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Analysis of the Economic Losses Due to Stunting in the Bangka Belitung Islands Province

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A B S T R A C T

As the next generation of the nation and a state asset, the government needs serious attention to overcome the problem of stunting, this is because stunting not only causes health problems but can also cause economic losses. The perception that stunting is only related to health problems is not correct because based on an economic perspective, the importance of health factors for humans is related to the quality of human resources. One way or another, the quality of human resources (HR) is determined by health status, so the fact is that stunting which results in a decrease in labor productivity in the future will have an economic impact. This research aims to analyze the impact and economic losses due to stunting of toddlers in the Bangka Belitung Islands Province. This research is a quantitative descriptive research sourced from secondary data from 2018-2022 and primary data through in-depth interviews. The analysis was carried out using the Konig formula calculation and Correction Factor. The results stated that during the 2018-2022 there was a significant decrease in the prevalence of stunting in the Bangka Belitung Islands Province. Based on the estimation results for the 2018-2022 period, the average value of potential losses due to a 2 percent decrease in productivity is IDR. 219,545,886,933.18 or 0.28 percent of Gross Regional Domestic Product (GRDP). Meanwhile, the average potential loss with a 9 percent decrease in productivity over a period of 5 years is IDR. 987,956,491,199.33. or 1.27 percent of the Gross Regional Domestic Product (GRDP).

Keywords: *Economic Losses; Stunting; Quality of Human Capital*
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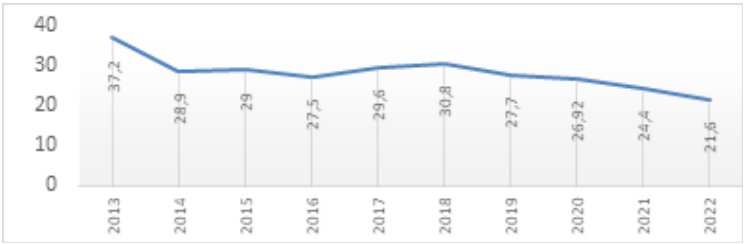
INTRODUCTION

Children are the nation's next generation who must receive special attention and have the right to achieve cognitive and social development. According to Unicef (2018), children, especially toddlers, are a group that is vulnerable to health and nutritional problems. Malnutrition is responsible for the health status of toddlers. The health consequences of malnutrition account for around four million deaths, while malnutrition explains around 45% of deaths among children under five (Renyoet, 2021).

The quality of children's growth and development needs serious attention to avoid stunting children's growth and development. The problem of hampered growth and development of children, especially for toddlers, consists of the problems of wasting, overweight and stunting (Salsabila et al., 2021). Stunting is a condition where the child's growth is not optimal due to chronic malnutrition in the first 1,000 days of life. A child is said to be stunted if the child's height is more than two standard deviations and lower than the median growth standard according to WHO for children of the same age and gender, which means the child is stunted (Kemiskinan, 2017). According to UNSCN (2004) stunting that occurs in developing countries is mainly caused by chronic malnutrition and infectious diseases which affect thirty percent of children under five years of age. The direct cause of nutritional disorders in children (including stunting) is a lack of nutritional intake and health status. The number of stunting can be reduced by addressing several causes of nutritional problems, such as factors related to food security, access to nutritious food (food), infant and toddler feeding practices, access to health services, health care and environmental health such as the availability of clean water facilities. and environmental sanitation (Nasional & Nasional, 2019).

Stunting is a condition of chronic malnutrition caused by insufficient nutritional intake over a long period of time, generally due to providing food that is not in accordance with nutritional needs (Sugiyono, 2019). Cases of stunting or failure to thrive in children under five in Indonesia are still high and have not shown significant improvement. The World Health Organization (WHO) ranks Indonesia as the third country with the highest cases in Asia. Based on 2018 basic health research (Riskesdas) data, the stunting rate in Indonesia reached 30.8 percent. Meanwhile, the WHO target is that the stunting rate should not be more than 20 percent (Saudale, 2019).

