



Coastal Areas Settlement Development – a Sustainable Model in Kendari City-indonesia

TECHNICAL ARTICLE

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ABSTRACT

This research was conducted to determine the existing conditions of coastal settlements in the Petoaha sub-district, Nambo District, Kendari City. Identifying the factors that influence coastal settlements in Petoaha Village, Nambo District, Kendari City and creating a model for environmentally-based sustainable coastal settlement development in Kendari City. This research is a qualitative research using 6 informants who have an understanding of the sustainable coastal settlement development model in Kendari City. The research results show that the model for developing residential areas is sustainable, including environmental sustainability, socio-cultural sustainability and economic sustainability. Environmental sustainability includes developing empty areas, including for the construction of houses and open spaces (green spaces), which can function as water catchments, parks for playing and other community activities. building a house can set aside part of the land as open space (green open space) which can function as protection and air conditioning and can be used as a place for family activities. House buildings are designed using windows and ventilation that comply with minimum SNI standards so that lighting and air circulation can be maximized and can reduce the use of lights during the day and reduce the use of air conditioning both during the day and at night, in addition to saving electrical energy can be done by using solar panels. Socio-cultural sustainability includes community activities and habits of gathering, working together and playing together within the Petoaha Village,. Meanwhile, economic sustainability includes community activities in their respective business fields by utilizing the facilities and infrastructure of nearby markets, fishing docks, Pertamina ports and mining companies as sources of income.

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INTRODUCTION

Community/resident settlements in coastal areas tend to be dense and close together with neighbors who are very close, causing environmental impacts. Most residents in coastal areas work as fishermen with an uncertain income. People only sail on certain days. And when the moon is full the fishermen stop sailing because there are no fish. This has resulted in fishermen being unemployed and choosing side jobs. Coastal residential areas are residential areas where the majority of the population works as fishermen.

Settlements in an area are sometimes circular or rectangular, as is the case in coastal areas, as a result of the condition of beaches which are elongated according to the length of the coastline, meaning that people live in groups along coastal areas. This is caused by the residents' working conditions as fishermen and the community's culture of life. Fitria (2022) said in her research that the development of housing and settlements often occurs if existing road infrastructure increases due to the attraction of quickly and easily reaching the location. This shows that there is regional development when there is population growth and activity in an area.

Residential areas in the development of a region are used as one of the links in the chain whose development is considered apart from economic growth and improving community welfare. This is because housing is a basic human need where they live and interact socially with others (Augustine, 2010).

Three main principles in sustainable development (Mc Intyre, 1993: 10): (a) Ecological Sustainability, namely ensuring that development is carried out in accordance with ecological processes, biology and the diversity of existing ecological resources. (b) Social and Cultural Sustainability, namely ensuring that the development carried out has a positive impact on the lives of the surrounding community and is in accordance with the culture and values that apply to that community, and (c) Economic Sustainability, namely ensuring that the development carried out is efficiently economy and that the resources used can survive future needs.

LITERATURE REVIEW

The settlement model in coastal areas is related to their livelihoods which depend on the sea, so fishing communities choose to live in coastal areas. The diverse potential and natural resources in coastal areas attract people to fulfill their daily needs, resulting in the formation of coastal settlements that vary according to the community's level of livelihood (Hariyanto in Sutigno and Pigawati, 2015).

Based on Kendari Municipality, (2021). The village/sub-district area in Nambo District, which was newly expanded in 2017, is an area directly facing Kendari Bay which is still

marginalized compared to other villages/sub-districts in Kendari City. The Nambo District area consists of: a) Tobimeita Village b) Petoaha Village c) Nambo Village d) Bungkutoko Village e) Sambuli Village f) Tondonggeu Village. The area of Nambo District is 25.32 Km².

Territory is space. Regarding this space, there are two different views, namely subjective and objective views. The subjective view states that determining territory is a way of dividing space to achieve certain goals. Regional determination is a classification method for arranging spatial groupings. Territory is seen as a tool to explain space that is defined according to certain criteria for certain purposes. Thus, if the criteria change, the territorial boundaries will also change (Nurzaman, 2012).

