Poverty Effect and Population Density Towards the Quality of Fishermen's Settlement Environment in Kusamba

I Made Gde Dwiartha Nugraha, Syamsul Alam Paturusi, Dewa Gede Agung Diasana Putra

Program Studi Magister Arsitektur, Universitas Udayana, Badung, INDONESIA

E-mail: dwiarthanugraha@gmail.com

Received November 07, 2022 | Accepted February 04, 2023 | Published April 23, 2023

ABSTRACT

Many people cannot live in a house with a quality environment that is livable. The main problem that becomes an obstacle is the economic factor, namely poverty. The poor are forced to live in a bad environment or can live in a good environment but cannot maintain it. The inability of the poor to set aside income to finance environmental maintenance is the main cause of continued environmental degradation. In addition to the problem of poverty, the availability of land is increasingly unable to accommodate population growth, resulting in an environment with a high population density. This problem is very common in settlements in coastal areas. Therefore, research on coastal areas, especially residential areas, is important to do. The purpose of this study was to determine the cause of the decline in the quality of the settlement environment by using the Kumba fisherman settlement as the research location. The method used in this study is a quantitative method with multiple linear regression analysis. Where, the independent variables are poverty and population density, while the dependent variable is environmental quality. From this study, it was found that the poverty factor with several indicators had a significant effect on environmental quality. The comparison of the amount of agricultural land to the population has a significant effect on environmental quality, beating the value of population density which compares the total land area with the total population. This shows the large role of open land used by agricultural activities on the quality of the residential environment.

Keywords: influence; poverty; population density; environmental quality; settlements.

INTRODUCTION

One of the basic human needs is the need for boards, namely housing. Humans will do anything to fulfill it. The increase in the number of residential units sometimes cannot keep up with population growth. The greater the birth rate, the higher the fulfillment of the needs of human life that must be fulfilled (Hariyono, 2010). The increase in the need for housing is a factor that causes land and housing prices to rise. The high price of housing means that the opportunity for the poor to own a home is getting smaller. The difficulty of getting affordable housing automatically encourages low-income people to build emergency shelter. Difficult economic conditions sometimes force people to live in uncomfortable and inappropriate environments. The high growth of population and activity, requires large areas of land. Meanwhile, the community is independent to map their plots of land and build their settlements without prior planning. The negative impact of this is that settlements become irregular, crowded, and supporting facilities and infrastructure do not meet the needs of the people who live there.

Many studies explain that there are opportunities when advanced economic growth can have a positive impact on environmental quality. The poor are only able to fulfill their basic needs and are economically unable to finance efforts to maintain environmental quality. Economic activities are carried out maximally by utilizing the environment and technology so as to cause environmental damage. Increasing people's income provides opportunities for improving environmental quality for the better.

There is a gap between theory and actual conditions. In theory, settlements inhabited by the middle to upper middle class will have good environmental quality. More economic capacity is considered capable of setting aside income for the benefit of environmental improvement. However, in reality, settlements inhabited by people with middle and upper middle-class economies still experience

pISSN 2302-4240
eISSN 2655-2086
Volume 12, Issue 2, June 2023, pp.360-367
DOI: http://dx.doi.org/10.32832/astonjadro.v12i2 http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO

environmental quality problems. Problems of flooding, waste management, fire protection, and poor drainage are still found in luxury and medium-sized settlements.

Disparities also occur in settlements inhabited by people with low incomes. As income increases, residents prefer to leave the neighborhood they lived in before or have another residence with better environmental quality. This causes, the increase in income levels is not accompanied by an increase in the quality of the settlement environment. Residents do not participate in maintaining and improving environmental quality.

The coastal area is a unique area and there is a lot of potential. Humans live and carry out all their activities, one of which is in coastal areas. Around 1990, it was believed that 50-70% of people would live in coastal areas, and at the end of the 20th century, more than three quarters of the world's population would live in coastal areas (Kodatie, 2005). In general, in Indonesia, coastal areas have problems of poverty and an unfit environment (Kodatie, 2003). Spatially, coastal communities can be defined as people who live spatially in coastal areas without considering whether they have socio-economic activities related to coastal and marine potentials and resources (Darmansyah, 2019). Coastal areas are growing, giving rise to new problems including the need for housing and settlements.

