SPMS
Spatial Planning & Management Science
SPMS 3(2): 57-69
ISSN 3088-9669

Institute for Advanced Science, Social and Sustainable Future
MORALITY BEFORE KNOWLEDGE

Population dynamics: Analysis of factors affecting population growth trends and education level distribution in Cilacap Regency

Arif Andriyanto[1,*]
[1] *Department of Mechanical Engineering, Faculty of Engineering, Universitas Negeri Yogyakarta, Sleman, Special Region of Yogyakarta 55281, Indonesia.*
*Correspondence: arifandriyanto.2022@student.uny.ac.id

Received Date: January 20, 2026 Revised Date: August 20, 2026 Accepted Date: August 29, 2026

ABSTRACT

Background: Population growth is influenced by births, migration, and deaths, while its relationship with economic conditions, unemployment, land availability, and access to education is an important regional issue. Education is a right for all Indonesian citizens as stipulated in Article 31 Paragraph 1 of the 1945 Constitution. This study aims to analyze factors associated with population growth and the distribution of education levels in Cilacap Regency based on census data from the Statisctics Indonesia/*Badan Pusat Statistik* (BPS). **Methods:** This research uses a quantitative descriptive approach and an ex-post facto design, as the variables are not manipulated because the events have already occurred. Secondary data from publicly available government sources were analyzed to describe population growth and the distribution of education levels in Cilacap Regency over the last five years. **Findings:** The descriptive analysis shows that population growth in Cilacap Regency is associated with birth, death, and migration rates. Economic conditions are also observed alongside population growth patterns. The distribution of education levels is associated with internal factors, including interests, motivation, and learning abilities, and external factors, including family support, social environment, economic conditions, and educational facilities. Economic conditions and educational facilities are particularly highlighted in relation to education distribution. **Conclusion:** Population growth and education distribution in Cilacap Regency show patterns associated with demographic and socioeconomic conditions. Improved economic conditions may support broader access to higher education. **Novelty/Originality of this article:** This study provides a descriptive analysis of population growth and education distribution in Cilacap Regency over the last 5 years, highlighting demographic and socioeconomic patterns based on publicly available BPS data.

KEYWORDS: Cilacap; distribution; education; population; population dynamics.

1. Introduction

Data are essential for society, including population data, as they provide a fundamental basis for implementing government programs such as work-program planning, sustainable development, disease-potential analysis, and educational data mapping. Population data can be obtained through censuses conducted by Statistics Indonesia/*Badan Pusat Statistik* (BPS) at both the regency and national levels. Statistics Indonesia regularly publishes population data each year, including data on population growth in specific regions. Rapid population growth is a global concern in many countries because increases in population size are accompanied by various challenges, particularly in the economic and educational sectors. Population growth and its implications have therefore become important topics of

Cite This Article:
Andriyanto, A. (2026). Population dynamics: Analysis of factors affecting population growth trends and education level distribution in Cilacap Regency. *Spatial Planning & Management Science, 3*(2), 57-69. https://doi.org/10.61511/spms.v3i2.2026.3210

Copyright: © 2026 by the author. This article is distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

study across countries. Examining the causes and consequences of population growth in a particular region can provide opportunities to assess community needs and support the achievement of sustainable development goals or the Sustainable Development Goals (SDGs). Data from Statistics Indonesia indicate that Indonesia's population growth rate continues to require serious attention, given that Indonesia is among the world's most densely populated countries. To control population growth at the national level, Indonesia has implemented several preventive measures, including the Family Planning/*Keluarga Berencana* (KB) program. Family Planning is a government program implemented at the individual level to regulate birth spacing or reduce fertility through contraceptive methods, either hormonal or nonhormonal, which may be permanent or temporary depending on the type of contraception used (Sartika et al., 2020). Consequently, population growth is not only a national challenge but also a challenge faced by individual regions, including Cilacap Regency.

Cilacap Regency is one of the largest regencies in Central Java Province and plays a strategic role in geographic, economic, and sociocultural terms. Located on the southern coast of Java Island, Cilacap is home not only to vital industrial facilities, such as PT Pertamina Refinary Unit (RU) IV and the Cilacap Steam Power Plant/*Pembangkit Listrik Tenaga Uap* (PLTU Cilacap), but also to agricultural and fisheries sectors that serve as important pillars of the local economy. In the context of national and regional development, a comprehensive understanding of population dynamics is essential for designing effective and sustainable policies. In pursuing sustainable development, Cilacap Regency faces complex challenges, including population growth dynamics, employment availability, healthcare facilities, infrastructure, and equitable access to education. High population growth without corresponding improvements in human resource quality may become a development burden (population burden) because it increases expenditure on basic services such as education, healthcare, and infrastructure that may remain consumptive without generating corresponding increases in productivity, thereby reducing fiscal resources available for productive public investment (Todaro & Smith, 2015). Therefore, stable and controlled population growth accompanied by improvements in human resource quality can serve as a valuable development asset.