At the Asian level, the prevalence of stunting in Indonesia is better than Myanmar (35%), but is still higher than Vietnam (23%), Malaysia (17%), Thailand (16%) and Singapore (4%) (Ministry of Health, 2023). During the 2013-2022 period, the prevalence of stunted toddlers in Indonesia has decreased. The highest prevalence rate was in 2013, namely 37.2 percent, and the lowest prevalence occurred in 2022, namely 21.6 percent. This condition shows

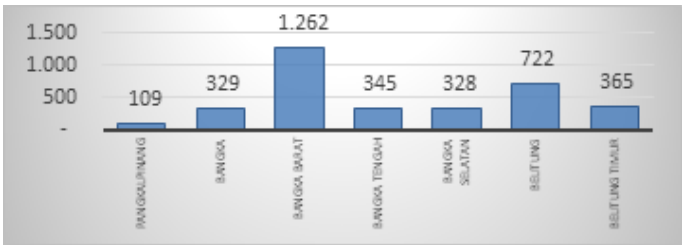


Source: Kemenkes, 2022

Figure 1.
Development of Stunting Prevalence in Indonesia for the 2013-2022 Period

that the government is serious in dealing with the problem of stunting in Indonesia.

Bangka Belitung Province, which is one of the provinces in Indonesia, is not free from the problem of stunting. Based on data from the (Kemenkes, 2021), the prevalence of stunting in the Bangka Belitung Islands Province is in the 8th lowest number of stunting cases, namely 18.5. The reduction in stunting rates in Bangka Belitung Province occurred due to the government's success in tackling stunting through programs implemented, especially the growing public awareness about the dangers of stunting. Even though there has been a reduction in stunting rates, the problem of stunting is still a concern for the Bangka Belitung Islands Provincial Government, because it not only impacts health problems, but also impacts economic losses.



Source: BKKBN, 2023

Figure 2.
Number of Stunted Toddlers Based on Regency/City in Bangka Belitung Islands Province in 2022

Data from the BKKBN of the Bangka Belitung Islands Province, the lowest number of stunting cases in the Bangka Belitung Islands Province was in the Pangkalpinang City area with 109 people or 3.2 percent and the highest occurred in West Bangka Regency, namely 1,262 people or 36.5 percent. Stunting conditions in West Bangka and Belitung Regencies are included in the regencies with high stunting rates compared to regencies/cities in the Bangka Belitung Islands Province. One of the causes of high stunting in West Bangka district is that young marriages are high, and problems with parenting patterns, this stunting is usually chronic malnutrition.

Several studies estimate that a The high rate of stunting in a country can have an impact economic loss. The UN Development Program (UNDP) collaborates with Statistics Indonesia (Central Statistics Agency or BPS) to creating a framework for reciprocal relationships between economic growth, poverty, and healthy development (nutritional status) (Nasional, 2019).

According to Becker, human capital is defined as knowledge, information, ideas, skills and health of an individual. Meanwhile, Acemoglu & Autor (2011) define human capital as something related to the knowledge or characteristics workers possess (either innate or acquired) which contributes to "productivity". Productivity theory is directly related to the contribution of human resources.

The contribution of human capital can be analyzed from two perspectives, namely micro and macro. The micro perspective views that human capital is part of the individual's production function which is then related to the quality of human resources. Knowledge can have an impact on mastery of technology and innovation in the production process. The result of this knowledge is efficiency in the production process which has the potential to increase productivity. On the other hand, having expertise will make individuals more competent in the production process, thereby encouraging productivity. At a macro level,

the contribution of human capital can be analyzed from the micro contribution which is aggregated as part of national economic development. This development has the impact of increasing welfare which is indicated by increasing the level of GRDP per capita (Anwar, 2017).

