and the value of agricultural products significantly sold determines the farmer's welfare. This shows that land that farmers can cultivate is a vital asset for the welfare of farming families. However, around 55% of farmers own less than 0.5 hectares of land (BPS, 2013). As a country where the majority of the population earns an agricultural livelihood, agricultural productivity has great potential to influence the welfare of farming families and their children's health. Low agricultural productivity can negatively impact families' availability and access to quality food, including adequate nutrition. In addition, agricultural productivity also affects family income, which can affect the family's ability to meet children's nutritional and health needs.

The study on the relationship between agricultural productivity and the probability of children becoming stunted has essential relevance in the development context in Indonesia. This study will discuss what factors influence this relationship, such as access to agricultural resources and sustainable agricultural practices, as well as other social and economic factors that can moderate this relationship. This study aims to understand better how agricultural productivity can contribute to the prevention of stunting in farming families and to provide relevant policy recommendations to improve the welfare of children in Indonesia. Based on the phenomena described above, this study aims to measure the impact of agricultural productivity on the welfare of households working in the agricultural sector. We conducted this study to see how critical agricultural products are in the welfare of farming families, especially farmers who own land. The level of welfare is measured using two approaches, namely, the level of poverty and the adequacy of food intake of farming households. These two things are an exciting highlight for researchers because many children who are malnourished come from poor households and rural areas (Beal et al., 2018).

2. RESEARCH METHODS

2.1. Data

This study used data from the fifth Indonesian Family Life Survey (IFLS) wave. This data is a longitudinal economic, social, and health survey at the Indonesian household level (Strauss et al., 2016). The sample taken in this survey is representative of 83% of the population in Indonesia in 1993 and is random at the national level. We used IFLS 5, a survey conducted in 2014. Micro-level household data has a broad scope for study because the goal of development is the welfare of each individual, which should be more clearly seen in microdata (Deaton, 1995).

In calculating welfare, we divide the calculation into poverty level and adequacy of food intake. For poverty measurement, we use household expenditure data as a proxy for income. We did not use revenue as income measurement because farming households have different incomes at the time of harvest and the harvest period for each type of agricultural product, so we use expenditure as an indicator to see the financial capabilities of agricultural households (Deaton, 1995). We use per capita expenditure data provided by the IFLS. In its calculations, IFLS calculates per capita expenditure by adding total food and non-food expenditures (electricity, water, telephone, household domestic needs, education, and housing costs) and then dividing it by the number of household members (Witoelar, 2009).

This study measured the poverty level using the poverty line in 2014 and those living in villages. We used this reference because agricultural communities live in rural areas. Based on BPS data (BPS, 2015), the poverty line in 2014 was IDR 296,681 (per capita and per month). We grouped households that had per capita expenditure below Rp. 296,681 as poor families and those that had expenditure of more than or equal to Rp. 296,681 as non-poor households. Many factors influence malnutrition or stunting in children under five, including socioeconomic factors and food security (Tiwari et al., 2014; UNICEF, 2013). Socioeconomic factors refer to education, employment, income, social class, race/ethnicity, and gender, which cause a person to have differences in accessing health services. Food security refers to sufficient food, both in quantity and quality, safe, diverse, nutritious, equitable, and affordable (Alonso et al., 2018). According to Dib et al. (2018) and Wicaksono et al. (2021), most health problems, especially stunting in toddlers, occur in low-income communities. The reason behind this fact is that people with low incomes tend to consume low-quality food.

2.2. Model Specification

The study model used in this study adopts the model from Darko et al. (2018), which calculates the impact of agricultural productivity on welfare. The general form of the mathematical equation is like this:

$$S_{ch} = \alpha_0 + \alpha_1 A_h + \alpha_2 X_{ch} + \alpha_3 MF_h + \alpha_4 H_h + \varepsilon_{ch} \quad (1)$$

$$Pov_h = \beta_0 + \beta_1 AL_h + \beta_2 MF_h + B_3 H_h + \delta_h \quad (2)$$

Equation (1) shows welfare conditions based on food security as measured by children's nutritional status. The notation S_{ch} indicates children who are stunted when the value is 1 (one) and the value 0 (zero) when they are not stunted. Subscript c indicates individual children, and subscript h indicates household. The variable A_h considers agricultural productivity, which is assessed from the results of agricultural business revenues during the last 12 months. The variable MF_h shows the father's and mother's age and education characteristics. The variable H_h contains household characteristics, namely the number of household members, per capita income, and receiving health care assistance from the government. Equation (2) calculates the welfare conditions of farmer households based on poverty status as indicated by the variable Pov_h . Apart from the value of agricultural productivity, this equation also considers land ownership from farming businesses. This equation also measures household conditions for the control variable as in equation (1). To answer this study question, we used the logistic regression method. This method is used to measure

dependent variables that are binary in nature. The logit model is able to take into account nonlinear functions whose probabilities are between zero and one (Wooldridge, 2016). We use marginal effect interpretation to identify variable probabilities.