Regional planning is a development planning process which is intended to make changes towards better development for a community, government and environment in a particular area by utilizing various existing resources and must have an orientation that is comprehensive, complete, consistent with the principle of priority (Riyadi and Bratakusumah, 2003).

According to general agreement in the world, coastal areas are areas where land and sea meet, landward including land, both dry and submerged in water, which is still influenced by the characteristics of the sea, such as tides, sea breezes and salt water seepage. Seaward includes parts of the sea that are still influenced by natural processes that occur on land such as sedimentation and fresh water flows, as well as those caused by human activities such as agriculture and pollution (Abdullah and Rina, 2015).

Basically, development is the process by which individuals, groups, organizations, instruction and society improve their ability to:

1. Perform basic functions, solve problems, determine and achieve goals;
2. Understand and relate their development needs in a broad context and in a continuous way (Sinaga, 2006).

A region as a geographical unit has the potential for carrying out regional development and development activities. And a region is also a geographical unit that forms a unity. The definition of a geographical unit is space so that it is not just a physical aspect of land, but more than that includes other aspects such as economic, biological, social and cultural (Sinaga, 2006).

According to Sirojuzilam (2005), regional development is an increase in the value of regional benefits for the people of a particular area, as well as accommodating more residents, with an average level of community welfare improving, in addition to providing more facilities/ infrastructure.

According to Law Number 1 of 2011 concerning housing and residential areas, namely that a settlement is part of a residential environment that consists of more than one housing unit that has infrastructure, facilities, public

utilities, and supports other functional activities in urban areas or rural areas. Housing is a collection of houses as part of settlements, both urban and rural, which are equipped with public infrastructure, facilities and utilities as a result of efforts to provide livable houses. According to Hadi Sabari Yunus (Ariyanti, 2017), settlements can be defined as formations, whether man-made or natural, with all their accessories, which are used by humans as individuals or groups to reside, either temporarily or permanently, in order to carry out their lives.

Molenda (1996), put forward a model that is commonly known in learning, namely the conceptual model which is often equated with theory, this model is a verbal description of a view of reality. This model does not provide a full explanation, but the relevant components need to be fully presented and defined. Conceptual models are descriptive in nature which describe relevant events based on a deductive process of logic or analysis and also conclusions from observations. One of its important functions is to provide a basis for research that can create inductive theories. According to Tamba and Surya (2017), deductive reasoning is drawing conclusions from general things to specific things based on existing facts. Deductive reasoning guarantees correct conclusions if the allegations from the argument are correct and reasonable (logical). Meanwhile, inductive reasoning is drawing general conclusions or making new statements from specific cases.

Community settlements can be located in various areas, both urban and rural. Coastal areas are areas directly adjacent to the sea. Definitions of coastal areas can vary, because a patent term has not been found to define them. In accordance with Law Number 27 of 2007, coastal areas have been defined as transitional areas between land and sea ecosystems which are determined by 12 mile territorial boundaries towards the water and district/city boundaries towards the interior. According to general agreement in the world, coastal areas are transitional areas between land and sea.

According to Robert Vale and Brenda in 1991 (in Yesser Priono, 2011). an ideal building is a building that does not use excessive energy sources. The way to make a building ideal is to design a building that is able to adapt to the environment, not change the environment or even damage it. The use of sunlight is a very useful energy source for buildings. Ways to design buildings to be energy efficient include:

- a. The building is long and not too wide to utilize natural light from the sun to save electrical energy.
- b. Using solar energy as a source of electricity by using solar panels which are used for lighting.
- c. The color of the interior walls of the building is bright but does not cause glare.
- d. Minimize the use of AC (Air Conditioning) and elevators.

The house building model must meet SNI standards, to determine the size, using a basic approach, including, among other things, space functions and activities, space capacity, human need for oxygen and so on. Area of lighting/light holes: The area of doors and windows is not included in the calculation:

- a. For bedrooms $1/6 \times$ floor space.
- b. Sitting room $1/7$ $1/6 \times$ floor area of the room.
- c. Schools and offices $1/6$ $1/5 \times$ floor area of the room.
- d. Hospital $1/6 - 1/5 \times$ room floor area.
- e. Workshop $1/6 - 1/3 \times$ floor area of the room.
- f. Warehouse $1/10 \times$ room floor area.