Human Capital Theory states that the educational process, values and skills that are useful in humans can increase their learning capacity and productivity. All this is what enables their future earnings, by increasing their lifetime earnings. The educational process is seen as a model of investment as distinguished from consumption in that it produces immediate gratification or benefits, but does not create future income. According to Romer (1989), human capital refers to a person's stock of knowledge and production skills. Education is one way in which individuals increase their human capital. The higher a person's education, the higher the stock of human capital is expected to be. Unlike other forms of capital which are only treated as tools, human capital can invest itself through various forms of HR investment, including formal education, informal education, work experience, health and nutrition and transmigration (Fattah, 2008).

From all understandings of human capital, it can be concluded that human capital is an investment in the field of human resources. It contains elements of education as a source of knowledge and skills that will support human productivity. Human capital theory then emerged as a status symbol for the greatness of superior schools with the concept put forward, ''Knowledge is the only meaningful resource today'' (Knowledge is one of the meaningful resources today).

Regarding human resources, Indonesia is predicted to become one of the world's economic powers in the next few decades. Air Coopers House Prices (PWC), predicts that in 2030 Indonesia's economy will enter the top five in the world and even in 2050 it could become the fourth country with the largest economy in the world. If that happens, Indonesia will be under China, India, and the United States. This prediction is based on Indonesia's economic growth considered stable, and has a large population. From the age of the population its composition, by 2030, 70 percent of The Indonesian population will be aged 15–64 years or at productive age (Hayes & Setyonaluri, 2015). The composition where there are more productive people than non-productive people is called an era demography bonus. This productive age group, which is estimated to number 180 million people, is a state asset which will later become the driving force of the national economy (Kudrna et al., 2022).

As the next generation of the nation and a state asset, the government needs serious attention to overcome the problem of stunting, this is because stunting not only causes health problems but can also cause economic losses. The perception that stunting is only related to health problems so far is not correct, because of the fact that stunting which results in a decrease in labor productivity in the future will have an economic impact. This is in line with research by Renyout & Nai (2019) showing that in Indonesia, stunting can cause potential economic losses of IDR 3,057 billion to IDR 13,758 billion or 0.04-0.16% of Indonesia's total GDP. Potential economic losses due to stunting in children under five reach IDR 1.7 million/person/year or IDR 71 million/person for 49 years (productive age 15-64 years) based on the 2014 BPS.

There have been several studies in Indonesia assess the impact of economic losses incurred for nutritional problems or malnutrition, such as research conducted by Aries & Martianto (2006) regarding economic losses due to malnutrition in children under five in Indonesia, Mangalik et al., (2016) regarding estimates of economic

losses and intervention costs due to anemia. Other research carried out by Renyout & Nai (2019) shows that there is economic loss due to absenteeism from work due to obesity in children under fifth. However, there is no discussion specifically calculating economic losses regarding stunting. Research discussing the potential losses of stunting on the economy has been researched by Suryana & Azis (2023), but the scope discussed is the Indonesian region, so no one has discussed the details at the provincial level. This research also uses data for a period of 5 years as a comparison (previous research only used data for 1 year) and uses data for 2022 (1 year before the research year).

Based on the background that has been described, the researcher is interested in researching and analyzing, with the research title "Analysis of the Economic Impact and Losses Due to Toddler Stuting in the Bangka Belitung Islands Province".

METHODOLOGY

This research was conducted in the Bangka Belitung Islands Province, because the Bangka Belitung Islands Province is one of the provinces that has a high prevalence rate nationally, with the scope of analysis of the impact and economic losses due to stunting in toddlers in the Bangka Belitung Islands Province which was carried out from 2018 to 2018. 2022. The data types in this research are divided into two, namely data types based on the time dimension and data types based on collection methods. This research uses toddlers because it follows the stages of child growth and development based on age range. This is the critical age before preschool. Growth and development during this period is the fastest and most measurable.

