Projected Productive Age Population in East Kalimantan in 2040

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ABSTRACT

The productive age refers to the population aged 15–64 years. This study aims to analyze the projection of the productive age population in East Kalimantan by the year 2040. This research employs a qualitative descriptive approach using a literature review method. The population and sample in this study are residents of East Kalimantan aged 15–64 years (productive age), with data collected through purposive sampling techniques and secondary sources. Data analysis was carried out using qualitative techniques based on the Miles and Huberman. The results indicate that East Kalimantan is projected to have a total population of 6,116,320 in 2040, with 4,223,680 individuals in the productive age group. This group is expected to experience the highest population growth rate and benefit from a significant demographic bonus. A large productive age population presents great potential for enhancing economic productivity; however, it may also pose social challenges if not accompanied by sufficient employment opportunities. Therefore, it is essential for the East Kalimantan government to develop inclusive policies that support education, skill development, and job creation to optimize the demographic bonus and minimize associated risks.

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Introduction

Indonesia is an archipelagic country located between the continents of Asia and Australia, as well as the Indian Ocean and the Pacific Ocean. The country consists of thousands of islands, with five large islands, namely Sumatra, Java, Kalimantan (Borneo), Sulawesi, and Papua. Geographically, Borneo is the third largest island in the world, covering an area of 743,330 km², of which 73% belongs to Indonesia (Kalimantan), 26% to Malaysia, and 1% to Brunei. Administratively, Kalimantan is divided into five provinces: North Kalimantan (Tanjung

Selor), East Kalimantan (Samarinda), South Kalimantan (Banjarbaru), Central Kalimantan (Palangkaraya), and West Kalimantan (Pontianak). The largest province by area is Central Kalimantan (153,564.50 km²), while the smallest is South Kalimantan (38,744.23 km²) (East Kalimantan Provincial Government, 2019).

According to the 2020 population census, West Kalimantan has a population of 5,414,376 with a Total Fertility Rate (TFR) of 2.33%, Infant Mortality Rate (IMR) of 17.47%, and total migration of 7.54%. East Kalimantan has 3,859,783 people (2.18% TFR, 15.51% IMR, 29.63% migration), South Kalimantan 4,182,080 people (2.31% TFR, 17.22% IMR, 11.67% migration), Central Kalimantan 2,741,075 people (2.31% TFR, 17.95% IMR, 19.95% migration), and North Kalimantan 727,755 people (2.35% TFR, 16.65% IMR, 32.20% migration) (BPS, 2020). These differences suggest an uneven distribution of population across Kalimantan, influenced by various factors such as geography, infrastructure, resource availability, and regional development (Wardani, 2019).

According to BPS, individuals aged 15–64 are considered of productive age. The productive age population in 2020 was 69.02% in West Kalimantan, 71.36% in Central Kalimantan, 71.44% in South Kalimantan, 70.28% in East Kalimantan, and 69.65% in North Kalimantan. These figures show that all Kalimantan provinces are currently experiencing a demographic bonus—a condition in which the working-age population dominates, potentially boosting productivity and economic growth (Dewi et al., 2018).

Kalimantan's strategic position is further strengthened by the relocation of the national capital (IKN) to North Penajam Paser and Kutai Kartanegara Regencies in East Kalimantan. According to Presidential Regulation No. 62 of 2022, the IKN will serve as an economic superhub, requiring close cooperation among Kalimantan provinces. The productive age population will be a key driver of this development, as the IKN is expected to attract significant investment and generate employment opportunities (Ernawati et al., 2022).

However, despite the availability of demographic data and studies on population trends in Kalimantan, there is a notable lack of research that specifically focuses on projecting the productive age population, especially in East Kalimantan amid the IKN development. Previous studies tend to address general population projections or urban migration patterns, leaving a gap in understanding how the productive age group will evolve and influence future planning.

This study aims to address that research gap by providing a focused projection of the productive age population in East Kalimantan by 2040. Based on BPS and SAKERNAS data in 2020, the Labor Force Participation Rate (LFPR) in Kalimantan is relatively high: South Kalimantan (73.03%), Central Kalimantan (71.21%), West Kalimantan (68.83%), North Kalimantan (66.51%), and East Kalimantan (65.50%). The highest Open Unemployment Rate (OUR) is found in East Kalimantan at 6.87%, with the lowest in Central Kalimantan at 3.39%. These dynamics illustrate both opportunities and risks for the workforce in the IKN context. While IKN development may increase job availability, the use of automation or a demand for specialized skills might limit access for the local labor force, potentially lowering LFPR and increasing unemployment.