Natural lighting is the use of light that comes from natural light such as the sun, moon and stars as space lighting. Environmentally friendly buildings generally have optimal natural lighting and air. The success of these two elements (air and light) in creating a comfortable home depends on the design of the openings and the air conditioning system (if needed). The use of multiple openings in the form of windows, vents and doors is an effective way to let in natural light. (Dora Esa Purnama, 2011).

Natural ventilation is the process of exchanging air circulation in a building through the help of building elements. Good air circulation in the building will create thermal comfort that is suitable for activities in the building (Nyoman Sudiarta, 2016).

RESEARCH METHODS

This research is a qualitative research. The research location is a place for developing coastal settlements in Nambo District, Kendari City, namely in Petoaha Village, Indonesia. The type of data collected for analysis consists of primary data and secondary data. Primary data in this research is by conducting direct surveys in the field, including physical surveys including the development of residential areas, building density, topography, condition and character of houses, existing residential infrastructure and non-physical, namely socio-cultural and economic, as well as making and filling out questionnaires, to explore references from respondents in community settlements in the research area. Secondary data is in the form of supporting data collected through literature studies taken from related agencies such as the Public Works Department, Central Bureau of Statistics, results of previous research, data from the internet and other references related to this research. The data in this research was collected directly from the field by involving respondents using tools. The tools are questionnaires.

DATA ANALYSIS

The research method used is a qualitative method which contains elements of a case study. The data analysis technique used in this research is descriptive qualitative, descriptive with a phenomenological approach. The following are the stages of research data analysis:

1. Qualitative descriptive analysis to describe the existing conditions of settlements in the Petoaha sub-district, Nambo District, Kendari City and the development patterns of coastal residential areas using GIS software to describe the physical conditions of the research area and the development of residential areas in 2008, 2013, 2018, 2023 until now.
2. The descriptive method with a phenomenological approach is used to determine the factors that influence the development of residential areas. Both non-physically include the socio-economic-cultural conditions of society; as well as physical aspects which include environmental conditions and topography, building density, residential layout, facilities and infrastructure, and open space,

3. The model presented in this research is a conceptual model which is an idea for efforts to develop sustainable residential areas, including environmental sustainability, social cultural sustainability and economic sustainability in Petoaha Village.

RESULTS AND DISCUSSION

A. CITY SPATIAL PLAN

The 2010–2030 Kendari city spatial plan places the development of coastal areas as a priority scale to support strengthening the economy of Kendari City by modernizing coastal areas into a healthy environment that can be used by the public.

Based on the Kendari City spatial plan (Figure 1), Nambo District is one of the priorities in the fisheries, tourism and industrial sectors. The current condition is that Nambo sub-district has a tourist area and an LPG (Liquefied petroleum gas) port. However, it was also found that several areas were still slum and required future development planning.

Research on the Sustainable Coastal Area Settlement Development Model in Kendari City was carried out in the Petoaha Subdistrict area, Nambo District, as one of