3. RESULTS AND DISCUSSION

The sample consists of 677 farming households and 1,468 children. The average annual income from farming is approximately IDR 11,500,000. The per capita expenditure of farming households remains low, at around IDR 770,000 per month. Less than half of the respondents have health insurance. On average, farming families have 2 to 3 household members. The educational attainment of parents in farming families is relatively low, with only about 37% to 38% having completed high school education.

Table 1. The Description of Statistics

| Variable | Mean | Std.Dev. | Minimum | Maximum |
|---|------------|------------|------------|------------|
| Stunted children | 0.649 | 0.478 | 0 | 1 |
| The value of agriculture product (IDR) | 11,520,263 | 15,487,181 | 20,000 | 99,999,995 |
| Weight at birth | 3.194 | 0.722 | 1 | 9.98 |
| Breastfed baby at least until 2 years old | 0.615 | 0.487 | 0 | 1 |
| Frequency of pregnancy check-up visits | 8.944 | 4.068 | 0 | 36 |
| Prenatal visit | 0.987 | 0.115 | 0 | 1 |
| Mother's age | 29.446 | 6.258 | 14 | 49 |
| Mother's education | 0.382 | 0.486 | 0 | 1 |
| Father's education | 0.371 | 0.483 | 0 | 1 |
| Number of household members | 2.502 | 1.226 | 1 | 14 |
| Per capita expenditure | 770,404.33 | 539,633.86 | 126,694.45 | 5,316,250 |
| Social health insurance | 0.451 | 0.498 | 0 | 1 |

Source: Author's Calculation (2023).

This study employs some child-level variables to measure stunting. More than half of the farming households in the sample have children categorized as stunted. The average birth weight of the children is approximately 3.19 kg based on infant nutritional status, we use the indicator of breastfeeding. About 61% of the children were breastfed for at least two years. We also consider the pregnancy conditions of mothers in farming households. The average age of mothers in this study is approximately 29 years. Almost all households visited healthcare facilities for prenatal checkups. During pregnancy, there was an average of about 8 to 9 prenatal visits per farming household.

Table 2 shows the social and demographic conditions that influence farming families into poverty. Agricultural households that have more farming businesses tend not to be poor. This probability is worth around 2%. The existence of land ownership also has almost the same probability as the agricultural productivity variable. Agricultural households that own land have a 2% tendency to be less poor. Farming households that own land tend to have higher incomes compared to those that do not own land (Dib et al., 2018). Agricultural land for farming households is an important asset in their welfare (Birhanu et al., 2021; Moeis et al., 2020; Varga, 2020). Farmers who have better access to land and financial capital have an easier ability to profit from palm oil compared to those who have limitations (Euler et al., 2017; Krishna et al., 2017). On the other side, farm families that have household member more than one have more probability to be impoverished family. This situation make worse the economic strain on these families, as the need to distribute limited resources among more individuals further diminishes their overall welfare. (Anyanwu, 2014) also indicate that household size is a crucial factor in determining poverty levels in developing country whereas adding more members to a household progressively increases the risk of poverty.

Table 2. Socio-demographic Factors and Poverty Status in Agricultural Households

| Variables | Poverty Households (=1) | Marginal Effect |
|---|-------------------------|----------------------|
| The value of agriculture products (ln, IDR) | -0.499*** (0.123) | -0.024*** (0.006) |
| The owner of the land | -0.539* (0.292) | -0.026* (0.014) |
| Mother's age | -0.0003 (0.026) | -0.0001 (0.001) |
| Mother's education | -0.607 (0.463) | -0.030 (0.023) |
| Father's education | -0.055 (0.443) | -0.002 0.022 |
| Number of household members | 0.680*** (0.147) | 0.033*** (0.007) |
| Social health insurance | -0.237 (0.352) | -0.011 (0.015) |
| Constant | 3.601 (1.889) | |
| Observation | 677 | |
| Pseudo R-squared | 0.1664 | |

Note: ***, **, and * indicate significance level at 1%, 5%, and 10%

Source: Author's Calculation (2023).

Table 3. The Prevalence of Child Stunting in Agricultural Households

| Variables | Model 1 | Model 2 | Model 3 | Model 4 |
|---|--|--|---|---|
| The value of agriculture product (ln) | -3.44 x10 ⁻⁹ (0.03 x10 ⁻⁹) | -0.50 x10 ⁻⁹ (0,36 x10 ⁻⁹) | -0.42 x10 ⁻⁹ (0.366 x10 ⁻⁹) | 0.32 x10 ⁻⁹ (0.37 x10 ⁻⁹) |
| Weight at birth | | -0.008 (0.079) | -0.050 (0.080) | -0.042 (0.080) |
| Breastfed baby at least until 2 years old | | -0.830*** (0.119) | -0.890*** (0.121) | -0.905*** (0.122) |
| Frequency of pregnancy check-up visit | | 0.011 (0.014) | 0.012 (0.014) | 0.0133 (0.014) |
| Prenatal visit | | -0.031 (0.498) | 0.144 (0.508) | 0.072 (0.510) |
| Mother's age | | | 0.048*** (0.009) | 0.052*** (0.009) |
| Mother's education | | | -0.092 (0.129) | -0.090 (0.130) |
| Father's education | | | -0.238* (0.130) | -0.220* (0.131) |
| Number of household member | | | | -0.103** (0.048) |
| Per capita expenditure | | | | 9.42 x10 ⁻⁹ (8.4 x10 ⁻⁹) |
| Social health insurance | | | | 0.028 (0.116) |
| Constant | 0.718*** (0.063) | 1.153** (0.542) | 0.135 (0.605) | 0.077 (0.614) |
| Observation | 1.626 | 1.471 | 1.468 | 1.468 |
| Pseudo R-squared | 0.0005 | 0.0302 | 0.0453 | 0.0481 |

Note: ***, **, and * indicate significance level at 1%, 5%, and 10%

Source: Author's Calculation (2023).