This study is urgent because the productive age population will significantly impact regional development outcomes in Kalimantan. By analyzing the projected productive age population in East Kalimantan in 2040, this research offers strategic insights for anticipating future challenges and designing responsive development policies. While numerous studies have examined general population trends, few have specifically focused on productive age projections in the context of transformative projects like IKN. This study thus provides new insights not only for researchers but also for policymakers and industry leaders. Understanding the future size and characteristics of the productive age population will help government agencies design appropriate education, employment, and welfare programs, while businesses can use the data to plan market strategies and workforce development. Therefore, the researcher is interested in conducting a study entitled "Projection of Productive Age Population in East Kalimantan in 2040".

Methodology

This research uses a qualitative descriptive approach with at library research method. This method uses secondary data obtained from the Central Statistics Agency (BPS) in East Kalimantan. The data used are from the 2020 Population Census and the latest publications related to the number of productive age population (15–64 years). According to Sugiyono (2017), a literature study is a theoretical study that is relevant to the problem being studied. The population of this study is the entire population of East Kalimantan, while the sample is the productive-age population.
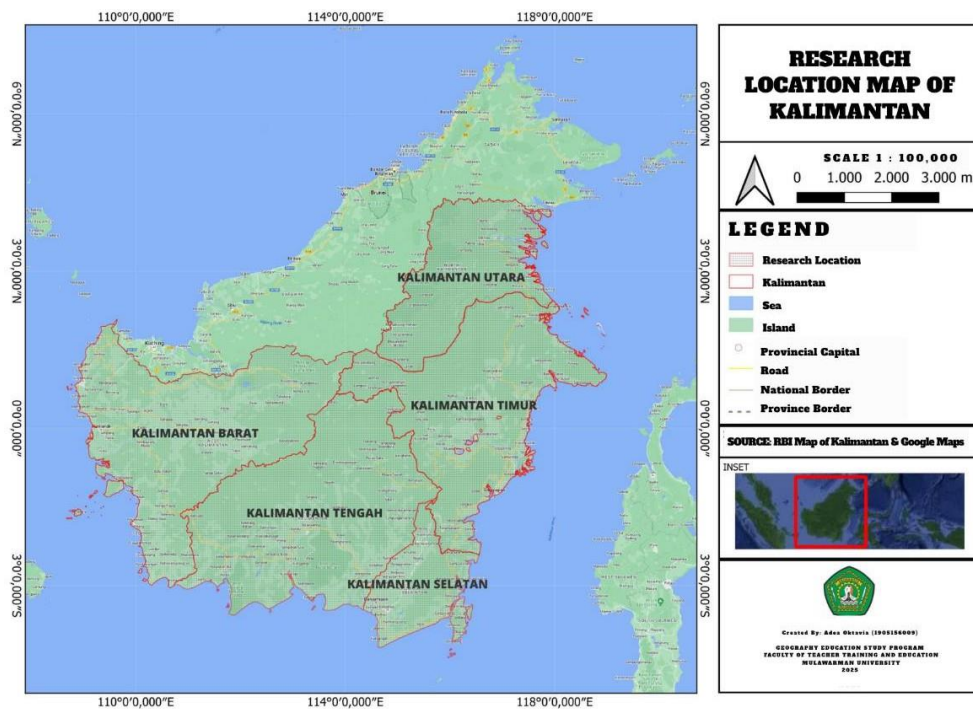

Figure 1. Map of Research Locations, 2025
(Source: Private collection, 2025)

The sampling technique used is purposive sampling, which selects samples based on certain criteria that are in accordance with the focus of the research. The Miles and Huberman model was used for data analysis which consists of three stages: data collection, data reduction, and data presentation. The reduced data were presented in the form of a table or diagram and analyzed using a component method with the following formula:

$$P_t = P_0 + (L - M) + (Mig_{in} - Mig_{out})$$

Information:
P_t   = Total Population in year t
P_0 = Number of population in the base year
L   = Number of Births
M   = Number of deaths
Mig_{in} = Number of inbound migrations
Mig_{out} = Number of outbound migrations

Result and Discussion

Result of the 2020 East Kalimantan Population Census (SP)