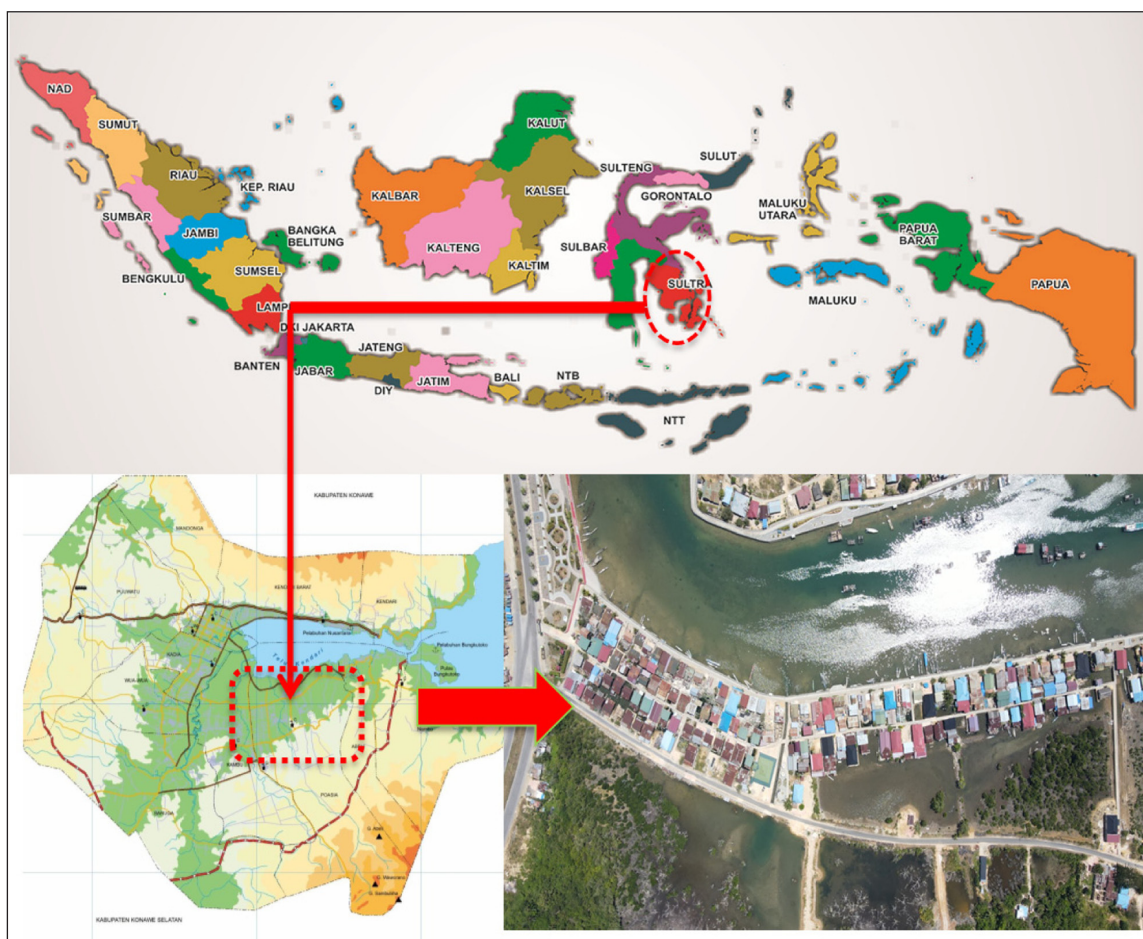


Figure 1 Kendari City Spatial Plan 2010–2030.

Source: Adapted from Spatial Planning and Regional Planning of Kendari City (2018).

the coastal areas with a complex environment, where settlements are no longer on the sea but houses are standing on piles of soil and rocks, or artificial areas. The research results found that there are four areas of Nambo District that are directly connected to the sea, such as Petoaha Village, Nambo Village, Sambuli Village and Tondonggeu Village. This is a proof that Kendari City has a coastal area as presented in the Figure 2.

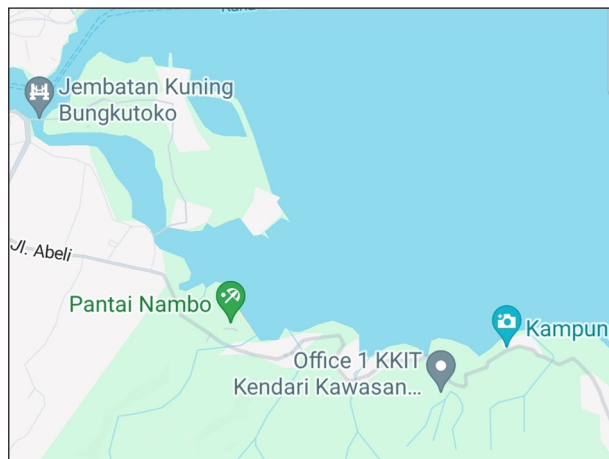


Figure 2 Coastal Area of Nambo District.