The research method used in this research is literature study and documentation. The literature study technique is carried out by collecting previous research and previous theories related to the research problem. The documentation technique is by obtaining data and information from written reports and published data. To increase the sharpness of the analysis, in-depth interviews were also conducted with sources who were considered to have extensive information about the research being conducted. The sources asked for information were the relevant agencies that deal with stunting problems, namely the Bangka Belitung Islands Provincial Central Statistics Agency, BKKBN Bangka Belitung Islands Province, and the Bangka Belitung Islands Provincial Health Service. The analysis carried out in this study is quantitative descriptive analysis. This research looks at the description of the phenomenon, the description of activities is carried out systematically and places more emphasis on factual data. The calculation stages used to calculate the potential for economic losses due to stunting problems in children using the Konig formula and Correction Factors. The analysis stages can be seen as follows:

The first stage, to calculate potential economic losses, we first need to calculate the Economic Value of the Child when starting work using the Konig formula as follows:

$$FV_{(r,t)} = P_0(1+r)^t$$

$FV_{(r,t)}$ is Income in the Productive Age (15-64 years), P_0 is Wage/Salary, r is Interest Rate, t is Years of Life and Productivity

Stage 2 is to calculate the amount of economic value until the child enters retirement, calculated using the formula:

$$FVA_{(r,t)} = \frac{\left(FV_{(r,t)}\right)\left[(1+r)^t - 1\right]}{r}$$

$FVA_{(r,t)}$ is Economic value until the child enters retirement, $FV_{(r,t)}$ is Income at Productive Age (15 years), r is Interest Rate, t is Years of Life and Productivity

Stage 3 continues by calculating the amount of a child's economic potential

when he is 0 years old, which can be calculated using the formula:

$$PV_{(0)} = \frac{FVA_{(r.t)}}{(1+r)^t}$$

$PV(_0)$ is Economic potential of children when they are 0 years old, $FVA(_{r,t})$ is Economic value until the child enters etirement r is Interest Rate, t is Years of Life and Productivity.

Stage 4, namely calculating the amount of productivity costs lost due to stunting, is calculated using the following formula:

$$P_{PEM} = Prev \times \sum BL \times PV_{(0)}$$

PPEM is Economic potential lost due to stunting, Prev is Prevalence of Stunting, ∑BL is Number of Births, $PV(_0)$ is Economic potential of children when they are 0 years old

Stage 5, after all the calculation steps have been obtained, the potential economic loss due to stunting is calculated using the correction factor, you can use the formula:

$$P = f_{(cor)} \times Prev \times \sum BL \times PV_{(0)}$$

P is The amount of Economic Loss that has been corrected, f (cor) is Correction Factors (2% and 9%), Prev is Prevalence of Stunting, ∑BL is Number of Births, $PV(_0)$ is Economic potential of children when they are 0 years old

Stage 6 is carrying out an analysis of economic impacts and losses based on the results of the Konig formula calculations (Stages 1-5) and the results of information obtained from (in-depth interviews) with sources who are considered to have extensive information on the research.

RESULTS AND DISCUSSION

Prevalence of Stunting in the Bangka Beitung Islands Province

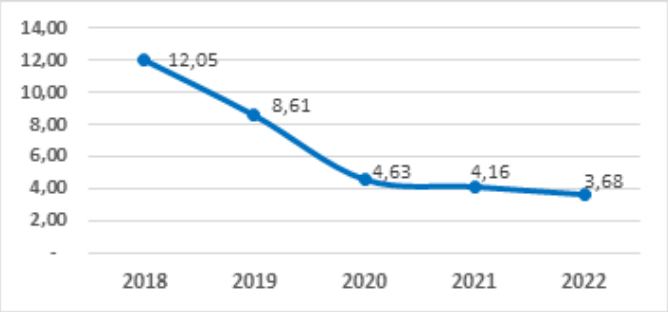
According to Anindya, Human Resources (HR) is the Human Development Index (IPM) or Human Development Index (HDI). HDI has three main determining factors, namely, education, health and economy. These three factors are closely related to the nutritional status of society, because children who receive adequate food from the womb and have good nutritional status will grow and develop optimally according to their age and have a good life expectancy because of their good health. Based on data obtained from the BKKBN of Bangka Belitung Province, the stunting prevalence figures can be seen in the following figure3.