The 2020 population census was conducted in Indonesia, including on the island of Kalimantan to obtain accurate population data for future projections. The following is data on

the number of people in each province in Kalimantan based on the results of the 2020 Population Census (SP) as shown in Figure 2 below:
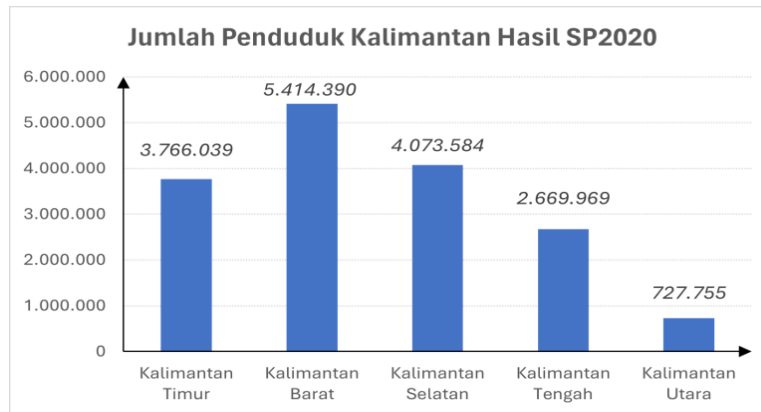

Figure 2. Kalimantan SP2020 Population Chart
(Source: BPS, 2021)

Based on data from the results of the 2020 Population Census (SP2020), the population of East Kalimantan was recorded at 3,766,039 people. This number places East Kalimantan as the province with the Third-largest population on the island of Kalimantan.

Birth Rate (TFR) Results of the 2020 East Kalimantan Population Census

Total Fertility Rate (TFR) is one of the data needed to make population projections in an area, especially in this study. The following is the TFR data based on the 2020 Population Census for provinces on the island of Kalimantan, which is presented in Figure 3 below:
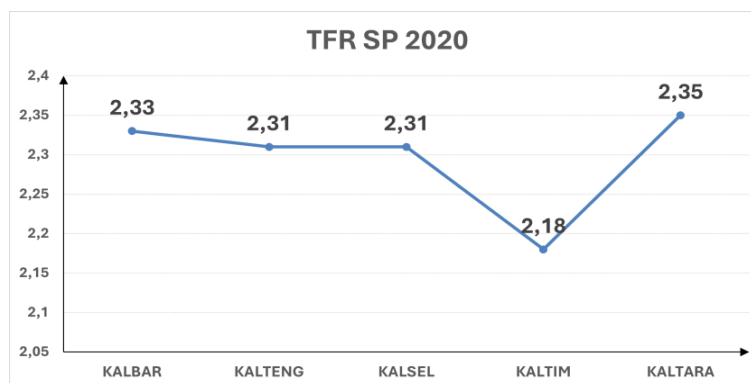

Figure 3. TFR SP2020 Graphic
(Source: BPS, 2021)

Based on the birth rate (TFR) data from the 2020 Population Census, East Kalimantan (East Kalimantan) has the lowest fertility rate compared to other provinces on the island of Kalimantan, which is 2.18. This figure shows the average number of children born to woman during their fertile period

Mortality Rate Results (CDR) of the 2020 East Kalimantan Population Census

The mortality rate or crude death rate (CDR) is the next data needed for this study because it is needed in the calculation of population projections over time. The following CDR data based on the 2020 Population Census (SP) for provinces on the island of Kalimantan as shown in figure 4 below:
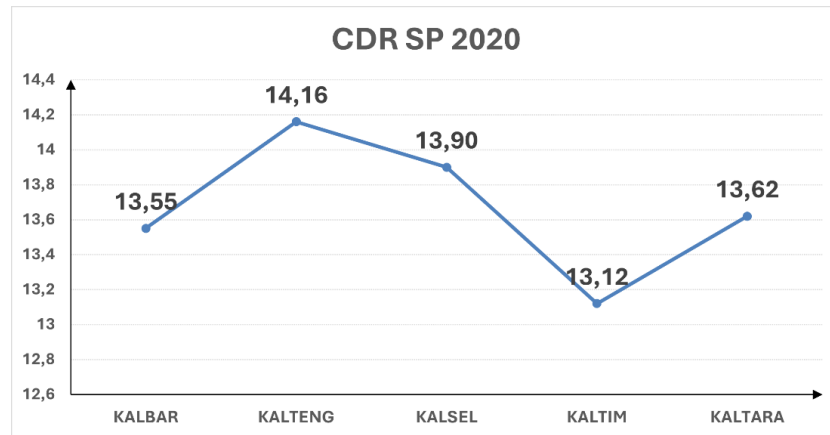
Figure 4. Kalimantan SP2020 Population CDR Chart
(Source: BPS, 2021)