Source: Private Document.

Based on topographic maps (Figure 3), the Nambo District area is at an altitude of 0–100 m covered by lowlands with quite different ecosystems. Most land use is still focused on mangrove forests and other trees. Apart from that, the livelihoods of people in the coastal areas of Nambo District are dominated by fishermen, industrial workers and laborers. There are also other livelihoods for civil servants and others.

B. EXISTING CONDITION

The existing conditions of coastal settlements in Petoaha Village, show that there is a pattern of residential space with the characteristics of houses which are no longer in the form of stilts above the sea but in the form of ordinary houses built on embankments and rocks. The conditions of Petoaha Village, are presented as follows.

The existing condition of Petoaha Village is a residential area that has been converted into a rowing sports tourist destination, but the residential model is no longer like before with the construction of all the houses on stilts that stand above the sea because some of them have been filled in by the government as land areas. As a result of this hoarding, it forced all people to hoard each location of their house. This has an impact on the narrowing of the marine environment and the loss of

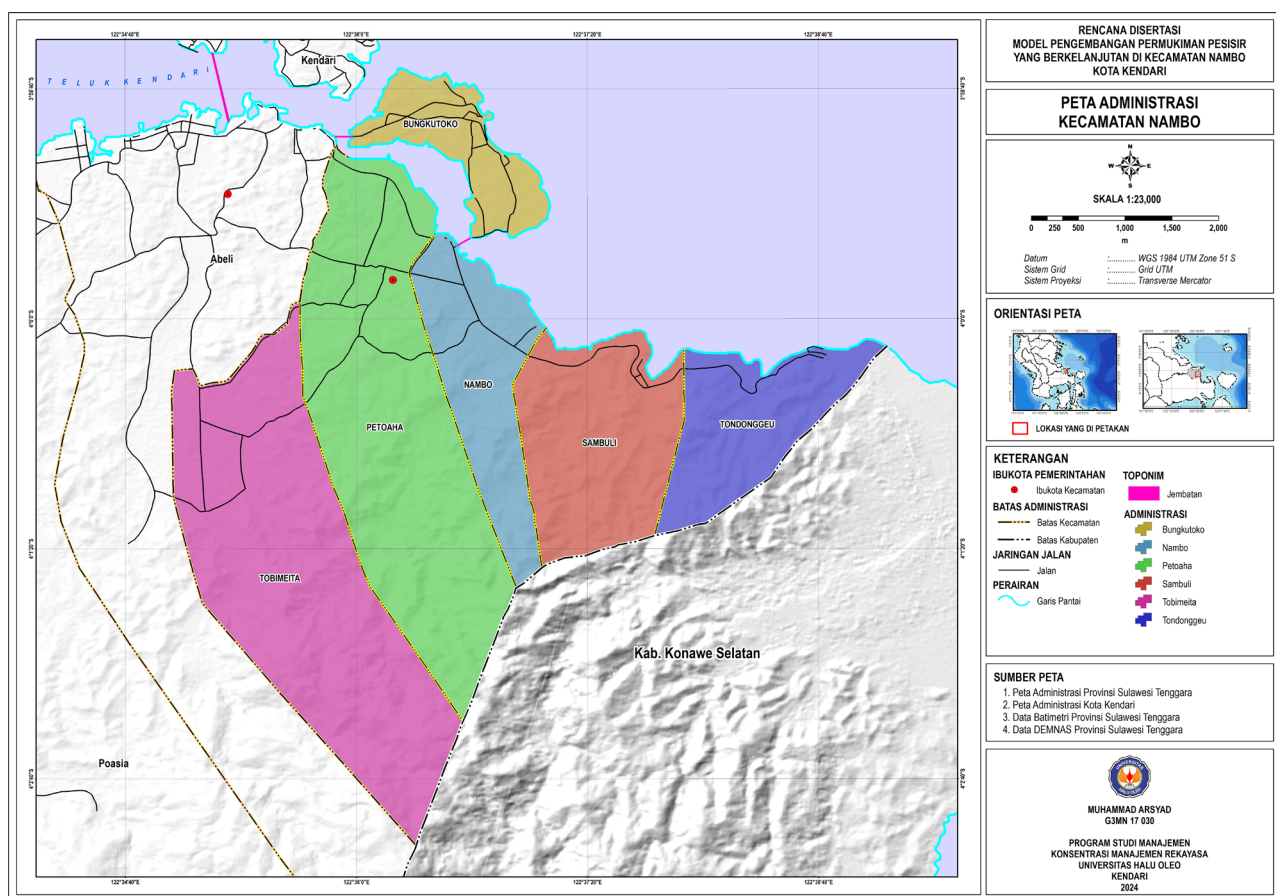


Figure 3 Environment of Petoaha Village, Nambo District, Kendari City.

Source: Author's analysis.

some of the mangrove forests in the Petoaha sub-district environment. The residents in this sub-district are mostly Bajo people who have immigrated from other areas. The settlement pattern in this area is linear on the coast with the characteristics of semi-permanent houses and built on landfill.

C. FACTORS AFFECTING COASTAL SETTLEMENTS IN PETOAHA DISTRICT, NAMBO DISTRICT, KENDARI CITY

Factors that influence coastal settlements include:

1. Environment

The coastal area of Petoaha Village, is no longer above the sea but has been turned into a land area due to the intervention of the Kendari City government by building a road along the beach which can function as an environmental road access and can be a place for mooring and repairing boats. This intervention was carried out by the Kendari City government to ensure that environmental quality is organized and improved and to hinder the development of house construction which continues to face the sea.

Apart from building environmental roads in the coastal area, the Kendari City Government also built roads at the front of the area as connecting roads between sub-districts and other sub-districts so that residential areas in the middle became inundated so that people affected by the inundation were forced to fill up their houses. renovating a house from a house on stilts to an ordinary house that is no longer on stilts (Figure 4).



Figure 4 Petoaha Village residential area.

Source: Author's analysis.