Based on figure 3, it can be seen that during the 2018-2022 period there was a significant decline in the prevalence of stunting in the Bangka Belitung Islands Province. The prevalence of stunting, which was initially 12.05 in 2018, fell to 8.61 in 2019 and fell again significantly to 4.63 in 2020. The large decrease in these 3 years is in line with the decline in stunting at the national level. Then from 2020 to 2022 there was also a decrease in the prevalence of stunting, although the rate of decrease was not large. Until 2022, the recorded prevalence of stunting in Bangka Belitung Province was 3.68. This is a major achievement for the province of Bangka Belitung in tackling stunting.

Estimated Economic Losses Due to Stunting

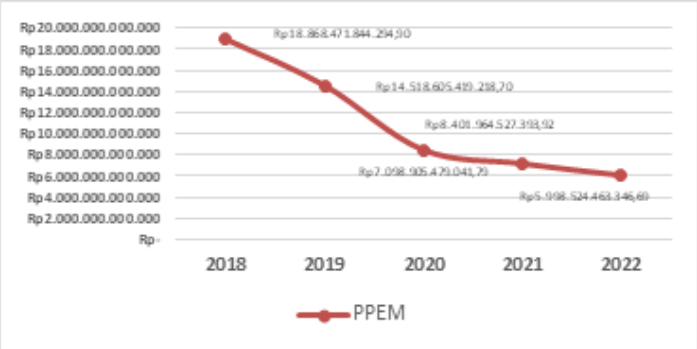
The prevalence rate of stunted toddlers in Bangka Belitung Province shows that the government still has duties and responsibilities in dealing with health and nutrition problems, especially for the toddler group. According to Renyout (2019), in general it can be said that economic improvement as a result of reducing the problem of malnutrition can be seen from two sides, namely reducing costs related to illness and death, and on the other hand increasing productivity.

Estimates or estimates of the amount of economic potential lost due to



Source: BKKBN Provinsi Kepulauan Bangka Belitung, 2023

Figure 3.
Prevalence of Stunting in Bangka Belitung Islands Province 2018-2022



Source: Processed data, 2023

Figure 4.
Estimated Economic Losses Due to Stunting in 2018-2022

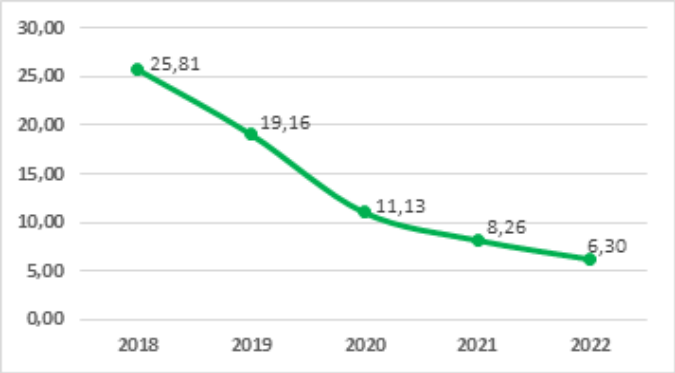
poor nutrition in children under five which results in stunting use basic calculations that have been formulated by Konig (1995) in Aries & Martianto (2006). In the Konig calculation formula, it is assumed that for people who have suffered from malnutrition as toddlers, their productivity as an adult is considered to be 0. Based on the data available in the Bangka Belitung Islands Province to estimate KEP losses, it is known that the data development is as follows figure 4.