Based on CDR (Crude Death Rate) data from the 2020 Population Census, East Kalimantan (East Kalimantan) has the lowest gross mortality rate among all provinces in Kalimantan, which is 13.12 per 1,000 population. This figure shows that the number of deaths in East Kalimantan is relatively lower than that in other provinces

Migration Results of the 2020 East Kalimantan Population Census

The last data needed for the projection calculations in this study were migration data from the 2020 population census. The following is the migration data of the population of Kalimantan in 2020 in Table 1 below:

Table 1. Population Migration Data as of SP2020

No	Province	Net Migration
1.	West Kalimantan	14. 951
2.	Central Kalimantan	-3. 845
3.	Kalimantan Selatan	5.814
4.	East Kalimantan	-23. 304
5.	North Kalimantan	68

Based on population migration data from the 2020 population census, East Kalimantan experienced a negative net migration of -23,304 people, which means that the number of people leaving East Kalimantan is more than those who entered.

Projection Results of East Kalimantan's Productive Age Population

The data source used in the results of this projection comes from the Central Statistics Agency (BPS) and the 2020 Population Census which has been processed by researchers. The following are the Projected results of the population of Kalimantan Island in 2020- 2040 which are attached in Table 2 below:

Table 2. Projected Data on Kalimantan Population in 2040

No	Province	2040
1.	West Kalimantan	6,620,160 inhabitants (30.35%)
2.	Central Kalimantan	3,264,930 inhabitants (14.97%)
3.	Kalimantan Selatan	4,944,150 inhabitants (22.67%)
4.	East Kalimantan	6,116,320 inhabitants (28.04%)
5.	North Kalimantan	866,080 inhabitants (3.97%)

Based on the table, it shows that all provinces are experiencing population growth at varying rates. East Kalimantan recorded the second highest growth after West Kalimantan. Researchers conducted a growth rate analysis to illustrate how rapidly the population is

increasing each decade. The following is attached to the projected data on the population growth rate each decade in Figure 5 below:
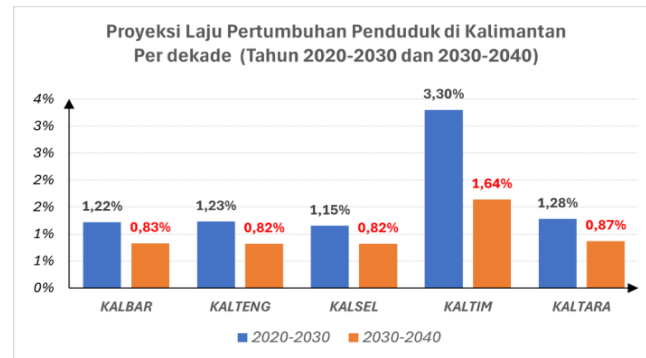

Figure 5. Graph of the projected growth rate of the decade in Kalimantan
(Source: Research Results, 2025)

Based on the table, the population growth rate in Kalimantan tends to decline in the 2030- 2040 period compared to 2020-2030 in all provinces. The most significant decline occurred in East Kalimantan, which was previously 3.30% in 2020-2030 to 1.64% in 2030-2040, or a decrease of 1.66% over a decade. This downward trend was also observe in the other four provinces of Kalimantan. This change in the growth rate affects the demographic structure, especially in the distribution of the Productive-age population. The following is attached data related to the projected productive age of the population in Kalimantan which is presented in Table 3 below:

Table 3. Projected data on the productive age population in Kalimantan

No	Province	2020	2040
1.	West Kalimantan	3,726,370 inhabitants (32.41%)	4,469,880 inhabitants (30.26%)
2.	Central Kalimantan	1,868,950 inhabitants (16.26%)	2,198,030 inhabitants (14.88%)
3.	Kalimantan Selatan	2,777,830 inhabitants (24.16%)	3,294,140 inhabitants (22.30%)
4.	East Kalimantan	2,633,020 people (22.90%)	4,223,680 inhabitants (28.59%)
5.	North Kalimantan	490,720 inhabitants (4.27%)	586,160 inhabitants (3.97%)