Population growth in Cilacap Regency is influenced by various factors, including fertility, mortality, and population movement or migration. Fertility and mortality affect population growth through natural demographic processes, whereas migration affects population growth through geographic population movement, as migration is a fundamental component that changes the size, structure, and distribution of a population across geographic areas (Lee, 1966). Migration in Cilacap Regency may be influenced by the region's attractiveness as an industrial area. This factor may, in turn, shape the age composition of the population and affect the size of the labor force as well as disparities in access to education through an uneven distribution of educational attainment.

Education is a conscious and planned effort undertaken by individuals to develop their potential for their future benefit (Law No. 20 of 2003). Education for Indonesian citizens is guaranteed under Article 31(1) of the 1945 Constitution, which stipulates that all citizens have the right to adequate education. Therefore, education is essential for individuals to develop their potential and improve their future prospects. However, in practice, communities continue to face challenges in obtaining adequate educational opportunities, resulting in disparities that contribute to an uneven distribution of educational attainment. The distribution of educational attainment is a fundamental indicator of human resource quality improvement. Equitable and high-quality educational attainment is essential for creating a competent workforce, alleviating poverty, and promoting innovation. However, disparities in educational attainment frequently occur across regions within a regency. Urban areas tend to have better access to and quality of education than remote areas. Analyzing the distribution of educational attainment can reveal disparities in human resource capacity that may hinder equitable development and, consequently, affect the sustainability of regional economic development.

Economic or financial conditions are among the factors considered by communities when pursuing higher levels of education. This issue is closely associated with parents' expectations regarding their children's future, requiring families to identify alternative strategies for addressing economic or financial constraints. Economics is a social science that examines human activities related to the production, distribution, and consumption of goods and services (Department of National Education, 2014). The term “economics” originates from the Greek words *oikos*, meaning household, and *nomos*, meaning rule, and can therefore be broadly interpreted as the rules governing household affairs. Accordingly, economic or financial conditions represent an important external factor that may influence individuals' opportunities to develop their capabilities through higher education.

Therefore, this study aims to analyze the relationships among economic conditions, demographic conditions, educational facilities, and the distribution of educational attainment in Cilacap Regency over the most recent five-year period. The analysis employs path analysis based on Partial Least Squares (PLS) within a Structural Equation Modeling (SEM) framework to identify the factors associated with the distribution of educational attainment among the population.

2. Methods

The research employed a quantitative descriptive method to identify and analyze the relationship between population growth and the distribution of educational attainment among the population of Cilacap Regency over the most recent five-year period. Descriptive research is used to provide an account of the phenomena or symptoms under investigation through descriptions of variable values, trends, or samples (Sugiyono, 2022; Creswell & Creswell, 2023). The study employed an *ex-post facto* research design, in which no treatment was administered to the variables because the events examined had already occurred.