Thus, with Konig's calculations, the Bangka Belitung Islands Province in 2018-2022 experienced an average potential economic loss due to stunting in children under five, namely IDR. 10,977,294,659.20. If the total GDP is calculated, the economic loss is around 14.13 percent.

Productivity Loss Correction Factor 2-9% (Ross and Horton 1998)

In the Konig calculation formula, it is assumed that people who have suffered from malnutrition as toddlers will have 0 productivity as adults, but according to Ross et al (1998), people who have a history of severe PEM as toddlers will lose productivity by 2-9 as adults. %. By calculating using the Ross et al (1998) correction formula from the results of calculating the economic loss of the Bangka Belitung Islands Province using the Konig formula, the following results are obtained on table 1.

The results of data processing show that stunting in toddlers will have a long-lasting impact and cause a loss of high economic potential. The potential economic loss for the Bangka Belitung Islands Province with a correction factor of 2 percent from 2018 to 2022 experienced a



Source: Processed data, 2023

Figure 5.
Percentage of Economic Losses Due to Stunting in 2018-2022

Table 1.
Estimated Potential Economic Losses Due to Stunting

Year	Potential Economic Losses		GDP	
	Correction Factor 2 %	Correction Factor 9 %	2%	9%
2018	Rp 377.369.436.885,90	Rp1.698.162.465.986,54	0,5	2,3
2019	Rp 290.372.108.384,37	Rp1.306.674.487.729,68	0,3	1,7
2020	Rp 168.039.290.547,88	Rp 756.176.807.465,45	0,2	1,0
2021	Rp 141.978.109.580,84	Rp 638.901.493.113,76	0,1	0,7
2022	Rp 119.970.489.266,93	Rp 539.867.201.701,20	0,1	0,5
Average	**Rp 219.545.886.933,18**	**Rp 987.956.491.199,33**	**0,2**	**1,2**

Source: Processed data, 2023

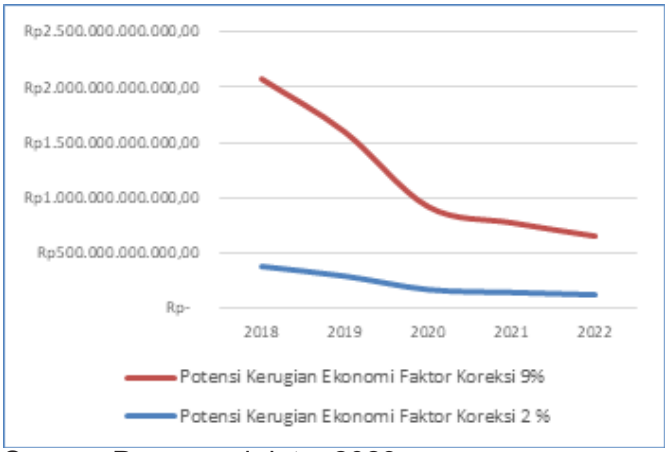
significant decrease of 68.9 percent. The highest potential economic loss occurred in 2018, namely Rp. 377,369,436,885.90 or 0.52 percent of Gross Regional Domestic Product (GRDP). Meanwhile, the lowest potential economic loss occurs in 2022, amounting to IDR. 119,970,489,266.93 or 0.13 percent of Gross Regional Domestic Product (GRDP). The average potential loss due to a 2 percent decline in productivity over a period of 5 years is IDR. 219,545,886,933.18. If this value is seen as a percentage of Gross Regional Domestic Product (GRDP), the average economic potential lost due to a 2 percent decline in productivity is 0.28 percent.