Based on the table, it can be seen that there is an increase in the number of productive age population in all provinces in Kalimantan from 2020 to 2040. East Kalimantan Province experienced the most significant increase, from 2,633,020 in 2020 to 4,223,680 in 2040. Meanwhile, the lowest number of Productive-age residents in 2040 is projected to be in North Kalimantan Province, at 586,160 people. The projected trend of the population growth rate in Kalimantan which shows a slowdown in 2030-2040 compared to the previous decade has the potential to impact the dependency ratio. The following is a projected dependency ratio in Kalimantan attached to figure 6 below:
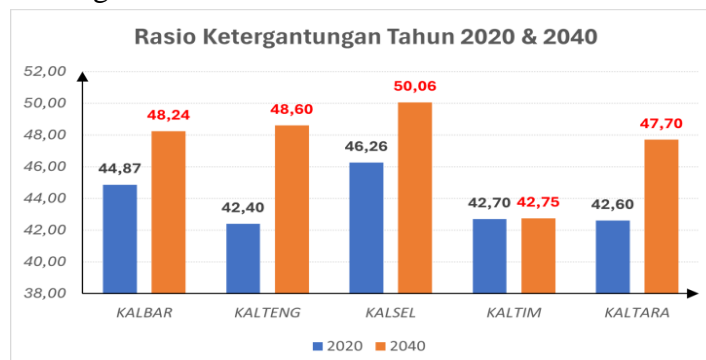

Figure 6. Projected graph of dependency ratio in Kalimantan
(Source: Research Results, 2025)

Based on these images, there is an increasing trend in almost all the provinces of Kalimantan. East Kalimantan has the lowest dependency ratio with a very small increase from 42.70 in 2020 to 42.75 in 2040, which indicates stability in the composition of the productive and non-productive age population.

The dependency ratio is projected to increase, but the figure is still below 50% in most provinces, meaning that Borneo can still enjoy a demographic bonus, where the number of the Productive-age population is still greater than the non-productive-age population. The following is attached to the demographic bonus graph for 2040 as shown in figure 7 below
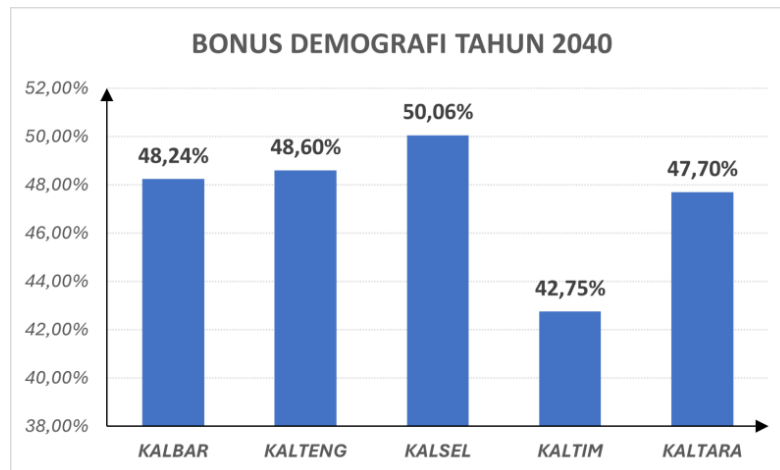

Figure 6. Demographic Bonus Projection Chart
(Source: Research Results, 2025)

Based on this figure, all provinces on the island of Kalimantan are projected to experience a demographic bonus in 2040. East Kalimantan Province has the lowest demographic bonus, at 42.75% and South Kalimantan Province has the highest demographic bonus, at 50.06%.

Discussion

This study focuses on the productive- age population in East Kalimantan, where the productive age is defined as the population aged 15-64 years (BPS, 2024). Based on data The number of people in Kalimantan in 2020, varies from province to province. The difference in the number of people in each region is usually related to the needs of the population in that area. This is in line with Indriani's (2022) research which argues that a population is a group of citizens who live in an area to settle with the needs that have been applied. TFR is the average number of live births experienced by every 1,000 women during their reproductive or childbearing ages (BPS, 2024). Based on the results of the 2020 population census, East Kalimantan Province recorded the lowest TFR among the other Kalimantan provinces. These differences reflect the different social, economic, and access to reproductive health service dynamics in each region of Kalimantan. This is supported Nandini's (2022) research which explains that factors such as higher levels of education, reproductive health knowledge, access to contraception, and exposure to information from the mass media contribute to a decrease in the desire to have more than two children.

