

Potensi Ekonomi yang Hilang Diakibatkan oleh Stunting di Kab. Kudus

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Evaluasi Sosialisasi Kegiatan Perhitungan
Potensi Ekonomi yang Hilang dengan Metode
Konig

Lost Economic Potential Caused by Stunting in Kudus Regency

*Evaluation of Socialization of Activities
for Calculating Lost Economic Potential
with the Konig Method*

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Abstract

The United Nations' Sustainable Development Goals (SDGs) have several points that are relevant to the issue of stunting, particularly those related to health and well-being. Stunting can have an impact on society, affecting the economy, education, and social development. In the context of government, stunting has a negative economic impact and therefore needs to be reduced. The Kudus Regency Government is currently making efforts to reduce stunting rates and aims to achieve zero percent by 2024. Stunting is one of the most critical issues that need to be addressed by the current regent and the next elected regent. The purpose of this community service activity is to provide technical guidance on calculating the economic losses caused by stunting. The method used to calculate the economic losses caused by stunting is the Konig method. Estimating the economic losses caused by stunting is necessary to serve as the basis for allocating funds to stunting programs in Kudus Regency. In the initial presentation phase, the preliminary analysis revealed that 98% of respondents were unaware of the economic potential lost due to stunting. During the activity, the team presented materials to explain the methods used to analyze the economic potential lost due to the impact of stunting in Kudus

Regency. The final results of the analysis show that stunting in Kudus Regency causes an economic loss of 627.97 billion rupiah every year. The final evaluation results indicate that 100% of respondents assessed that the presentation of the material provided knowledge in reducing stunting rates in Kudus Regency. Academic recommendations for policymakers are expected to provide empirical evidence of the economic losses as a

basis for the need for effective activities to reduce stunting rates in Kudus Regency. With this, stunting rates can be further reduced, and it is hoped that the economic losses caused by stunting in the following years can be minimized.

Keywords

Economic Potential; Stunting; SDGs; Kudus Regency

Abstrak

Sustainable Development Goals (SDGs) oleh PBB memiliki beberapa poin yang relevan dengan masalah stunting, terutama yang berkaitan dengan kesehatan dan kesejahteraan. Stunting dapat berdampak terhadap masyarakat, baik itu memengaruhi ekonomi, pendidikan, dan pembangunan sosial. Dalam konteks pemerintah, stunting memberikan dampak negatif secara ekonomi sehingga perlu untuk ditekan. Pemerintah Kabupaten Kudus saat ini memiliki upaya menekan angka stunting serta menargetkan nol persen pada 2024. Stunting menjadi salah satu permasalahan yang cukup krusial yang perlu diselesaikan oleh Bupati saat ini maupun bupati terpilih selanjutnya. Tujuan dari kegiatan pengabdian kepada masyarakat ini dilakukan guna membimbing teknis terkait untuk menghitung estimasi ekonomi yang hilang akibat permasalahan stunting yang ada. Metode penghitungan nilai ekonomi yang hilang akibat stunting dilakukan dengan menggunakan metode konig. Estimasi ekonomi yang hilang akibat stunting diperlukan guna menjadi dasar dari pengalokasian dana terhadap program stunting di Kabupaten Kudus. Kegiatan paparan pada tahap awal, hasil analisis awal menunjukkan sebesar 98% responden belum mengetahui potensi ekonomi yang hilang ditimbulkan oleh stunting. Dalam kegiatan yang dilakukan, diberikan pemaparan materi dari tim kelompok untuk menjelaskan mengenai metode dalam menganalisis potensi ekonomi yang hilang diakibatkan dampak stunting di Kabupaten Kudus. Hasil akhir dari analisis menunjukkan potensi ekonomi yang hilang akibat stunting di Kabupaten Kudus sebesar 627,97 Milyar Rupiah Setiap tahunnya. Hasil evaluasi akhir dapat dikatakan 100% responden menilai bahwa paparan materi tersebut memberikan pengetahuan dalam menekan angka stunting di Kabupaten Kudus.

Saran akademik bagi pengambil kebijakan diharapkan dapat menunjukkan bukti empiris nilai ekonomi yang hilang sebagai dasar kebutuhan kegiatan yang efektif dalam menekan angka stunting di Kabupaten Kudus. Dengan hal demikian, angka stunting selanjutnya dapat ditekan dan diharapkan dapat mengurangi potensi ekonomi yang hilang akibat stunting di tahun selanjutnya.