Geographically, the land area of the Kusamba fishermen settlement is 23.58 ha. The typology of Kusamba fishing settlements is located in lowland areas and coastal areas. The population of the Kusamba fishing settlement is 8,270 people (Capil Office, 2021). The level of population density is included in the classification of areas with high population density (SNI 03-1733-2004), namely 350 people/ha. Kusamba Village is dominated by indigenous people and Kampung Kusamba Village is dominated by immigrants. The residential area of the Kusmba Village community tends to be wider than that of the Kusamba Village community. This is because, many traditional Balinese houses are still visible in Kusamba Village, while the settlement conditions of Kampung Kusamba are relatively narrower, rundown, and many semi-permanent buildings. The difference between the two villages can also be seen from their social problems. The poverty rate and population density are higher in Kampung Kusamba, when compared to Desa Kusamba. The Kusamba fishing settlement has a crossing port to Nusa Penida District, making it the only access in Klungkung Regency that connects Klungkung Mainland with Klungkung Islands.

Based on the explanation above, it is necessary to conduct a research on the relationship or comparison between the quality of the environment and the conditions of poverty. This research can be used as a tool to understand social phenomena and determine strategies for handling the Kusamba fishing settlement area to become a livable residential area and can become a reference for policy makers in regional and central government.

Housing and Settlements

Housing is a group of residences as part of settlements, both urban and rural, which are equipped with infrastructure, facilities and public utilities as a result of efforts to fulfill livable housing. Housing is not the same as settlement. Settlement is an environment where humans live which functions as a supporter of the life and livelihood of its citizens. Housing is more precisely defined as a group or group of houses.

The quality of the settlement environment is very dependent on the availability of infrastructure that supports the activities of the residents. Infrastructure in settlements includes roads, wastewater, rainwater, clean water, electricity and telephone networks (Kwanda, 2004). Infrastructure (urban) is a building or basic facilities, equipment, installations that are built and needed to support the functioning of a system of socio-economic life of the community (Adisasmita, 2012).

Concentric Theory and Environmental Kuznet Curve Theory

The Concentric Theory states that there are five zones showing different types of land use. One of the zones described in the Concentric Theory is the Transition Zone. This zone is inhabited by many poor people in their socio-economic life. In this zone, a decline in the quality of the residential environment has begun to occur, giving rise to slum areas.

The next theory that conveys the relationship between poverty and the environment is the theory presented by Grossman and Krueger in 1991. This theory explains the relationship between economic growth and environmental quality by applying Kuznet's hypothesis (Grossman & Krueger in Cahyani, 2020). In the early stages of community development, they concentrated more on consuming basic goods than on good environmental quality. People with low income (poor) can only afford to consume and cannot afford to reduce environmental pollution. This causes a continuous decline in environmental quality due to the excessive use of natural resources. . Revenue achievement results in environmental degradation and environmental quality (Sarkodie & Strezov, 2019).

Poverty is one of the main causes of declining environmental quality in poor and developing countries and environmental degradation will continue if poverty is not addressed or reduced (Kocak et al, 2019). Research in 2019 conducted by Khan found in ASEAN countries that poor people tend to increase environmental degradation such as increased CO2 emissions. The increase in CO2 emissions occurs because the poor are considered unskilled in consuming sustainable natural resources (Khan, 2019). The inability to manage natural resources can be said to be related to the educational level of the population. Most of the poor survive by exploiting natural resources (Finco, 2019). Thus, personal survival is more important or prioritized than future survival. Poverty in a rural area in the long term will reduce environmental quality, such as the availability of clean water and energy consumption (Zaman, Ikram, & Shah, 2010). Ownership or rights to something, both natural resources and others, will influence people's behavior towards their environment (Commonwealth Secretariat, 1991). The phenomenon of poverty in rural areas is inseparable from the low-income strata of society, causing the poor to be unable to meet their basic needs so that they cannot set aside their income to protect the environment. Based on several literatures, the effect of poverty on the environment can be seen from several indicators (Table 1).