The TFR figure which is still above the BKKBN target of 2.1 shows that the birth rate in Kalimantan is still relatively high which can affect future population growth. In line with Igustin's research (2021) which states that the TFR is below 2.1, the population tends to experience a decrease in number, but if the TFR is more than 2.1, there will be population growth. The gross death rate is the number of deaths that occur in one year per 1,000 population in the middle of that year (BPS, 2024). Based on the results of the 2020

Population Census, East Kalimantan province has the lowest gross mortality rate or CDR value of 24.1 compared to 4 other Kalimantan provinces. The death rate in an area can be caused by various factors, such as age, and disease. Purba (2023) research which states that the factors that affect death are divided into two, namely: 1. direct factors (factors from within), these factors are influenced by several variables, namely: a. age, b. gender, c. disease, d. accident, violence, and suicide. 2. Indirect factors (external factors), are influenced by several variables, namely: a. pressure, both psychological and physical, b. marital status, c. socio- economic position, d. education level, e. employment, f. burden of children born, g. residence and environment, h. level of environmental pollution, i. health facilities and ability to prevent diseases, j. politics and natural disasters.

Migration is one of the main components of population growth, in addition to fertility and mortality. Migration can be measured using various indicators, such as mobility rates, inbound migration rates, outbound migration rates, and net migration (BPS, 2024). Based on data, the net migration of the population in Kalimantan shows varied results in each province, one of which is East Kalimantan which has a net migration of -23,304. The variation in the results of this migration data indicates the existence of social, economic, and demographic dynamics that affect the pattern of population movement between regions. This is in line with Nunumete's (2023) research which stated that migration out of East Kalimantan was influenced by a number of demographic factors, including young age groups, marital status, study status, and average length of schooling. Residents with these characteristics tend to have high mobility in search of better opportunities in other provinces. Population projection is an estimate of the population based on certain methods with assumptions of births, deaths and migrations (Desviandini & Karyana, 2022). The results of the projected population in Kalimantan in 2040 show that it will continue to experience population growth from 2020 to 2040. East Kalimantan Province showed the most visible spike with a projected population of 6,116,320 people (28.04%), an increase of almost double from 2020 and this surge is inseparable from the influence of the development of the National Capital City (IKN) of the archipelago located in this region. Sutanto's (2022) state that East Kalimantan's population is expected to increase drastically from 3.8 million in 2021 to around 11 million in 2045, driven by urbanization, population displacement, and the concentration of national infrastructure development.

The projection results show that the population distribution in Kalimantan is still uneven and can become a significant problem if ignored. This is in line with the research of Goma et al. (2021) which states that the uneven distribution of the population is one of the big problems that Indonesia often faces and the population is usually concentrated in one particular area which has more value than other regions. Populations have diverse characteristics in each region, which can affect their uneven distribution. This is in line with Moertiningsih's opinion (2010) who states that the population can be grouped based on certain characteristics :

1. Demographic characteristics, such as population structure by age, gender, number of women of childbearing age, and number of children.
2. Social and cultural characteristics, such as marital status, language, ethnicity/ethnicity, religion, education, identity ownership and other deeds.
3. Based on the economy, such as main daily activities, work-non-work, employment, employment status, type of work, and average working hours.
4. Based on geography and residence, such as urban and rural populations, and populations by island.

The rate of population growth can be used to observe trends and project the number of people in the future (BPS, 2024). Based on these results, East Kalimantan recorded the highest growth rate, of 3.30% in the 2020-2030 period, before declining to 1.64% in the

2030-2040 period. Despite the decline, East Kalimantan still has the highest growth rate compared to the other four provinces in Kalimantan and the phenomenon of this surge is closely related to the development of the Nusantara Capital City (IKN). This is related to Maulana's (2024) research which states that the development of the IKN encourages a surge in demand for goods and services, especially in the property and construction sectors which has a direct impact on migration flows and population growth. According to the Central Bureau of Statistics (2024) Productive Age is the age of the population measured from the age range of 15-64 years. The results of the analysis show that, East Kalimantan Province appears to have experienced the highest increase, from 2,633.02 people in 2020 to 4,223.68 people in 2040. An increase in the number of people of productive age throughout Kalimantan has the potential to create a demographic bonus, but the benefits will be optimal if accompanied by a decrease in the population dependency rasio (PDR). This is line with Goma's research (2021) which states that although the number of productive-age population is very large, the number of non-productive- age population is also quite large, which affects the high number of dependency load ratios.