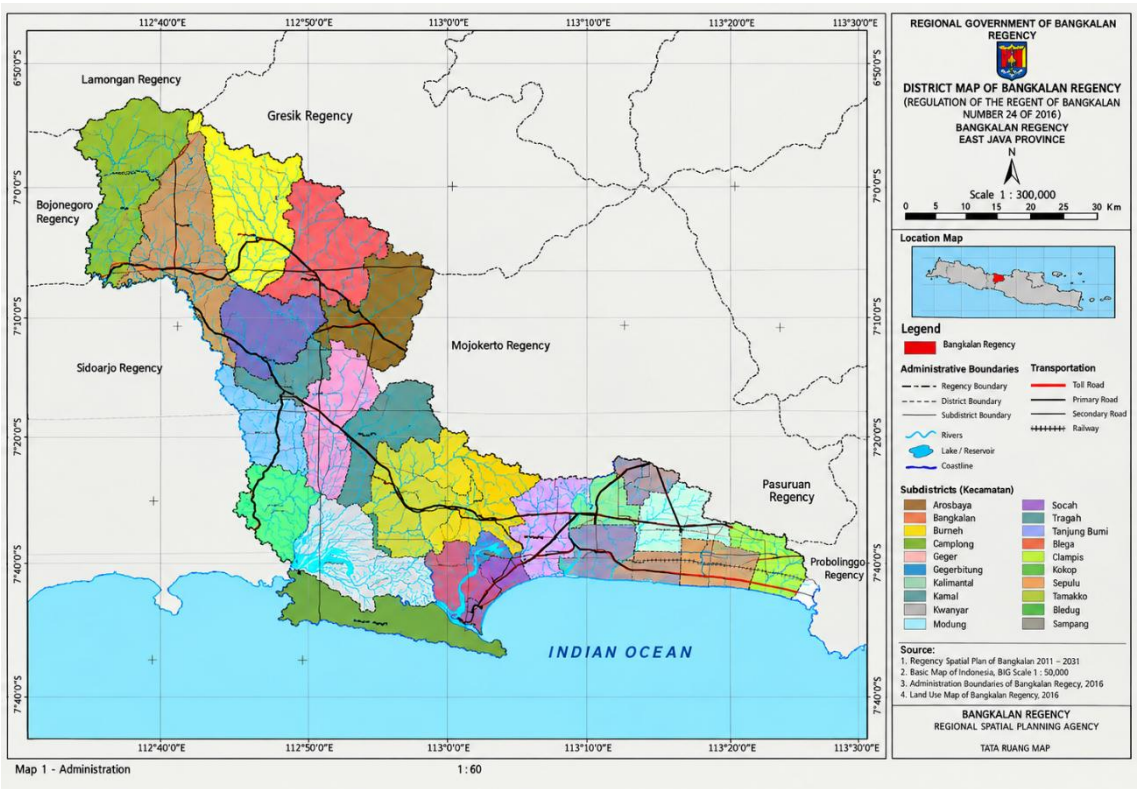


Fig. 1. Map of Cilacap Regency
(Department of Communications and Information Cilacap Regency, 2017)

The data used in this study were secondary data that had been previously collected and publicly published by a government institution. The main advantage of secondary data is its greater efficiency in terms of time and cost for data collection and validation, whereas its limitation is that changes in conditions or outdated data may reduce the relevance of the findings. The secondary data used in this article were obtained from population surveys conducted by Statistics Indonesia and publicly published for the period from 2020 to 2025, after which the data were analyzed using SmartPLS. This software was selected because it automatically reduces the complexity of the modeling process, allowing greater emphasis on predicting causal parameters and is therefore commonly referred to as soft modeling (Pering, 2020). SmartPLS is also relatively easy to use and is particularly suitable for studies involving small sample sizes (Purwanto et al., 2021). Research hypotheses represent tentative answers to the research questions (Nursalam, 2008). The hypotheses formulated in this study were as follows: Educational facilities have a positive and significant relationship with the distribution of educational attainment; economic conditions have a positive and significant relationship with educational facilities; and demographic conditions have a positive and significant relationship with educational facilities.

3. Results and Discussion

3.1 Result

3.1.1 Algorithm test (outer model)

The algorithm test, also referred to as the outer model or measurement model, was conducted using the PLS Algorithm to examine the relationship between each indicator and its respective variable. The test results produced the following model present in Figure 2.

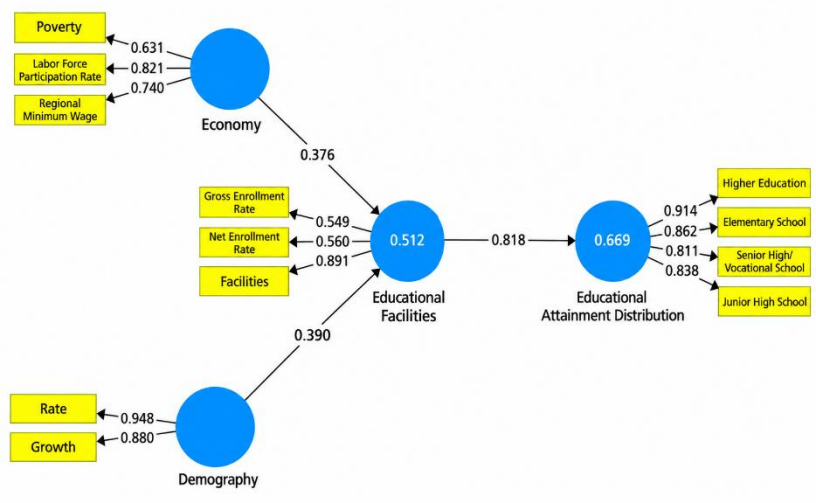


Fig. 2. Outer model

The measurement model generated through the outer model analysis is summarized in a more concise form in Table 1. The convergent validity test was conducted to assess the validity of the proposed model based on the loading factor values. A model is generally considered valid when the loading factor value is greater than 0.50. Based on the test results, the model was considered to demonstrate adequate validity because all indicators had loading factor values greater than 0.50. This indicates that all variables met the specified validity criterion. Convergent validity demonstrates that the indicators within each construct are relatively consistent and aligned, thereby exhibiting a strong correlation in measuring the construct.