2. Socio-cultural

Communities are related to ethnicity and regional origin, such as in Petoaha Village there are the Bajo and Buton tribes, the Bajo tribe with the characteristics of living on the seashore with houses on stilts above the sea, but with the intervention of the Kendari City government which has filled up the beachside area as an access road as well as for mooring and repairing boats does not mean changing the character of the Bajo tribe to continue to depend on the sea as fishermen. The characteristics of the house's simple-and top-shape are still maintained.

The influx of community groups of residents who live in an area, as happened in Petoaha Village, most of the Bajo Tribe who come from other areas such as the outer Saponda area and other areas have settled and resided on the coast of Petoaha Village for decades.

3. Economic Conditions

The location of Petoaha Village is on the outskirts of Kendari City, however access to the City Center and work places in Kendari City can be accessed easily and in a relatively short time using either private vehicles or public transportation. The current job opportunities around Petoaha Village are fisheries, industry and services. These three sectors can become alternative places of work for children and their families.

The population living in Petoaha Village is dominated by the Bajo tribe, who generally work as fishermen who work at sea either individually or in groups with irregular income, income is very dependent on the ability to obtain the catch. This is one of the triggers for poverty which cannot meet the needs for clothing, food and shelter.

D. SUSTAINABLE COASTAL SETTLEMENT DEVELOPMENT MODEL IN PETOAHA VILLAGE

This research aims to explain the development model for coastal settlements in Petoaha Village. The used development model is a conceptual model to provide a full explanation with relevant components to be fully presented and defined. Conceptual models are descriptive in nature which describe relevant events based on a deductive process of logic or analysis and conclusions from observations.

1. Environmental Sustainability

Dense residential areas in Petoaha Village, are caused by the construction of settlements that do not use permits from the government and do not follow pre-existing settlement layouts due to the following conditions:

- a) There is extensive land control by certain parties
- b) Land that was previously empty was occupied/ inhabited illegally by groups of people such as the Bajo ethnic group, the Butonese ethnic group and the Muna ethnic group.

- c) The land wants to be reused by the owner with the consequence of dividing the land into two, most of it for the land owner and the rest for illegal settlers. This happens in forest areas.
- d) Joint decision/with the agreement of both parties, and the community wants to play an active role in the process and participate in providing ideas/thoughts.