The productive age group plays a major role in economic growth because it has optimal work capacity and actively contributes to various industrial sectors compared with the young and advanced age groups. This is in line with Febianti's (2023) research which states that the young and elderly groups are considered unable to produce production, so that the population is too high in both categories can be an obstacle to economic growth. In contrast, the abundance of the population in productive age can stimulate economic growth. Age has a significant effect on labor productivity because it is related to the physical ability of a worker. Workers of productive age tend to be physically stronger than those of non-productive age.

Based on projections, Kalimantan's dependency ratio in 2040 will increase compared to 2020, with East Kalimantan having the lowest ratio of 42.70. The high dependency ratio shows an increasing burden on the productive age group in supporting the non-productive population. This is in line with Hasanah (2021) who states that the dependency ratio is an important indicator in demographics, where the higher the value, the greater the economic burden on the productive population. This ratio is also an indicator of the demographic bonus, when the number of productive populations is greater than the number of non-productive populations. Msiren (2022) added that the lower the dependency ratio, the greater the potential demographic bonus is a region.

Based on the data from the analysis of the demographic bonus projection, all provinces in Kalimantan are predicted to experience a large demographic bonus, especially in East Kalimantan. This demographic bonus can have a positive or negative impact, as well as present benefits and challenges, depending on how the productive-age population is optimally utilized and managed. This is in line with Marlia's research (2022) which states that the demographic bonus is a phenomenon that needs to be anticipated by the public and professional workers. This is because can have a positive and negative impact on the country experiencing it. Without good preparation, it is possible that the state and workers of productive age will lose money in this one condition without reaping the positive impact. The positive and negative impacts are as follows:

1. Positive impact
   a. Will open up job opportunities for the community.
   b. Rapid economic development.
   c. Growth in the government and economic sectors.
   d. The emergence of the golden generation
2. Negative impact
   a. The unemployment rate has increased significantly.
   b. The quantity and quality of human resources are not comparable.

    c.   The aging population is increasing.

    d.   Has resulted in the formation of the sandwich generation.

Marlia (2022) added that there are benefits and challenges that can be taken by the government in this demographic bonus era, namely:

1.   Benefits that can be taken by the government in the era of the Demographic Bonus

    a.   Increase GDP

        The dominance of the productive age population in the demographic bonus opens up opportunities for increased labor and productivity, which encourages an increase in Gross Domestic Product (GDP).

    b.   Increasing Community and Social Savings

        A high number of productive ages can accelerate economic growth through increased individual and social savings, which has an impact on people's welfare.

    c.   Forming the Golden Generation

        The demographic bonus is an opportunity to form a golden generation, namely a productive, creative generation, and able to be a driver of national development in the future.

    d.   Reducing Life Burden

        With fewer non-productive age populations, the burden borne by productive groups becomes lighter, thus providing the potential for progress towards developed countries.

2.   Government Challenges in the Era of Demographic Bonus

    a.   Employment Needs

        The abundance of productive age requires the provision of wide employment opportunities. Without it, the demographic bonus could lead to an unemployment explosion.

    b.   Adequate Skill Requirements

        The majority of the productive-age population is educated at the lower secondary education,level; therefore it is necessary to improve their skills through training by the government or professional institutions to maximize their potential.

Conclusion

The projection analysis indicates that Kalimantan's population will continue to grow until 2040, with East Kalimantan experiencing the most significant increase due to the development of the Nusantara Capital City (IKN). This growth, particularly in the productive age population, presents a valuable opportunity for a demographic bonus that can drive regional economic advancement if effectively managed. However, the accompanying challenges—such as high dependency ratios and uneven population distribution—must be addressed through strategic planning. This study contributes to the existing body of knowledge by providing a future- oriented perspective on productive age population trends in East Kalimantan, offering insights that can support government policies related to human resource planning and sustainable development. Nonetheless, the study is limited by its reliance on secondary data and a qualitative approach, which may not fully capture the dynamic socio-economic conditions in the region. Future research should consider integrating primary data and mixed-methods analysis to provide a more comprehensive understanding and strengthen the accuracy of projections.

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