Based on Table 1, the Average Variance Extracted (AVE) values for each variable were identified. Average Variance Extracted (AVE) measures the proportion of indicator variance

explained by a construct. A higher AVE value indicates that the indicators represent the construct more effectively. The AVE value can be calculated as the average of the squared loading factors of all indicators associated with a construct. A construct is generally considered to have adequate convergent validity when its AVE value exceeds 0.50 (Amiruddien et al., 2013; Ghozali, 2014; Yuhana et al., 2024). Based on the preceding table, two variables can be considered to have adequate convergent validity because their AVE values exceed 0.50, whereas two variables have inadequate convergent validity because their AVE values are below 0.50. This finding indicates that the latent variables do not yet explain the variance or variability of their respective indicators sufficiently and that some overlap may exist among the indicators.

Table 1. Outer model

No.	Variable/Construct	Loading Factor	Collinearity Statistics (VIF)	Average Variance Extracted (AVE)	Category
1	Educational Facilities				
	Gross Enrollment Rate	0.549	1.091	0.326	Invalid
	Net Enrollment Rate	0.560	1.084		
	Facilities	0.891	1.119		
2	Economic Conditions				
	Poverty	0.631	1.164		
	Regional Minimum Wage/*Upah Minimum Regional* (UMR)	0.821	1.208	0.375	Invalid
	Labor Force Participation Rate/*Tingkat Partisipasi Angkatan Kerja* (TPAK)	0.740	1.185		
3	Population				
	Growth Rate	0.948	1.877	0.581	Valid
	Population Growth	0.880	1.877		
4	Distribution of Educational Attainment				
	Elementary School	0.862	3.559	0.510	Valid
	Senior High School/ Vocational High School	0.811	2.116		
	Junior High School	0.838	1.766		
	University	0.914	4.158		

Discriminant validity was subsequently assessed using the Fornell–Larcker criterion, as presented in Table 2. Discriminant validity can be assessed using cross-loading values or the Fornell–Larcker criterion. A construct is generally considered to demonstrate adequate discriminant validity when the relevant value exceeds 0.70 (Ghozali, 2014; Yuhana et al., 2024). This assessment is important because it determines whether the constructs are sufficiently distinct and prevents overlapping relationships among variables from reducing the accuracy of construct measurement.

Table 2. Fornell-larcker criterion

Construct	Educational Facilities	Economic Conditions	Populations	Distribution of Educational Attainment
Educational Facilities	0.476			
Economic Conditions	0.463	0.510		

Populations	0.465	0.517	0.635	
Distribution of Educational Attainment	0.568	0.482	0.658	0.595

Discriminant validity was further assessed using the cross-loading values for each construct. The results are presented in Table 3. Based on the model assessment, all variables can be considered to have inadequate discriminant validity because the Fornell–Larcker criterion values are below 0.70. This suggests that the constructs have not yet demonstrated sufficient empirical distinctiveness and may still exhibit overlapping characteristics, making it difficult to clearly differentiate one construct from another.

Table 3. Cross-loading values

Construct	Educational Facilities	Economic Conditions	Populations	Distribution of Educational Attainment
APK	0.381	0.203	0.201	0.218
APM	0.389	0.230	0.217	0.233
Facilities	0.619	0.446	0.456	0.582
Poverty	0.237	0.438	0.303	0.231
Growth Rate	0.494	0.442	0.658	0.635
PT	0.494	0.442	0.658	0.635
Population Growth	0.329	0.527	0.611	0.563
SD	0.410	0.241	0.581	0.599
SMA/SMK	0.329	0.527	0.611	0.563
SMP	0.619	0.446	0.456	0.582
TPAK	0.425	0.570	0.330	0.326
UMR	0.324	0.514	0.524	0.503

Composite reliability testing was conducted to determine the reliability of the constructs used in the study. This assessment was performed for each indicator forming a construct to evaluate the internal consistency of the proposed model. Reliability can be assessed using Cronbach's alpha or composite reliability. A construct is generally considered reliable when its composite reliability value exceeds 0.70, while several sources use a Cronbach's alpha threshold of 0.60 (Kodarisman & Nugroho, 2013; Ghozali, 2014; Yuhana et al., 2024). Higher composite reliability values indicate greater consistency among the indicators in measuring the corresponding construct. The results of the composite reliability assessment are presented in Table 4.

Table 4. Composite reliability

Variable	Cronbach's Alpha	rho_A	Composite Reliability	Category
Educational Facilities	0.329	0.437	0.497	Weak
Economic Conditions	0.406	0.432	0.539	Weak
Populations	0.563	0.631	0.632	Weak
Distribution of Educational Attainment	0,612	0,639	0,636	Weak

Based on the test results, it can be concluded that all variables have weak reliability, as their composite reliability values are below 0.70. The algorithm test also indicates that several indicators have relatively weak relationships with their respective constructs. Therefore, although some indicators may demonstrate acceptable loading factor values, the

overall model requires further consideration because the reliability results do not meet the commonly recommended threshold.

