

Structure of coastal community occupational in responsible environmental quality at Tanjung Burung village, Tangerang regency

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Abstract. Tanjung Burung Village is an area located on the river mouth. The position makes the occupational structure of the community has a relationship with the environmental conditions of the river mouth. The occupational structure of the estuary community tends to be in the primary sector. However, at present, the environmental condition of the Cisadane River estuary has a quality degradation in terms of the intensity of river water pollution, the frequency of flooding, and the intensity of groundwater contamination. This study aims to analyze the relationship between environmental degradation and changes in occupational structure, and analysis on the quality of life of the community. In collecting and processing data, this research uses sequential exploratory strategy. This process refers to the geographical map of Tanjung Burung Village in 1996, 2006, 2016; Population data of 1995, 2000, 2005, 2011, 2016; as well as environmental quality data from 1995 to 2017. The results of this study show that within 20 years the community has strengthened occupational structure in the tertiary sector. Furthermore, the strengthening of occupational structure in the tertiary sector has not been able to improve the quality of life of Tanjung Burung villagers.

1. Background

The environment is a state, thing, or condition in which a human is in it or a complex climatic state, ranging from abiotic and biotic as a factor acting on an organism or ecological community [1]. The quality of an environment is related to the problems that often arise in the area, such as floods, pollution, erosion and others. The quality of the environment can be defined as a state of the environment that is able to support optimally human survival in an area [2]. Based on these definitions, in this study the parameters of environmental quality is determined based on the perception of TanjungBurung Village society about the physical environment condition.

Human needs are increasing, while the carrying capacity of nature is limited, causing the potential for natural resources to become increasingly larger [3]. The problems faced by cities in the river estuary are increasingly diverse as urban development. Thus causing its territory to be vulnerable to the results



of economic development undertaken. Especially attention to community communities / settlements that exist at the mouth of the river. Urban development not only changed the physical condition of the natural environment to be artificial, but also changed the social environment of society [4].

Low-income people are the most vulnerable to natural resource damage, because they lack the ability to mitigate, environmental concerns are scarce, and are likely to tend to be slow to respond as a community [5]. Attention to community communities affected by environmental quality degradation is necessary because the people who suffer the most from climate change, water pollution and air pollution are the poorer layers within the community. The occurrence of degradation of environmental quality will be responded by a community community by making livelihood changes. Especially those who depend household income on available natural resources. One of the efforts to sustain life for people under stress is to diversify, meaning finding new types of job and income [6]. It is also reinforced by Adger's statement, that responses to the negative impacts of environmental change may vary, but society typically struggles to adapt to the changing new conditions [7]. Based on the two findings described above, it can be concluded that the adaptation effort with the changing environmental conditions is by making a major livelihood change. At present the pressure experienced by the TanjungBurung Village community is the declining carrying capacity of the environment for their livelihood.

Research conducted in Brazil found within 50 years of livelihoods changes that have occurred in the community as a result of the deterioration of coastal environmental quality [8]. The form of change that occurs in the community is shifting the main livelihood of fishermen into the workforce in the field of tourism. J. Forster, et al. also conducted research on changes in livelihoods due to environmental changes in the Anguilla region of the Caribbean Islands [9]. The environmental changes referred to in this study are the incidents of Luis and Lenny storms that occurred in 1995 and 1999 respectively. Both natural events caused damage to coastal infrastructure and ecosystems that caused the number of fish in coastal areas to decrease. The results showed that the storm Luis had a significant impact on the sustainability of livelihoods of fishermen.

Decline in environmental quality not only affects the existing infrastructure, but also can affect the livelihoods of the communities. One of them is seen in research in Lagos, Nigeria. The results show that flooding and pollution occur, causing flood-affected households to experience vulnerability to their livelihoods and financial assets [10]. Based on the research that has been done then it can be concluded that the degradation of environmental quality can influence the main livelihood changes of affected community communities. The measurable deterioration in the quality of the environment and the way communities are adapting to changing the main livelihoods are the quality of river water, the frequency of floods and the quality of groundwater.

Bennet states that adaptation can be interpreted as humans' effort to adjust their life to the environment and / or the environment to their life [11]. Meanwhile, according to Harris, in order to adapt, humans observe and interpret the symptoms and changes that occur in the environment and the ways they deem less effective to achieve their goals will be replaced by new ways, on the contrary the ways which they consider effective will continue to be maintained and passed on through socialization [12].