Table 1. Implications of Poverty Indicators on Environmental Quality

Poverty Indicator	**Expert Source**
Number of Poor Population	Zaman et al (2010)
Income Level	Sarkodie & Strezov (2019)
Education	Khan (2019)
Consumption of clean water	Zaman et al (2010)
Energy Consumption	Finco (2019)
	Zaman et al (2010)
Land Ownership Status	Commonwealth Secretariat. (1991)

The quality of the settlement environment can be seen from the condition of the building, accessibility, infrastructure, land status, population conditions, and social economy (Ramadhan & Pigawati, 2014). The quality of the settlement environment is shown from the quality of the network such as drainage networks, clean water networks, and sanitation (Jayadinata, 1986).

Theory of Carrying Capacity and the Concept of Limits to Growth

The Theory of Environmental Carrying Capacity, commonly known as the Theory of Carrying Capacity. The theory of environmental carrying capacity is a development of the concept of population density. In simple terms, this theory explains the maximum of a population that can be accommodated or supported in an area. Ecologically, the carrying capacity of the environment is the number of populations or communities that can be supported by the resources and services available in the ecosystem (Ress, 1990).

Another theory mentions the concept of Limits to Growth, which explains that the environmental capacity for human-produced waste has a maximum limit and non-renewable natural resources (Meodow in Dariah, 2007). The potential use of land for meeting daily needs affects land use for agriculture. Population density, especially related to the number of people who use land area for agriculture will affect the quality of the environment (Zaman et all, 2010). The research conducted by Zaman was carried out in Pakistan using the area of agricultural land as one of the benchmarks for assessing environmental quality. The use of agricultural land by the community is reflected in the value of agrarian population density and physiological population density. Agricultural

pISSN 2302-4240
eISSN 2655-2086
Volume 12, Issue 2, June 2023, pp.360-367
DOI: http://dx.doi.org/10.32832/astonjadro.v12i2 http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO

Population Density, is a comparison between the number of people who work using land for agriculture. Meanwhile, Physiological Population Density is the ratio of the total population to land used as agricultural land.

RESEARCH METHODS

The approach used in this research is a quantitative approach. Determination of variables obtained from a review of the literature obtained previously. The Poverty variable consists of several indicators including: Income, Education, Sources of Clean Water, Sources of Information, Defecation Facilities and Waste Management. While the Variable Population Density consists of nominal population density, agrarian population density and physiological population density. The sample used is a group of poor families determined by the village government. The Slovin method was used in determining the sample so that the number of samples used was 74 households (heads of families). After obtaining the number of samples used, then the next step is to determine the proportion of samples (Probability Sampling) in each region. The data analysis technique used is the Multiple Linear Analysis Technique, which was previously carried out by Factor Analysis and Classical Assumptions Test.

Data analysis
Factor Analysis

Factor analysis in this study consisted of the Barlett's Test of Sphericity and the Kaiser-Meyer-Olkin Test (KMO) and the Measure of Sampling Adequacy (MSA) Test. The Barlett's Test of Sphericity is used to find out which variables are correlated with each other so that they can be grouped into the same group. This test is used to find out the indicators used in the poverty variable, it is appropriate to be included in one group. The KMO test was carried out to ensure the feasibility of a factor analysis. While the MSA test is carried out to measure the adequacy of the sample used in each variable.

Classic assumption test

The classic assumption test consists of the normality test, multicollinearity test and heteroscedasticity test. The Normality Test aims to test whether in the regression model, the confounding or residual variables have a normal distribution. High or perfect correlation between independent variables. A good regression model should not have a high correlation between the independent variables. The heteroscedasticity test aims to test whether in the regression model there is an inequality of variance from one residual observation to another. Regression models that are considered good are residuals from one observation to another that are constant or homoscedasticity or there is no heteroscedasticity.