Other welfare conditions are measured based on children's nutritional status, which indicates the food security of farming families, as shown in Tables 3 and 4. This study found no relationship between agricultural productivity and children's nutritional conditions. Ogutu et al. (2020) have shown that agricultural commercialization notably enhances food security and dietary quality concerning calorie, zinc, and iron intake, though it has negligible effects on vitamin A. It leads to higher incomes and greater nutrient intake from purchased foods without diminishing nutrient consumption from self-produced foods.

This study does not measure agricultural commercialization. We only measure agricultural productivity and we do not find the effect between agricultural productivity and good nutritional intake. Instead, parental factors and household member conditions significantly influence children's health in farming families. This suggests that improving agricultural productivity alone may not be sufficient to enhance children's nutritional outcomes. Efforts to improve child nutrition should also address broader household and parental factors, including education, health awareness, and access to diverse food sources.

This study finds that children who received breast milk for at least two years were 19.43% less likely to experience stunting. Several studies in the health sector have proven that exclusive breast milk nutrition can reduce the probability of children experiencing stunting, especially in low-income families (Haile & Headey, 2023; Sirajuddin et al., 2020). This shows mothers' role in agricultural households to breastfeed their babies exclusively. Breastfeeding offers numerous benefits for infants during the first six months of life, including reduced incidence of diarrhea and other gastrointestinal issues, as well as enhanced immunity (Wicaksono et al., 2021). The importance of breastfeeding in preventing stunting underscores the need for comprehensive maternal and child health programs in rural areas.

Table 4. The Probability of Stunted Children

| Variables | Marginal Effect |
|---|--|
| The value of agriculture product (IDR) | -0,0696 x10 ⁻⁹ (0,0801 x10 ⁻⁹) |
| Weight at birth | -0,009 (0,017) |
| Breastfed baby at least until 2 years old | -0,194*** (0,024) |
| Frequency of pregnancy check-up visits | 0,002 (0,003) |
| Prenatal visit | 0,015 (0,109) |
| Mother's age | 0,011*** (0,002) |
| Mother's education | -0,019 (0,027) |
| Father's education | -0,047* (0,028) |
| Number of household members | -0,022** (0,010) |
| Per capita expenditure | -2,02 x 10 ⁻⁸ (1,8 x 10 ⁻⁸) |
| Social health insurance | 0,006 (0,024) |

Note: ***, **, and * indicate significance level at 1%, 5%, and 10%

Source: Author's Calculation (2023).

The father's low education level is another factor that influences farmer children to experience stunting. Children who have fathers who have at least completed high school level are less likely to experience stunting by around 4%. This can be caused by the knowledge that the father has to

support the child's good nutrition. The father's education level determines the opportunity to obtain other jobs with more stable wages (Fadilah & Romadona, 2022). Farmers with higher education have the chance to pursue occupations beyond farming. This can increase household income, which in turn, influences the ability to meet the nutritional needs of children. Meanwhile, maternal age and household size have an effect to nutritional status of children. An older mother has a probability of around 1% of having a stunted child. Households that have a large number of household members have around a 2% chance of having stunted children. This finding could occur due to a need for more attention from parents to pay attention to their children's nutrition because they have to pay attention to many household members. Several previous studies found the influence of social factors and family demographics on the probability of children becoming stunted (Chowdhury et al., 2020; Deshmukh et al., 2013; Logarajan et al., 2023).

4. CONCLUSIONS

Conclusions that can be drawn from this study, it was found that social and demographic factors has significant effects on the welfare status of farming families, both in the context of poverty and children's nutritional conditions. The study results indicate that agricultural households with more farming businesses tend to have a lower probability of being included in poor households. Ownership of agricultural land has also proven critical in improving the welfare of farming families. However, regarding children's nutritional conditions, this study did not find a significant relationship between agricultural productivity and children's nutritional conditions. On the other hand, factors such as exclusive breastfeeding for at least two years and a higher level of father's education positively impact the child's nutritional status. In addition, older maternal age and many household members can increase the probability of children experiencing stunting. These findings underscore the importance of social and demographic factors in understanding farm family well-being and child health in agricultural settings. Parental knowledge and practices, especially regarding breastfeeding and education, are essential in preventing stunting. Apart from that, household management and attention to children's nutrition are also relevant factors. The results of this study provide a more comprehensive view of the factors that influence stunting in farming families, which can assist in developing more effective policy strategies to improve the welfare of children in Indonesia's agricultural sector.

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