In line with the potential economic loss with a correction factor of 2 percent, the potential economic loss with a correction factor of 9 percent in the Bangka Belitung Islands Province from 2018 to 2022 also experienced a significant decrease of 68.9 percent. The highest potential economic loss occurred in 2018, namely Rp. 1,698,162,465,986.54 or 2.32 percent of Gross Regional Domestic Product (GRDP). Meanwhile, the lowest potential economic loss occurs in 2022 amounting to IDR 539,867,201,701.20 or 0.57 percent of the Gross Regional Domestic Product (GRDP). The average potential loss with a 9 percent decrease in productivity over a period of 5 years is IDR. 987,956,491,199.33. If this value is seen as a percentage of Gross Regional Domestic Product (GRDP), the average economic potential lost due to a 9 percent decline in productivity is 1.27 percent. In line with other research, economic losses are caused by Nutritional problems and stunting also occur in various regions of the world. According to research by Bagriansky (2010) the Albanian region has 50 percent greater financial losses than others

eating pattern problems. Similar research was also carried out in Cambodia. As a result, stunting causes economic losses up to 31% (USD 128 million or around Rp 1.568 billion in 2013), larger than others nutritional problems in this country (Bagriansky et al., 2014). One of the factors that causes high and low potential economic losses is the high number of births. Every baby born has the potential to become a new human resource, and many births will also have an impact the loss of economic potential if stunting occurs is also high. Although not all provinces have a high prevalence of stunting, the loss of economic potential is also high Various previous research results link stunting with poverty, low education, burden of disease, and the general interest of women's empowerment (De Onis & Branca, 2016 ; (Kenyon et al., 2008). For example, there is research conducted in Bangladesh shows that the level of poverty and malnutrition , illiterate, low-income mothers have more siblings, lack of access to media, inadequate nutritional intake, and a lower environment Sanitation risks are closely related to health and nutrition levels (De Onis et al., 2012). Based on research conducted by (Hayati et al., 2012; Mauludyani et al., 2021 ; Kusumawardani & Ashar, 2022) several factors behind the occurrence of stunting include the mother's height and weight, insufficient breast milk obtained by the baby, quality and quantity of food. complementary breastfeeding, and premature birth.

Successful implementation of policies to reduce nutritional problems (including stunting) through various methods requires comprehensive efforts even though there will be many obstacles in the field. (Keats et al., 2018). Implementation of policies for accelerate nutritional improvements and implementation must be carried out consistently, organized and collaborative so can be applied at all levels stakeholders involved. Policies that can be implemented must focus on the first 1000 days of life, and encourage cross-program (special) and cross-sectoral integration (sensitive) activities (Budiastuti & Rahfiludin, 2019).

Moreover, the Bangka Belitung Islands Province has committed to reducing the prevalence of stunting, including through cross-sectoral synergy and the formation of a provincial level Stunting Acceleration Reduction Team (TPPS) based on the Decree of the Governor of the Bangka Belitung Islands Number: 188.44/51/Bappeda/2022 concerning the Formation of an Acceleration Implementation Team Reducing Stunting in Bangka Belitung Islands Province.



Source: Processed data, 2023

Figure 6.
Estimated Potential Economic Losses Due to Stunting

Based on these conditions, it is necessary to carry out efforts to prevent and control nutrition as a form of economic investment intervention activity. Overcoming the problem of stunting must start long before a child is born, namely starting with prevention in the adolescent age group so that the cycle of the stunting chain can be broken. Apart from that, an integrated, targeted and effective program is needed to overcome and reduce stunting. Cross-sectoral collaboration and synergy are also important in supporting stunting prevention efforts.

CONCLUSIONS

During the 2018-2022 period, there was a significant decline in the prevalence of stunting in the Bangka Belitung Islands Province. This is a form of achievement for the province of Bangka Belitung in tackling stunting. Based on the estimation results for the 2018-2022 period, the average value of potential losses due to a 2 percent decrease in productivity is IDR. 219,545,886,933.18 or 0.28 percent of Gross Regional Domestic Product (GRDP). Meanwhile, the average potential loss with a 9 percent decrease in productivity over a period of 5 years is IDR. 987,956,491,199.33. or 1.27 percent of the Gross Regional Domestic Product (GRDP).

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