Kata Kunci

Potensi Ekonomi; Stunting; SDGs; Kabupaten Kudus



1. Introduction

Stunting is a condition of impaired growth in children caused by chronic malnutrition and recurrent infections, usually occurring during the first 1,000 days of life (from pregnancy to the age of two years). Stunting has significant impacts on children's physical and cognitive development and may affect their quality of life in the future. The United Nations' Sustainable Development Goals (SDGs) include several points that are directly relevant to stunting, particularly those related to health and well-being.

Several SDG points are directly or indirectly connected to stunting. SDG 1 (No Poverty) emphasizes poverty eradication, which can help reduce stunting, as poorer families tend to have more limited access to nutritious food and

healthcare. Poverty alleviation directly contributes to improved nutrition and health conditions (Widari et al., 2021). SDG 2 (Zero Hunger) focuses on ending hunger and ensuring access to sufficient, nutritious, and sustainable food for everyone, particularly children (Grosso et al., 2020; Nainggolan et al., 2024). Addressing stunting is a critical part of ending malnutrition and ensuring healthy child growth and development. SDG 3 (Good Health and Well-being) seeks to ensure healthy lives and promote well-being for all at all ages.

Addressing stunting includes reducing child mortality, improving maternal health, and ensuring access to quality healthcare (Komarulzaman et al., 2023). SDG 4 (Quality Education) highlights the importance of education, as

better education for parents and communities about nutrition and healthcare can help prevent stunting. Furthermore, children affected by stunting often face difficulties in education, so supporting quality education also plays a role in mitigating its impacts (Purba et al., 2024). SDG 6 (Clean Water and Sanitation) emphasizes the importance of access to clean water and proper sanitation to prevent infections that can affect nutrient absorption and overall child health. Poor sanitation can worsen stunting through intestinal infections and other health problems (Roediger et al., 2020). Stunting remains a serious issue in developing countries, typically caused by insufficient nutrition, which directly and indirectly limits child growth and health, with long-term implications for

life and economic productivity (Afiatna et al., 2024; Ayukarningsih et al., 2024; Elba et al., 2023; Fajar & Khairuddin, 2022; Juliana & Febiyanti, 2024; Monikasari et al., 2024; Sari, 2024; Sundoro et al., 2024; Wardani et al., 2023; Yuliarni et al., 2023).

Stunting can affect society as a whole, influencing the economy, education, and social development (J. N. Fauziah et al., 2023; S. N. Fauziah et al., 2024). In the context of Kudus Regency, the tobacco industry, which serves as a major source of regional revenue through the central government, requires a workforce that will be employable in the future. This makes the issue of stunting particularly critical for the Kudus Regency Government. A national study involving children

under five years old in 2013 reported that the average economic loss across 32 provinces in Indonesia, calculated using the Konig method, ranged from IDR 96 billion to IDR 430 billion (Renyoet et al., 2016).

A more recent study in 2022 estimated that economic losses caused by stunting in Central Java Province reached between IDR 435 billion and IDR 1,957 billion, with productivity losses reducing GRDP by approximately 0.08% (Khotimah, 2022). These losses vary among regencies due to the reliance on national and provincial-level macro indicators in the calculations. Such studies are provincial in scale and relatively outdated compared to current conditions. Adults who experienced stunting as children tend to have

lower workplace productivity, which can affect overall economic growth (Aulia et al., 2024; Y et al., 2023).

High stunting prevalence also increases the burden on healthcare systems due to additional medical needs and management of chronic diseases. Its impact on children's academic performance can reduce educational attainment and skill levels in society (Rohloff & Flom, 2023). Poor education, in turn, can hinder social mobility and long-term economic opportunities (Ashwad et al., 2023). In terms of human resources, stunting undermines the potential for a healthy and productive workforce, which is essential for sustainable social and economic development. Communities with high stunting rates often struggle to achieve social

welfare and progress. Addressing stunting therefore requires a comprehensive and coordinated approach, involving sectors such as health, nutrition, education, and the economy (Fitria et al., 2023; Hatini et al., 2023). Reducing stunting not only improves individual health and well-being but also contributes to broader social and economic development (Gusriani et al., 2023; Monikasari et al., 2023).

From a governmental perspective, stunting exerts a negative impact on a country and thus must be reduced due to its significant economic consequences. In Indonesia, stunting was estimated in 2013 to have reduced productivity by 0.04%-0.16% of total GDP (Khotimah, 2022). These impacts include reduced productivity, higher

healthcare costs, and constraints on long-term economic growth. Its impacts also included the reduced workforce productivity. Specifically, adults who experienced stunting in childhood often have lower cognitive and physical skills, which diminishes labor productivity. This affects both the quality and quantity of the workforce. With limited skills and capacity, such individuals may only obtain lower-paying jobs, reducing their income potential and, ultimately, their contribution to the economy (Nainggolan et al., 2024).