It is also important to note that the Cronbach's alpha values for some variables are close to or below the minimum criterion. This condition may indicate the influence of sample size, the number of instrument items, and other sample characteristics on the reliability estimates. Previous studies have discussed the potential influence of these factors on Cronbach's alpha values (Pretorius & Padmanabhanunni, 2025; Rak & Wrześniowski, 2024). In the present study, the relatively small sample size may have contributed to the low Cronbach's alpha values. After the validity and reliability of the constructs were assessed, the structural model was subsequently evaluated.

3.1.2 Structural model test (inner model)

The structural model, or inner model, was assessed using bootstrapping to examine the relationships among endogenous variables. The assessment involved the R-square values to evaluate the predictive strength of the structural model and the relationships among constructs, as well as to assess the hypothesized relationships in this study. The results of the inner model assessment are presented in Figure 3.

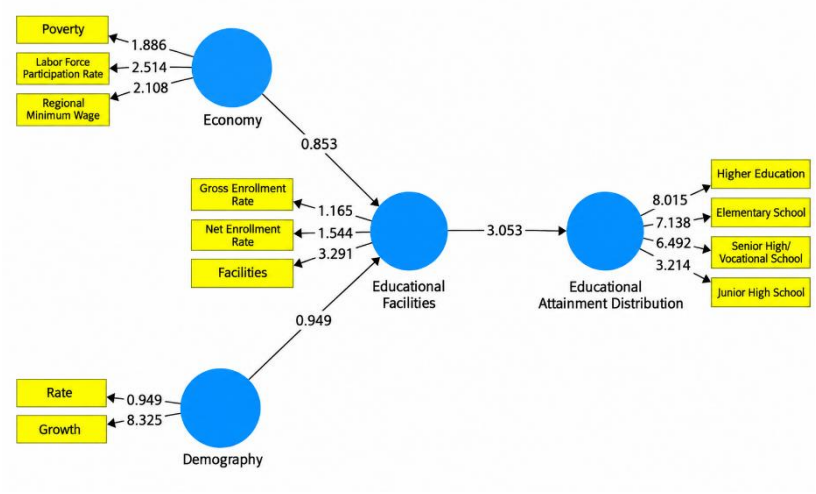


Fig. 3. Inner model

The model above presents the R-square values for each endogenous variable, which indicate the predictive strength of the proposed structural model. The R-square values are summarized in Table 5.

Table 5. R-square

	R Square	Adjusted R Square
Educational Facilities	0.355	0.279
Distribution of Educational Attainment	0.464	0.441

Table 6. F-square

	Educational Facilities	Economic Conditions	Populations	Distribution of Educational Attainment
Educational Facilities				2.025
Economic Conditions	0.089			
Populations	0.096			

Distribution of Educational Attainment

Table 7. Bootstrapping results

	Original Sample (O)	Sample Mean (M)	Standard deviation (STDEV)	T Statistics (| O/STDEV |)	P Values
Educational Facilities -> Distribution of Educational Attainment	0.568	0.567	0.186	3.053	0.002
Economic Conditions-> Distribution of Educational Attainment	0.261	0.266	0.306	0.592	0.274
Demographic -> Educational Facilities	0.271	0.297	0.285	0.659	0.238

After the bootstrapping results were obtained, hypothesis testing was conducted to address the research questions using a two-tailed test, as presented in Table 8.

Table 8. Hypothesis testing

Hypothesis	Value	Critical value	Decision
Hypothesis-1	3.053	+1.96	H0 Reject
		-1.96	
Hypothesis-2	0.592	+1.96	H0 Fail to reject
		-1.96	
Hypothesis-3	0.659	+1.96	H0 Fail to reject
		-1.96	

Based on the hypothesis-testing results, two null hypotheses were not rejected, namely Hypotheses 2 and 3. These hypotheses examined the direct relationships between economic conditions and educational facilities, and between demographic conditions and educational facilities, respectively.

3.2 Discussion

The discussion in this study focuses on path analysis, a method developed by geneticist Sewall Wright between 1918 and 1921 to explain causal relationships within genetic populations. Path analysis is an extension of correlation analysis that enables the interpretation of relationships based on their consequences and is closely related to multiple regression analysis (Sarwono, 2011). In this study, path analysis was used to examine relationships among variables, construct a model that could be more readily observed and interpreted, and analyze the hypotheses formulated in the study.