New ways that are considered effective by changing the primary livelihood of every household in a community will change the occupational structure within the community itself. The occupational structure is the full-time engagement in part or whole of the work task force by persons involved as well as by society [13]. Horizontally, the classification of occupational structures is classified into primary sectors (agriculture, mining, etc.), secondary (industrial goods), and tertiary (services and trade). Further analysis of changes in occupational structures within a particular community needs to be done to determine the impact on such changes.

The form of analysis that can be done is to measure the quality of life of the community. The measurement of the quality of life of a community has been developed by *Truckee Meadows Community* and examples of the quality of life of a community described by M. Joseph Sirgy et al. [14]. In addition, the Indonesian Central Bureau of Statistics has also issued indicators to measure the quality of life of every household in Indonesia [15]. Measurement variables from the three sources if used in the context of the variables that can be used in this study are housing, education, jobs, entrepreneurship, finance and vehicles that occur in the midst of society with the degradation of environmental quality.

Based on the description above then I see the need for research in Indonesia who conduct studies on changes in occupational structure of the community in the estuary of the river. The study specifically looked at the relationship between environmental degradation that occurred with changes in occupational structure of society. Therefore, based on the results of observation and some information from media research with the topic is very suitable to be done in the Village of TanjungBurung, Teluknaga District, Tangerang Regency.

Selection of TanjungBurung Village area as a research location because of the location of the existing settlement is right on the estuary / river body. This area is also flanked by two big cities which are only less than 5 Km namely North Jakarta and Tangerang City. Its location which is in the estuary makes the area of TanjungBurung Village become a place for urban wastes that go into the Cisadane River. Particularly 7 districts and residential areas crossed by the Cisadane River. Various types of industrial and settlement area activities along the Cisadane River Basin (DAS) provide a high pollution load input. What is directly seen at this time is the piles of garbage in the mouth of the river estuary located in the area of TanjungBurung Village.

The area of TanjungBurung Village is not only affected by domestic waste, but routinely in the last 20 years has been flooded. Under these conditions, the people who still use the river water for economic activities or as the main source of livelihood will feel the negative impact. One of the impacts is to change the main livelihood or increase the cost of living to get a decent source of clean water. Based on these assumptions and observations, the phenomenon of environmental degradation occurring in TanjungBurung Village directly has the impact of changing the socio-economic structure of society.

Based on the environmental conditions and preliminary data obtained, an analysis of occupational structures formed during the period of 1995 - 2017 needs to be done in greater depth. In that time span, livelihood changes are related to river water quality data, flood intensity and ground water quality as a whole that has the possibility of being a determinant factor in changes in livelihood structures. And do a further analysis on the quality of life of the community of TanjungBurung Village today.

2. Research Methods

This research uses a mixed method with sequential explanatory strategy approach the use of this method is done because of the limited data needed to reach the purpose of research. The limited data are environmental quality consisting of river water quality, ground water and flood that occurred in 1995-2015 period. Therefore, to get the data from the past then conducted qualitative approach by doing observation, *focus group discussion* (directional discussion), and processing of visual data.

The sequential exploratory strategy approach, involves the collection and analysis of qualitative data in the first phase, followed by the collection and analysis of quantitative data in the second stage based on the results of the first stage [16]. At the most basic level, the goal of this strategy is to use quantitative data and results to help interpret qualitative findings.

Sequential exploratory strategies are often used as a research procedure when the researcher needs to make an instrument due to an existing instrument that is not feasible or unavailable. In the case of

this study the instrument to be collected is the occupational structure of society within a certain period and the factors that cause the occupational structure to change in each period that has been determined.

To make the instrument, the research carried out through three stages: first, collecting qualitative data and analyzing, then the results of the analysis were used to make an instrument, which was then adjusted for the sample population of, briefly the process is as follows:

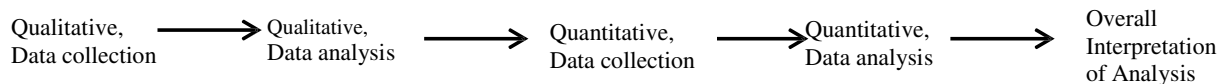


Figure 1. Sequential Exploratory Strategies

This study was conducted within 12 months, starting from May 2016 until May 2017. The selection of the time range was adjusted to the needs of qualitative data collection. Within that span of qualitative data collection takes approximately 8 months and 4 months for the collection and processing of quantitative data.

Primary data in the form of qualitative obtained through the process of directed discussion (FGD), observation and interpretation of documentation results. Focused discussion involves 16 people with age group > 50 years 4 persons, 35 - 49 years 6 persons, and <35 years 6 persons. Those who participated in the FGD were community leaders, representatives of village government, religious leaders, and representatives of several existing NGOs and youth organizations. This process focuses on collecting information and data regarding environmental conditions and occupational structure in general. The reference in the focus discussion is the geographical map of TanjungBurung Village in 1996, 2006, and 2016. Data analysis in this stage is done by triangulation of data, which is interpreting data with descriptive analysis. Stages of data analysis consist of three parts, namely data reduction, data presentation, and withdrawal of conclusions.