Children affected by stunting may also require more frequent and intensive healthcare, both for stunting-related issues and for subsequent health conditions, increasing the financial burden on national health systems. Stunting is linked to various long-term health problems requiring

ongoing care, further raising healthcare costs. National economic performance can also be disrupted by reduced productivity across the labor force, stemming from high stunting prevalence (Haskas, 2020). A population with suboptimal health and skills is likely to experience slower economic growth compared to its full potential. This creates a substantial long-term social and economic burden. Stunted children often face academic difficulties, which may result in lower educational attainment and fewer skills (Putri, 2021). This, in turn, affects their ability to fully contribute to the national economy in adulthood. Stunting is also often linked to poverty, with affected children struggling to escape the cycle of poverty, exacerbating social and economic inequality (Haskas, 2020).

Stunting also undermines community well-being. The decline in quality of life resulting from stunting, including poor health and limited cognitive capacity, reduces overall societal welfare, with implications for social and economic stability (Mitra et al., 2023; Tugiono et al., 2022). By limiting education and skills, stunting restricts social and economic mobility, thereby reducing opportunities for individuals to improve their social and economic status (Oktaviani et al., 2023).

Indonesia faces serious challenges regarding stunting but has also made progress through various policies and programs. According to the Indonesian Nutrition Status Survey (SSGI) 2023, the prevalence of stunting in Indonesia was 24.6%. This indicates that about

1 in 4 children under five experience stunting, although this figure has declined compared to previous years. The Government of Indonesia currently targets reducing stunting prevalence to 14% by 2024, in line with the National Medium-Term Development Plan (RPJMN). Stunting rates in Central Java tend to be lower than in provinces such as East Nusa Tenggara and Papua, but remain higher than the national average of 24.6%. Several regencies in Central Java, especially rural areas or those with limited access to health and nutrition services, continue to face high stunting prevalence.

Efforts to reduce stunting in Kudus Regency require cross-sectoral collaboration. The Acting Regent of Kudus, Muhamad Hasan Chabibie, represented by Acting Regional Secretary

Revlisianto Subekti, stated that the Kudus Regency Government is targeting zero percent stunting by 2024. As shown in Figure 1, the prevalence of stunting in Kudus Regency remains high, with an estimated prevalence of 15.7% at the end of 2023.

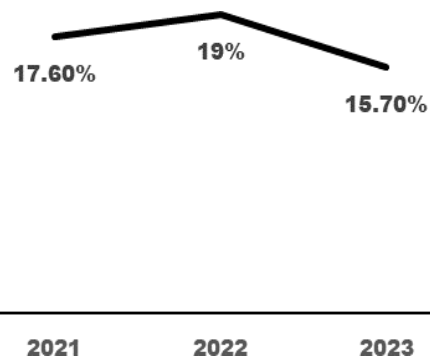


Figure 1. Prevalence of Stunting in Kudus Regency

Source: National Nutrition Status Survey (2024)

The Kudus Regency Government has also engaged stakeholders, such as business actors, to work together in reducing stunting rates. In terms of assistance, the

Supplementary Feeding Program (PMT) is expected to improve child nutrition. Furthermore, according to Hasto, the Family Planning Operational Fund (BOKB) of Kudus Regency in 2024 amounts to around IDR 7 billion, which is expected to achieve better reductions in stunting cases than the previous year. Previously, the Kudus Regency Government received a performance-based fiscal incentive allocation of IDR 7.37 billion in the 2023 fiscal year, in recognition of its commitment to stunting reduction.

Stunting remains a key responsibility of the Kudus Regency Government and continues to be a significant global issue, especially in developing countries. It is a condition in which children fail to grow to the appropriate height for their age due to chronic malnutrition, recurrent

infections, or a combination of both. This condition can have long-term effects on health and child development, influencing learning ability and potentially reducing future productivity. Governments and non-governmental organizations worldwide are working to reduce stunting prevalence through various approaches, such as supplementary feeding, health education, and infrastructure improvements. However, combating stunting requires a holistic and sustainable approach to address its root causes.

In Kudus Regency, stunting poses a serious challenge to children's physical growth and cognitive development, influenced by factors such as imbalanced nutrition, limited access to healthcare, and low public awareness of proper

nutrition. To address this issue, the local government needs to implement a range of programs, including nutrition awareness campaigns, nutritional supplementation for pregnant women and young children, and expanded access to healthcare services (Nurbaeti et al., 2024). Collaboration among the government, international organizations, local NGOs, and the community is essential to achieving significant reductions in stunting prevalence and ensuring that future generations in Kudus Regency have healthier and more productive lives.