It is hoped that the phenomenon of residential development in the coastal areas of Kendari City so that slum management can be implemented well, the slum settlement management model must be based on strong analysis by taking into account factors such as regional conditions, population characteristics, land status, building density, level of slums, conformity with spatial planning and other supporting factors and of course must be supported by valid data, both primary and secondary data, taking into account effectiveness,

efficiency, adequacy, fairness, responsiveness and target accuracy.

The conceptual model in developing coastal settlements is environmental sustainability, socio-cultural sustainability and economic sustainability.

Figure 5 shows locations that can be used for residential development. The development model used is the use of empty space/land. This empty space can be partially used for the construction of houses and green open spaces which can function as water catchments, gardens for playing and trees as protection and air conditioning and can be used for other family activities.

Figure 6 is a model for the development/construction of a new house in an area that is still empty, where the construction must leave space for open space as a green open space which can function as water catchment, protection and air conditioning and can be used as a place for other family activities such as drying fish and clothes.



Figure 5 Location of the Settlement Development plan.

Source: Author's analysis.



Figure 6 House building model.

Source: Author's analysis.

Figure 7 The shape of a house building with the use of glass in the windows which can maximize natural light during the day and reduce the use artificial lights during the day. Environmental sustainability is a healthy home model with good lighting. Lighting adapts to the function of each room at least in accordance with SNI standards.

Figure 8 The form of use of window openings/ ventilations and roof ventilation which is expected to maximize indoor air circulation so that the room remains cool/not hot while also reducing the use of air conditioning both during the day and at night.

Apart from that, one of the ways to achieve environmental sustainability is saving on the use of electrical energy. To save household electrical energy, solar panels can be installed on the roof of the building as in **Figure 9**.

2. Socio-Cultural Sustainability

The settlement development model implemented so far is the Village Improvement Program (KIP) model. KIP is a village development pattern that is based on community participation in improving environmental quality and meeting their needs. Development of socio-cultural aspects includes community activities and habits to gather, work together, cooperate and play together within the Petoaha Village environment. The relationship

between socio-cultural aspects and the settlement development model in this research is the characteristics of the shape/model of houses according to the customs of each region. Until now, Bajo tribal settlements still maintain a simple, tropical settlement model as a symbol of Bajo tribal culture.

The development of coastal settlements using a socio-cultural aspect approach aims to create a tolerant community environment that lives together in the same environment. The existence of differences in cultural customs in the coastal environment can form renewable socio-cultural groups from a combination of various ethnicities in the coastal area of Petoaha Village, Nambo District, Kendari City.



Figure 9 House with solar panels on the roof of the building.

Source: Author's analysis.

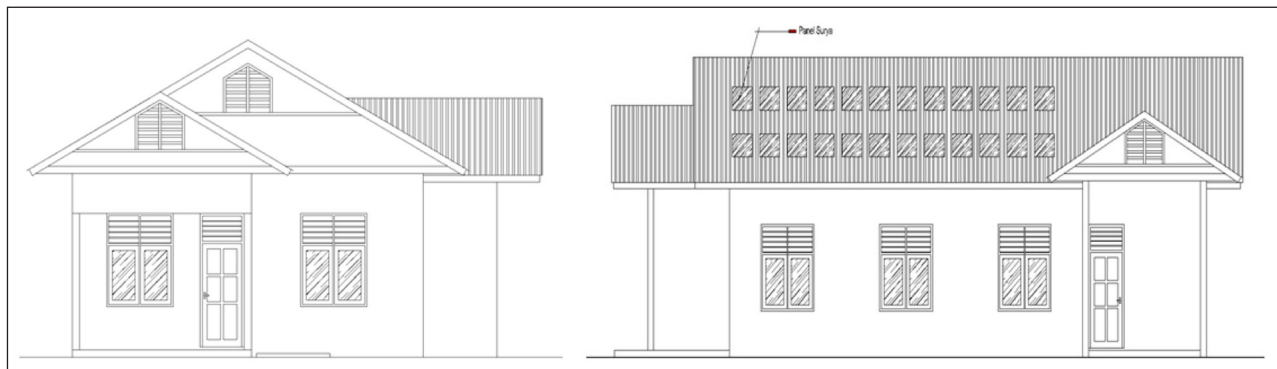


Figure 7 Model for developing houses for coastal residents with a lighting system from air ventilation.