Multiple Linear Regression Analysis

Multiple Linear Regression Analysis is an equation that describes the relationship between two or more independent variables (Poverty and Population Density Variables) and one dependent variable (Environmental Quality).

$$Y = a + b_1X_1 + b_2X_2 + \cdots + b_nn$$

In Multiple Linear Regression Analysis to determine the relationship of independent variables (poverty and population density variables) together affect the quality of the environment through the Annova test. Meanwhile, to test the effect of each indicator and independent variable on environmental quality, it is known through a partial test.

RESULTS AND DISCUSSION
The Effect of Poverty on the Quality of the Settlement Environment

The results of the partial test show that the income variable is the most significant positive influence variable in determining environmental quality. The positive results of the partial test show that the higher the income of the community, the better the quality of the surrounding environment compared to the environment where people live with lower per capita income. . This is inseparable from the

people who have a higher per capita income, setting aside part of their income to protect the environment, even though the amount is very small. These results are in line with Kuznet's Environmental Theory presented by Kuznet (1995) that positive economic growth (marked by increased income, for example) will cause environmental degradation and at the turning point will have an effect on reducing environmental degradation that occurs when economic activity leads to economic activity. sustainable.

The partial test results show that the clean water source variable has a significant positive effect on environmental quality. The use of naturally protected springs will reduce the carrying capacity of the environment. Utilization of protected springs has the potential to pollute the environment and result in drought natural disasters. The results of this study are inseparable from the activities to build a network of clean water sources and increase the production capacity of clean water worth a total of 1.8 billion from the 2020 Special Allocation Fund (DAK) for low-income communities in Dawan District and the results of these activities also have an impact on the area Kusamba Village (DPA Klungkung Regency. 2020) . So that the use of protected springs can be reduced significantly. These results are also in line with research conducted by Zaman (2010), prolonged poverty will lead to reduced availability of clean water sources and research conducted by Finco (2019), poor people tend to exploit natural resources causing environmental damage.

Land Ownership Status is closely related to the sense of ownership of the land occupied so that a sense of concern for the surrounding environment arises. The partial test results show that the variable Land Ownership Status has a significant positive effect on quality. Although the poor population of Dusun Bias and Dusun Bingin, the majority of the land they occupy is not private property, but land belonging to the local customary village (the village's fatherland). The land was given by the village with customary obligations in it which must be carried out by the land dwellers. The land has been occupied for generations from generation to generation. This causes a sense of belonging to grow so that the quality of the environment tends to be better than the poor families of Kampung Kusamba who occupy no-man's land or regional land on the shoreline. These results are in accordance with the statement given by the Commonwealth Secretariat in 1991 that factors such as ownership or rights to something, either natural resources or others, will influence people's behavior towards their environment.

In the partial test it was found that the Defecation Facility Variable had a significant positive effect on environmental quality. The non-compliance of MCK facilities in poor families with the technical requirements causes environmental pollution. Starting from the unavailability of closets to septic tanks so that dirty water is directly disposed of into drainage canals and into the surrounding environment. This result was more or less influenced by the government's support for the construction of latrines for poor families in one of the hamlets in the Kusamba residential area, which significantly reduced the number of toilet facilities for poor families that did not meet technical standards.

The results of the partial test also show that the education level variable of the head of a poor family has a significant positive effect on the quality of the residential environment. A positive value indicates that the higher the level of education attained, the wiser it is in utilizing natural resources and preserving the surrounding environment. These results are in line with research conducted by Khan in 2019 which stated that the level of education affects the level of skills in managing sustainable resources.

The light source variable in the partial test showed insignificant results on environmental quality with a sig. 0.163 (greater than 0.050) . This is because the majority of lighting sources use electricity as a lighting source. Where electricity is one source of environmentally friendly energy. The intensity of the use of environmentally friendly resources tends to be random to the environmental conditions they occupy. So it can be concluded that the use of the type of lighting source does not affect the quality of the environment in this study.