Stunting-related activities are often hindered by the lack of empirical evidence on the economic losses caused by stunting in Kudus Regency. The purpose of this study is to demonstrate the potential economic losses

caused by stunting. It is expected that, once local technical officers are able to calculate these losses, the findings can serve as a basis for budget allocation for stunting programs in Kudus Regency. This, in turn, will directly and indirectly contribute to reducing stunting prevalence in the regency.

Stunting verification in Kudus Regency is carried out periodically at local health centers (puskesmas) with the involvement of qualified technical staff. Estimating the economic losses caused by stunting is crucial for determining the allocation of funds for stunting programs in Kudus Regency. At present, technical staff have yet to fully understand why stunting reduction programs are necessary. Practically, this study also observes the behavioral responses of staff implementing stunting programs after gaining knowledge of stunting's economic

impacts. Their behavior is often influenced by their understanding of these economic consequences. This study will therefore present the economic losses caused by stunting in Kudus Regency, with the findings delivered through joint socialization sessions using a mathematical model. Following this, a survey will be conducted to assess the understanding of technical staff after receiving explanations regarding the economic losses caused by stunting.

2. Methods

Before the presentation was conducted, a preliminary analysis was carried out to assess participants' knowledge regarding the economic impact of stunting in Kudus Regency. Data collection for the evaluation of this

$$PV_{[0]} = \frac{FVA_{[r,t]}}{(1+r)^t} \quad (3)$$

community service activity was conducted through a survey of 100 participants who attended the session on

the economic impact of stunting. Following this, a presentation and calculation simulation were conducted to estimate the economic impact of stunting using the Konig method (1995). The Konig method was chosen in this study because, in economic analysis, it reduces the number of iterations and yields a relatively high and accurate projection (Renyonet et al., 2016). The calculation of a child's economic value when entering the workforce is explained in Equation (1)

$$FV[r,t]=P0(1+r)^t \quad (1)$$

The total economic value until retirement age is explained in Equation (2)

The calculation of a child's economic potential at age 0 is explained in Equation (3)

Finally, the economic potential lost due to

stunting is explained in Equation (4)

$$P_{[PEM]} = Prev \times \sum BL \times PV_{[0]} \quad (4)$$

The formulas are defined as follows:

$FV[r,t]$ = productive income (ages 18–60)

$FVA[r,t]$ = economic value until retirement

$PV_{[0]}$ = economic value of a newborn child

$P[pem]$ = economic potential lost due to stunting

P_0 = 2024 wage (annual)

r = interest rate (5%)

t = productive working years

$Prev$ = stunting prevalence

ΣBL = number of births

In the Konig method calculations, several economic assumptions were applied, including the regional minimum wage of Kudus Regency, amounting to IDR 2,516,888, with an interest rate of 5%. The productive working age used in the study was 15 to 60 years, resulting in 45 years of productivity. The

stunting prevalence in Kudus Regency was taken as 3.69%, based on digital data from the e-PPGBP system accessed through diskominfo.kuduskab.go.id. The annual number of births was assumed to be 10,000 individuals.

Based on the analysis, an estimated amount in rupiah was obtained, representing the economic losses caused by stunting. The results were then presented, followed by a Q&A session and discussion with the technical officers who participated in the activity. The discussion outcomes were later evaluated through a survey that assessed participant satisfaction with the material presented. The survey questions focused on participants' views regarding the usefulness of the material provided.

3. Results and Discussion

In the presentation given to participants, the session served as a treatment to explain the economic impact of stunting in Kudus Regency. Before

the presentation, participants were asked whether they were aware of the economic impact caused by stunting in Kudus Regency.

The analysis results of the questionnaire distributed to 100 respondents are presented below:

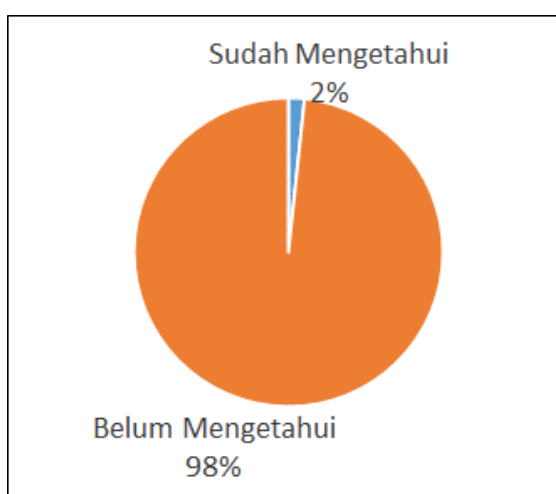


Figure 2. Preliminary Analysis of Respondents

Source: Author (processed, 2024)

Figure 2 shows that 98% of respondents had no knowledge of the economic potential lost due to stunting. This indicates the need for a detailed explanation of the economic impact of stunting in Kudus

Regency.