Source: Author's analysis.

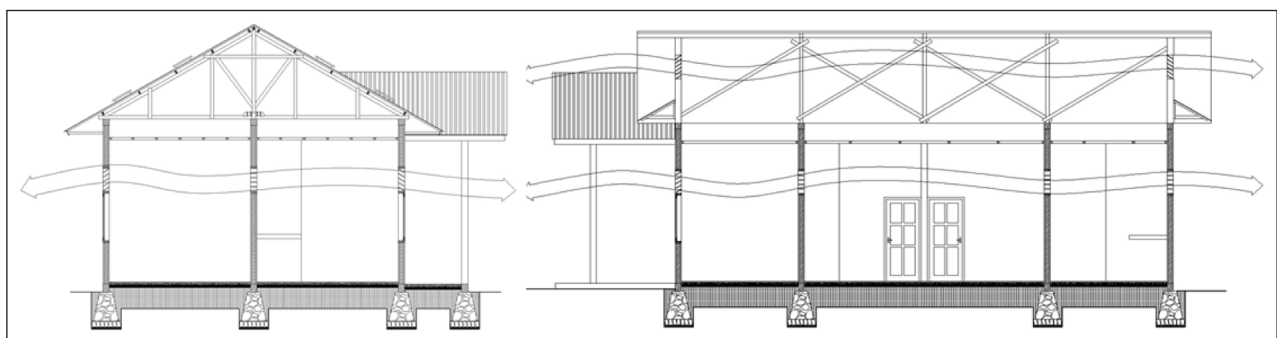


Figure 8 Air Circulation.

Source: Author's analysis.

3. Economic Sustainability

Settlement development with a conceptual model of economic sustainability for previously poor and slum communities. Currently the government has provided an economic center. The economic center in Nambo District, Kendari City includes markets, fishing docks, Pertamina companies and mining companies which can absorb local workers in Nambo District, Kendari City.

The economic aspect is directly related to residential development as a source of capital to build houses using income from employment opportunities in Nambo District, including the income of independent fishermen and groups on the coast of Petoaha Village.

CONCLUSION

The conclusions and research include:

1. The existing conditions of residential areas in Petoaha sub-district, Nambo District, Kendari City show houses with dense slum characteristics with distances between houses of less than 3 m. Slum houses are close to permanent and permanent houses so that the quality of the environment becomes slum even though some coastal areas have been turned into tourist areas and industrial areas.
2. Factors influencing regional settlement consist of non-physical factors in the form of human resource development which is still low in Nambo District. Socio-economic factors supported by the location of community activity centers such as schools, markets, companies and other activity centers aimed at generating income have now begun to have an impact on the development goals of coastal areas in Nambo District. From cultural factors, there are religious centers in the form of houses of worship for residents to carry out their religious activities. Factors that can become the main pillars in developing settlements in coastal areas to eradicate slums so that people can live healthily in a clean environment.
3. The sustainable coastal settlement development model in Petoaha Village, that is used is a conceptual model that explains the development of environmentally sustainable settlements through developing areas on land that is still empty as a location for building houses and open spaces/green open spaces and building a house that leaves open space as a space that can function as a garden and protective trees for air conditioning and other family activities. The house building is designed with glass openings/windows to maximize natural light and with sufficient ventilation for air circulation needs and the use of solar panels on the roof to save

electrical energy. Socio-cultural sustainability includes community activities and habits of gathering, working together, working together and playing together within the Petoaha Village. Meanwhile, economic sustainability includes community activities in their respective business fields by utilizing the facilities and infrastructure of nearby markets, fishing docks, Pertamina ports and mining companies as sources of income.

COMPETING INTERESTS

The authors have no competing interests to declare.

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