The analysis revealed that the t-value was greater than the critical value (3.053 > 1.96). This finding indicates a positive and significant relationship between educational facilities and the distribution of educational attainment. In other words, the condition and development of educational facilities in a particular region influence the distribution of educational attainment among its population. Better educational facilities contribute positively to the distribution of educational attainment and may therefore reduce disparities in educational attainment. This finding is supported by Khisandoko et al. (2025) and Kamalia & Nawangsih (2025), who reported that disparities in educational facilities significantly contribute to differences in educational completion across regions. Accordingly, areas with better educational accessibility tend to achieve higher educational outcomes. This is because accessibility-related factors, such as distance, environmental conditions, and the availability of educational facilities, influence the distribution of educational attainment within a region. Greater educational accessibility may increase

people's motivation to pursue education by reducing external barriers, including physical and economic constraints; creating a more positive and personalized learning experience; and fulfilling basic psychological needs, such as competence, relatedness, and autonomy, which constitute important sources of intrinsic motivation. Thus, accessibility is not merely a prerequisite for entering the education system but also a foundation for developing the willingness to continue learning within it (Aminah, 2025; Hidayat et al., 2024).

The analysis showed that the t-value was lower than the critical value (0.592 < 1.96). This finding indicates that economic conditions do not have a positive and significant relationship with the development of educational facilities. In other words, the economic conditions of the population in a particular region do not directly influence the availability or development of educational facilities in that region. Economic conditions alone do not necessarily determine the distribution of educational facilities. Instead, other factors may influence or mediate the relationship between population characteristics and educational outcomes in a region. This finding may be explained by education policies that provide financial support to students, thereby reducing disparities in educational access resulting from differences in household economic conditions. The finding is consistent with Maharani & Sishadiyati (2025), who stated that community economic conditions are not directly associated with the condition of educational facilities but tend to influence the distribution of educational opportunities. Economic conditions do not necessarily determine the number of educational facilities available; rather, they may affect participation in education, which subsequently influences literacy rates and school dropout rates. Limited or unstable economic conditions may constrain the ability of households to meet education-related expenses, including transportation, books, uniforms, and other necessities, even when tuition is provided free of charge (Galuh & Hanifa, 2025; Ozturk et al., 2025; Agusti et al., 2025).

The analysis revealed that the t-value was lower than the critical value (0.659 < 1.96). This finding indicates that demographic conditions do not have a positive and significant relationship with educational facilities. In other words, population development in a particular region does not directly influence the development of educational facilities in that region. Population characteristics, including population growth and the population growth rate, do not necessarily determine an increase in the quantity of educational facilities. This result also suggests that other factors may influence or mediate the relationship between demographic conditions and the distribution of educational opportunities in a region.

These findings reinforce the premise that the effects of demographic conditions on educational distribution cannot be generalized as a direct relationship. This interpretation is consistent with Maulida (2025) and Jones & Pratomo (2022), who stated that the availability and condition of educational facilities are not always determined by population demographics but may also be influenced by other factors, such as government policies and economic conditions. In some cases, disparities may arise from failures in planning and implementation to respond adequately to demographic changes rather than from the absence of a relationship between demographics and educational facilities.

Such failures may occur when policies concerning new student admissions and school construction do not accurately anticipate demographic changes. This situation can create a mismatch between the supply and demand for educational services and potentially widen disparities that restrict social upward mobility among communities trapped in a cycle of structural poverty (Marbun et al., 2025). Therefore, appropriate policies and effective management are necessary to develop educational facilities that correspond to demographic conditions and maintain a balance between the supply and demand for educational services.

4. Conclusions

The Cinangka Coastal Area is characterized by relatively flat and low-lying topography and a high level of tsunami hazard. Inundation modeling under a 10 m wave scenario indicates that flooding could affect all seven coastal villages and extend approximately 100

m inland from the shoreline. Tsunami vulnerability varies across the area, with low vulnerability in Bulakan and Pasauran, moderate vulnerability in Cinangka, Kamasan, and Umbul Tanjung, and high vulnerability in Karang Suraga and Sindanglaya. The physical component is relatively dominant in determining vulnerability. These conditions indicate that the concentration of settlements, public facilities, and economic activities within exposed areas is an important factor shaping regional vulnerability.

An evaluation of spatial utilization indicates that the development of built-up areas has not fully considered tsunami hazards and vulnerability. The area occupied by settlements and built-up land increased by 59.80 ha between 2015 and 2023, while 33.2% of settlements and public facilities were located within the 100 m coastal setback. In addition, approximately 57.55 ha of tourism areas were situated within both the coastal setback and tsunami hazard zones. These conditions indicate inconsistencies between actual spatial utilization and coastal protection regulations. Therefore, spatial management in the Cinangka Coastal Area should prioritize controlling land use based on tsunami hazard and vulnerability levels through the consistent implementation of hazard-prone area zoning and coastal setback regulations.