Effect of Population Density on Settlement Environmental Quality

The factor analysis or KMO test carried out yielded the result that Physiological Population Density (comparison of population to agricultural land) (X.2.3) has the highest correlation value to explain

pISSN 2302-4240
eISSN 2655-2086
Volume 12, Issue 2, June 2023, pp.360-367
DOI: http://dx.doi.org/10.32832/astonjadro.v12i2 http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO

the effect on environmental quality compared to Arithmatic Population Density (comparison of population to land area) total) and Agricultural Population Density (the ratio of the number of farmers to the area of agricultural land) . Therefore, the value of Phyological Population Density can represent the value of the Population Density Variable (X.2). The results of the regression analysis of the Physiological Population Density variable have a significant effect on environmental quality. The results of the factor analysis and regression analysis explain that agricultural land has an overall impact on all residents (not just farmers) so that the quality of the environment becomes better.

Physiological population density describes the condition of the total population of land used for cultivating land either for their own needs or for later trading. Utilization of land for farming has a positive influence on improving environmental quality. This research is in line with the concept of Limits to Growth, where the environment has its maximum limit in providing resources. In other words, the amount of agricultural land can be interpreted as an increase in the maximum limit of nature in providing resources. Besides that, this research is in line with research that was conducted by Zaman in 2010, where the area of agricultural land has an effect on environmental quality.

The Effect of Poverty and Population Density on the Quality of the Settlement Environment

Based on the data analysis that has been done, the variables of Education, Land Ownership Status, Education, Sources of Clean Water, Sources of Lighting, Defecation Facilities and Physiological Population Density jointly have a positive effect on the Environmental Quality of Kusamba Fisherman Settlements. This is shown from the ANOVA test which was carried out by raising the sig.0.00 value so that it can be concluded that the variables X1 (Poverty) and X2 (Population Density) jointly affect Environmental Quality (Y).

The results of this study are in line with the explanation of the Transition Zone in the Concentric Theory which states that the poor who occupy the transition zone will experience continuous environmental degradation. This happens because humans who have the same social characteristics will also occupy the same space.

The coefficient of determination in this study obtained a value of 0.898, it can be interpreted that all X variables (Poverty and Population Density) in this study have an effect of 89.8% which can explain the effect on environmental quality. Meanwhile, 11.2% is explained by variables outside this study. Based on the results of observations obtained in the Kusamba settlement area, it is likely that variables such as the government's role in building infrastructure can affect environmental quality.

CONCLUSION

The characteristics of poverty conditions are translated into several measurement indicators. The work is 34% traders 30% and others, 20% farmers and 16% fishermen, the income level is 61.8% less than Rp. 318,000 per capita and 38.2% more than Rp. 318,000 per capita, the status of ownership of land for houses occupied by poor families is 82.9% non-owned and 17.1% owned, the last education attained by the head of the family 40.8% did not attend school or finished elementary school and 59.2% exceeded the elementary school level. Source of water used daily 15.8 % protected springs and 84.2% not protected springs. Lighting sources used 38.2% often use non-environmentally friendly lighting sources and 61.8% often use environmentally friendly lighting sources. Defecation facilities available in each household say 55.3% do not have proper latrines according to technical requirements and 44.7% have latrines according to technical requirements. Population density is divided into three types, namely arithmetic population density, agrarian population density and physiological population density. Bias Hamlet has an arithmetic population density of 184.2 people/hectare, an agrarian population density of 30 people per hectare and a physiological population density of 5720 people per hectare. Bingin Hamlet has an arithmetic population density of 217.9 people per hectare, an agrarian population density of 8.6 people per hectare and a physiological population density of 303 people/hectare. Kampung Kusamba has an arithmetic population density of 90.6 people per hectare, an agricultural population density of 5 people per hectare and a physiological population density of 951 people per hectare. Based on the scores obtained by each hamlet, the results of the environmental quality assessment are as follows: Bingin Hamlet has the best environmental quality, followed by Bias Hamlet and lastly Kusamba Village. The KMO test results show that the Physiological Population Density variable (X.2.3) has

the highest correlation value to environmental quality so that it can represent the value of the Population Density variable (X.2). The results of the Determination Coefficient Test show that the Poverty Variable and Population Density Variable affect 89.9% of the Environmental Quality variable. While 11.1% is influenced by other variables that are not included in this study. The results of the F test show that all variables of poverty and population density simultaneously and significantly affect the environmental quality variable. The results of the T test showed that the variable Income (X.1.1), the variable Land Ownership Status (X.1.2), the Education variable (X.1.3), the Water Source variable (X.1.4), the Defecation Facility variable (X.1.6) and the variable Physiological Population Density (X.2.3) individually has a significant effect on the variable Environmental Quality (Y). While the variable Source of Information (X.1.5) individually does not significantly influence the Environmental Quality variable (Y).