Figure 3. Presentation of Lost Economic Potential Due to Stunting in Kudus Regency

Source: Author (2024)

Figure 3 illustrates that the community service activity was attended by village officials and community health center staff from various villages across Kudus Regency.

During the session, the team presented materials explaining the methods used to analyze the economic impact of stunting in Kudus Regency. The assumptions applied in the analysis included the Kudus Regency minimum wage of IDR 2,516,888, a 5% interest rate, and a productive working age span of 15 to 60 years (45 years in total). The stunting

prevalence rate was obtained from the e-PPGBM database (via diskominfo.kuduskab.go.id), and the assumed number of annual births was 10,000, based on BPS data from 2011-2014.

The outreach activity simulated how the Konig method's formulas could be applied with macroeconomic indicators representing the specific conditions in Kudus Regency. Following the presentation, a Q&A session was held, allowing all participants to respond to the calculations and analysis presented (see Figure 4).



Figure 4. Q&A Session with Participants

Source: Author (2024)

After the Q&A session, an evaluation was conducted

based on feedback from all participants. The evaluation was carried out online through a Google Form survey, asking participants about the usefulness of the materials presented in enhancing their knowledge of stunting. The purpose of this evaluation was to measure how well the material was understood by participants and its practical value for their work in reducing stunting rates in Kudus Regency. The analysis results of the evaluation are as shown in Figure 5.

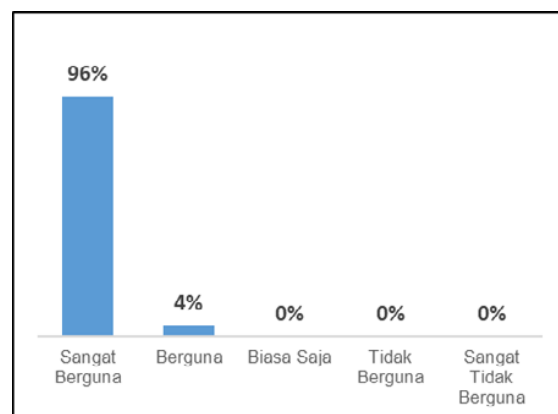


Figure 5. Evaluation Results from Respondents

Source: Author (processed, 2024)

Figure 5 shows that the materials presented in Kudus Regency were received very positively. Of the respondents, 96% rated the presentation as very useful in providing insights for reducing stunting rates in Kudus Regency, while 4% rated it as useful. In other words, 100% of respondents gave positive feedback on the presentation. The feedback from this socialization activity pointed that the outreach was conducted primarily through one-way simulations. For future sessions, it is recommended to adopt two-way simulations, enabling stakeholders to apply the method more effectively in practice.

4. Conclusion

The community service program carried out in Kudus Regency, aimed at providing understanding to village officials and health center staff stationed in each village, has been implemented in line with its objectives. The activity involved

delivering material on the potential economic losses caused by stunting in Kudus Regency. Previous analysis revealed that nearly all participants were unaware of the potential economic losses resulting from stunting in Kudus Regency. The explanation regarding the calculation of potential economic losses due to stunting was presented clearly and participants attended enthusiastically, accompanied by a question-and-answer session between the presenters and the participants. The results of the analysis showed that stunting in Kudus Regency could lead to an estimated economic loss of IDR 627.97 billion.

Further evaluation confirmed that 100% of participants considered this information valuable in supporting efforts to reduce stunting in Kudus Regency. By quantifying the potential economic losses caused by stunting, it is expected that local government agencies will be able to present

empirical evidence to justify budget allocations for stunting reduction programs. Reducing stunting rates in Kudus Regency will directly and indirectly minimize potential economic losses.

The evaluation results indicate that the objectives of this community service activity—raising awareness about the potential economic losses due to stunting—were successfully achieved, equipping village officials and health center staff

Acknowledgement

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with the necessary knowledge to take action in reducing stunting in Kudus Regency. This is particularly important in light of the Kudus Regency Government's target of reducing the stunting rate to 0%. However, feedback from the session suggested that the current one-way simulation method should be developed into a two-way simulation in the future, so that the method can be applied more effectively by stakeholders.

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