Acknowledgement

The author would like to thank all parties who contributed to the completion of this research.

Author Contribution

Introduction, A.A; Methodology, A.A; Results and Discussion, A.A; Design, A.A.

Funding

This research received no external funding.

Ethical Review Board Statement

Not available.

Informed Consent Statement

Not available.

Data Availability Statement

Not available.

Conflicts of Interest

The authors declare no conflict of interest.

Open Access

©2026. The author. This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit: http://creativecommons.org/licenses/by/4.0/

References

Agusti, R. A., Marta, J., & Idris. (2025). Pengaruh kondisi sosial ekonomi rumah tangga terhadap status putus sekolah anak di Indonesia. *Jurnal Kajian Ekonomi dan Pembangunan, 7*(1), 79–90. https://doi.org/10.24036/jkep.v7i1.17261

Aminah, S. (2021). *Aksesibilitas pendidikan di UIN Sunan Kalijaga dan motivasi belajar difabel netra*. Maghza Pustaka. https://digilib.uin-suka.ac.id/id/eprint/52636/1/AKSESIBILITAS%20PENDIDIKAN%20DI%20UIN%20SUNAN%20KALIJAGA%20DAN%20MOTIVASI%20BELAJAR%20DIFABEL%20NETRA.pdf

Amiruddien, M., Widodo, A. P., & Isnanto, R. R. (2021). Evaluasi tingkat penerimaan sistem manajemen aset menggunakan metode HOT-FIT. *Jurnal Sistem Informasi Bisnis, 11*(2), 87-96. https://doi.org/10.21456/vol11iss2pp87-96

Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE Publications.

Department of National Education. (2014). *Kamus besar bahasa Indonesia Pusat Bahasa*. Gramedia Pustaka Utama.

Department of Communication and Informatics Office of Cilacap Regency. (2017). *Peta Kabupaten Cilacap*. https://kominfo.cilacapkab.go.id/peta-cilacap/

Galuh, A. Y. A. & Hanifa, N. (2025). Pengaruh pengangguran, PDRB, dan partisipasi sekolah terhadap kemiskinan di Jawa Timur. *Independent: Journal of Economics, 5*(2), 30–43. https://doi.org/10.26740/independent.v5i2.69626

Ghozali, I. (2014). *Structural equation modelling* (Edisi II). UNDIP Press.

Hidayat, R., et al. (2024). Meningkatkan kualitas pendidikan melalui pendekatan personalized learning di Desa Benteng. *PARTA: Jurnal Pengabdian Kepada Masyarakat*. https://journal.undiknas.ac.id/index.php/parta/article/download/6077/1899/20431

Jones, G.W., & Pratomo, D. (2016). Education in Indonesia: Trends, differentials, and implications for development. In: Guilmoto, C., Jones, G. (eds) *Contemporary Demographic Transformations in China, India and Indonesia*. *Demographic Transformation and Socio-Economic Development, vol 5*. Springer, Cham. https://doi.org/10.1007/978-3-319-24783-0_12

Kamalia, Z., K., & Nawangsih, I. (2025). Identifikasi pola tingkat kesenjangan ketuntasan pendidikan di Indonesia dengan menggunakan metode k-medoids clustering. *Jurnal Teknologi Informasi dan Ilmu Komputer, 12*(2). https://doi.org/10.25126/jtiik.1229219

Khisandoko, I. A., Pratama, C. A. A., & Ramadhanti, J. A. (2025). Kajian model spasial tingkat aksesibilitas sarana pendidikan terhadap nilai indeks pembangunan manusia berdasarkan faktor pendidikan dan ekonomi di Kabupaten Brebes. *Salus Cultura, 5*(1), 93–109. https://doi.org/10.55480/saluscultura.v5i1.414

Lee, E. S. (1966). A theory of migration. *Demography, 3*(1), 47–57. https://doi.org/10.2307/2060063

Maharani, A. R., & Sishadiyati. (2025). The effect of poverty conditions and educational facilities on school participation levels in Pacitan City. *Journal of Regional Economics and Development*, *3*(1), 13. https://doi.org/10.47134/jred.v3i1.894

Marbun, S. F., Sihombing, C. C., Sihombing, R. A., Manik, R.A., & Mendrofa, D. (2025). Analisis ketersediaan dan pemerataan fasilitas pendidikan di Kecamatan Medan Tembung. *Jurnal Intelek dan Cendikiawan Nusantara, 2*(5). https://garuda.kemdiktisaintek.go.id/documents/detail/5748020

Marmot, M., Allen, J., Boyce, T., Goldblatt, P., & Morrison, J. (2020). *Health equity in England: The marmot review 10 years on*. The Institute of Health Equity. https://www.health.org.uk/publications/reports/the-marmot-review-10-years-on