ACKNOWLEDGEMENT

Thanks are given to colleagues at the Office of Public Works, Housing, Spatial Planning, Housing and Residential Areas of Klungkung Regency for helping with this research. The author does not forget to thank other parties in carrying out the collection of primary data and secondary data needed in this paper.

REFERENCES

Adisasmita, Rahardjo. (2012). Analisis Tata Ruang Pembangunan. Yogyakarta: Graha Ilmu.

Cahyani, F. A. (2020). Sustainable Development. State Law Rivew, 2(2), 168–179.

Darmansyah, Aidi. (2019). Perubahan Permukiman Nelayan Pasca Reklamasi Pantai di Kelurahan Lette Kecamatan Mariso Makassar. Jurnal Tekno Sains Vol.8 Hal. 158-167.

Finco, M. V. (2009). Poverty-Environment Trap: A nonLinear Probit Model applied to Rural Areas in the North of Brazil. In American-Eurasian Journal of Agricultural and Environmental Science (Vol. 5, pp. 533–539).

Hariyono, Paulus. (2010). Perencanaan Pembangunan Kota Dan Perubahan Paradigma. Yogyakarta: Pustaka Belajar.

Jayadinata, Johara T. (1986). Tata Guna Lahan Dalam Perencanaan Pedesaaan, Perkotaan dan Wilayah. Bandung: Intitute Teknologi Bandung.

Khan, S. A. R. (2019). The nexus between carbon emissions, poverty, economic growth, and logistics operations-empirical evidence from southeast asian countries. Environmental Science and Pollution Research, 26(13), 13210–13220.

Koçak, E., Ulucak, R., Dedeoğlu, M., & Ulucak, Z. Ş. (2019). Is there a trade-off between sustainable society targets in Sub-Saharan Africa? Sustainable Cities and Society, 51(April).

Kodatie, Robert J. (2003). Manajemen dan Rekayasa Infrastruktur. Yogyakarta: Pustaka Belajar.

Kodatie, Robert J. (2005). Pengantar Manajemen Infrastruktur. Yogyakarta: Pustaka Belajar.

Kwanda, T, Rahardjo, J. & Wardani, M.K. (2004). Analisa Kepuasan Penghuni Perumahan Sederhana di Denpasar Berdasarkan Faktor Lokasi Prasarana Sarana Kualitas Bangunan Desain dan Harga. DImensi Journal of Architecture and Bulit Environtment Vo.29.

Ramadhan, R. A., & Pigawati, B. (2014). Pemanfaatan Penginderaan Jauh Untuk Identifikasi Permukiman Kumuh Daerah Penyangga Perkotaan(Studi Kasus: Kecamatan Mranggen Kabupaten Demak). Geoplanning: Journal of Geomatics and Planning, 1(2), 102-113.

Rees, J. (1990). Natural Resources: Allocation, Economics and Policy, London: Routledge

Sarkodie, S. A., & Strezov, V. (2019). A review on Environmental Kuznets Curve hypothesis using bibliometric and meta-analysis. Science of the Total Environment,649,128–145.

pISSN 2302-4240
eISSN 2655-2086
Volume 12, Issue 2, June 2023, pp.360-367
DOI: http://dx.doi.org/10.32832/astonjadro.v12i2 http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO

Zaman, K., Ikram, W., & Shah, I. A. (2010). Bivariate cointegration between poverty and environment: A case study of Pakistan (1980-2009). Journal of Environmental Planning and Management, 53(8), 977–989.