Maulida, A. I., & Kurniawan, D. E. (2024). Studi kasus faktor penyebab rendahnya kesadaran pendidikan di Desa Sengi Kecamatan Dukun Kabupaten Magelang. *Realita: Jurnal Bimbingan dan Konseling, 9*(2), 2416–2424. https://doi.org/10.33394/realita.v9i2.11849

Ministry of Primary and Secondary Education. (2025). *Undang-undang Sistem Pendidikan Nasional tahun 2025*. Kemendikdasmen. https://sisdiknas.kemdikbud.go.id/

Nursalam, 2008. *Konsep dan penerapan metodologi penelitian ilmu keperawatan*. Salemba Medika

Ozturk, G. N. (2025). Navigating educational options and future attainments: Exploring adolescents' choices in alternative high school programs in Van, Türkiye. *International Journal of Educational Development, 119.* https://doi.org/10.1016/j.ijedudev.2025.103455

Pering, I. M. A. (2020). Kajian analisis jalur dengan structural equation modeling (SEM) Smart-PLS 3.0. *Jurnal Satyagraha, 3*(2), 28–49. https://doi.org/10.47532/jis.v3i2.17

Pretorius, T. B., & Padmanabhanunni, A. (2025). Reliability generalization of the problem solving inventory: A meta-analysis of cronbach's alpha with a varying-coefficient model. *SAGE Open, 15*(3). https://doi.org/10.1177/21582440251361978

Purwanto, A., & Sudargini, Y. (2021). Partial least squares structural squation modeling (PLS-SEM) analysis for social and management research: A literature review. *Journal of Industrial Engineering & Management Research*, *2*(4), 114–123. https://doi.org/10.7777/jiemar.v2i4.168

Rak, T., & Wrześniowski, S. (2024). Cronbach's alpha-What makes it really good? Some advice for planning and criticizing psychological questionnaires. *Przegląd Psychologiczny, 66*(4), 151–167. https://doi.org/10.31648/przegldpsychologiczny.9467

Sartika, W., Qomariah, S., & Nurmaliza. (2020). Faktor yang mempengaruhi penggunaan KB suntik. *Oksitosin: Jurnal Ilmiah Kebidanan, 7*(1), 1–8. https://doi.org/10.35316/oksitosin.v7i1.617

Sarwono, J. (2011). Mengenal path analysis: Sejarah, pengertian dan aplikasi. *Jurnal Ilmiah Manajemen Bisnis, 11*(2), 285–296. https://www.neliti.com/publications/98454/

Statistics Indonesia. (2020). *Konsep-konsep dasar demografi*. Statistics Indonesia. https://www.bps.go.id/id/publication/2025/01/31/29a40174e02f20a7a31b5bc3/statistik-demografi-indonesia--hasil-sensus-penduduk-2020-.html

Statistics Indonesia. (2024). *Profil pendidikan penduduk Kabupaten Cilacap 2023*. BPS Kabupaten Cilacap. https://cilacapkab.bps.go.id/id/publication/2024/08/21/df76671cf8742d62ddf29358/educational-profile-of-the-population-of-cilacap-regency-2023.html

Statistics Indonesia. (2025). *Kabupaten Cilacap dalam angka 2025*. BPS Kabupaten Cilacap. https://cilacapkab.bps.go.id/id/publication/2025/02/28/2e7e190f181acd4fb31ee14b/kabupaten-cilacap-dalam-angka-2025.html

Sugiyono. (2022). *Metode penelitian kuantitatif, kualitatif, dan R&D* (3rd ed.). Alfabeta.

Todaro, M. P., & Smith, S. C. (2015). *Economic development* (12th ed.). Pearson.

UNESCO. (2020). *Global education monitoring report 2020: Inclusion and education: All means all*. United Nations Educational, Scientific and Cultural Organization. https://unesdoc.unesco.org/ark:/48223/pf0000373718

Yuhana, D., Setiawan, D., & Utomo, P. E. P. (2024). Analisis sistem e-dimas Universitas Jambi dengan pendekatan HOT-FIT model. *Jurnal Sistem Informasi Bisnis, 14*(1), 77–87. https://10.21456/vol14iss1pp77-87

Biographies of Author

Arif Andriyanto, Department of Mechanical Engineering, Faculty of Engineering, Universitas Negeri Yogyakarta, Sleman, Special Region of Yogyakarta 55281, Indonesia.

- Email: arifandriyanto.2022@student.uny.ac.id
- ORCID: 0009-0005-0316-7898
- Web of Science ResearcherID: https://scholar.google.com/citations?user=K1t4fFwAAAAJ&hl=en&oi=ao
- Scopus Author ID: N/A
- Homepage: N/A