Quantitative method used is descriptive statistics method. The use of this method to determine the perception of 60 households against the three indicators of environmental degradation and major livelihoods changes in the last 20 years. The time span is then divided into four periods of time ie 1995 - 2000, 2001 - 2006, 2007 - 2012, and 2013 - 2017.

3. Result and Discussion

The identification of environmental degradation is done by analyzing the geographical condition, for example coastal / coastline change in TanjungBurung Village. The changes can be seen based on Landsat satellite imagery in 1996, 2006 to 2016. Here are the results obtained based on a span of 20 years.



Figure 2. Territory of land and change mouth of estuary in Tanjung Burung Village 1996 (a), 2006 (b), and 2016 (c)

The satellite imagery in Fig.2 shows the red-circle portion of the increment of land area and shoreline changes in the estuary of Cisadane River. These changes occur within 20 years caused by sedimentation that accumulate in the mouth of the estuary. Nowadays with the emergence of the river delta, some residents utilize it by constructing new ponds. Additional notes related to the Focus Group Discussion results are as follows:

- a. In 1995 the fishpond in TanjungBurung Village was very productive, so almost all economic activity in the area was heavily dependent on the pond area. According to the residents in the FGD session, the water source used to fill the ponds is the Cisadane River water. The use of river water is done because in 1995 - 2000 the water quality of the Cisadane River is still good and has not shown any signs of contamination.
- b. In 1996, shrimp farms were stricken with diseases and caused most of the ponds to have failed crops. In the same year, the flood disaster began to hit the area of TanjungBurung Village which coincided with the increasing number of garbage piles at the mouth of the river.
- c. The years 2001 - 2005 became the worst year for the flood disaster that hit areas in RW 05, 06, 07 and 08, based on information obtained, the flood at that time could reach a height of 1.5 meters. One of the causes of the flood is the failure of the Ciliwung River's stream diversion project resulting in high levels of sedimentation at the river mouth.
- d. In 2006 - 2015, most of the people have started to switch to other livelihoods. Out of 15 FGD participants only 1 person retained their main livelihood as fishermen and 1 farmer. Most FGD participants said that the main reason they changed their livelihood was the less income generated from their previous jobs.

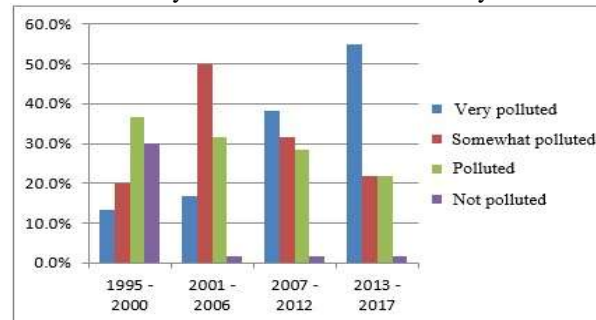
3.1. Measurement of Environmental Quality Indicators

To strengthen the data obtained from FGD results, followed by a survey to 60 households. The results of the survey to 60 respondents get perception about the quality of the physical environment that can affect the main livelihood changes of the community is the condition of river water, groundwater, and flood frequency that occurs in the residential area. This is based on the results of previous research conducted in the Tigray region, Ethiopia. In addition to these three indicators, the study also found 12 other indicators that could affect livelihoods change in the region [17]. However, not all indicators found in research can be used for the research conducted in Indonesia, especially in the estuary area of the river.

Based on the results of the analysis of the form of environmental degradation that occurred in TanjungBurung Village, it has changed from the polluted category to be highly polluted as in indicators of river water quality and groundwater quality. While the flood frequency indicator included in the category often, with the number of occurrences an average of 5 times a year. The decline began to occur in the period 2001 - 2006 and continues until 2017. The environmental conditions are no longer able to

support the livelihoods of people working in the primary sector. Since livelihoods in the primary sector (agriculture, fishing, and fish farm) are highly dependent on the quality of the environment to obtain maximum results. The results of the analysis of the three indicators used in this study looks as follows:

Graph 1. The Intensity of Contamination in Estuary of Cisadane River

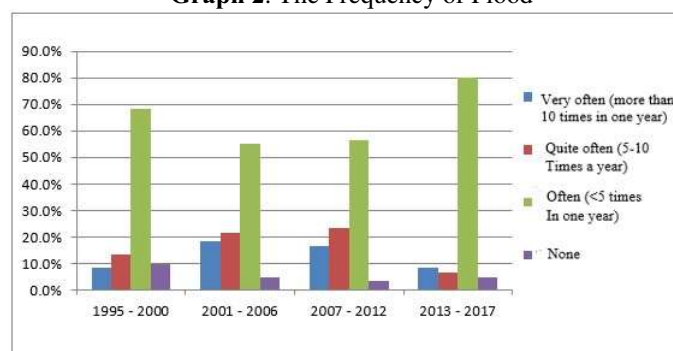


Source: Research result, 2017

Graph 1 shows that more than half of respondents rated the river as being in a very polluted category. This category refers to physical indicators that can be seen directly by the people of color, smell, and taste. The findings in this survey are in the odor indicator, currently within a certain time the river water emits a very stinging smell. According to residents, the smell that arises like the smell of garbage and can last up to 7 days. The cause of the smell is not known for sure, because it only arises at a certain time when the dry season arrives. Based on the information obtained during the FGD, the smell will occur in August - October. Based on the results of FGD and survey conducted concluded that the flavor changes have also occurred in the river water. This is reinforced by the narrative of one of the participants directed discussion.

"From 1995 to 1997 some households still use river water as a source of drinking water, although at that time toilet activities were still done in the river. But after it was discovered that the pig farm waste belonging to the company in front was dumped in the river, the residents no longer consume the river water. "(Participant of FGD 05, October 2, 2016)

Graph 2. The Frequency of Flood



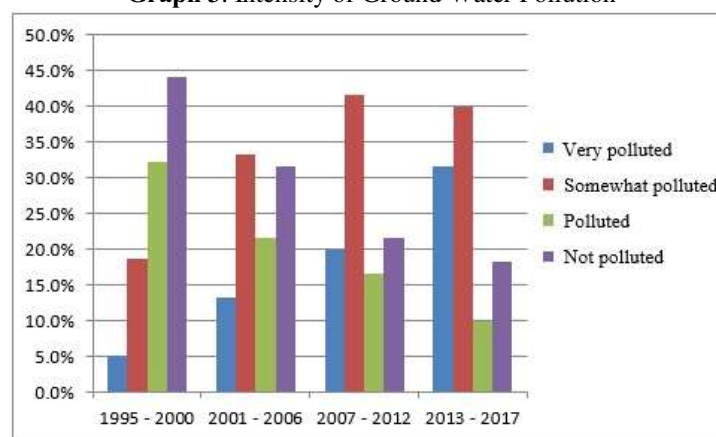
Source: Research result, 2017

The floods in TanjungBurung Village are caused by two floods due to the influence of tides and floods due to the high volume of water entering along the Cisadane River basin. Because of the location of the area is quite low, for example the entire residential area is at an altitude of 0.5 to 6 meters from the sea surface then the Village of TanjungBurung often experience flood.

In general, based on survey results conducted, the frequency of flood events did not change significantly in the period 1995 - 2017. The survey results showed floods into the frequent category, for example less than 5 times the incidence of flooding in one year. The main cause of the flood in this survey is the rainfall which is quite high in the rainy season, such as in January - March. In those months the volume of water that exists on the Cisadane River exceeds the height of the river cliffs, which then causes flooding or puddles in the area on the banks of the river. The decrease in the frequency of floods is caused by changes in the mouth condition of the estuary previously narrowed by the piles of garbage and sedimentation, then divided into two parts naturally as a result of the dropping of sedimentation land at the mouth of the estuary in 2013. Conclusions from the results of the survey, FGD, and interviews conducted can be concluded that, the flood that occurred in TanjungBurung Village did not change significantly in the four periods reviewed. But the differences in each event can be seen at the height of the inundation that occurs.

The results of data collection on the intensity of groundwater pollution occurring in TanjungBurung Village are shown in graph 3. The data obtained is the perception of TanjungBurung Village community to the intensity of groundwater contamination. Graph 3 shows that there was a 26.6% increase in perception for the highly polluted category within the period 1995 - 2017, and vice versa in the non-polluted category.

Graph 3. Intensity of Ground Water Pollution



Source: Research result, 2017

Increased perceptions of residents about the contamination of ground water in TanjungBurung Village are presented based on physical indicators that can be observed and felt in existing ground water. According to residents (FGD 09, October 2016) at the FGD session, ground water (well water) in 1995 - 1997 is still used as a source of clean water. At that time the groundwater is still clear, does not cause odor and only sometimes still feels brackish. However, since the early 2000s several wells have changed the quality of water. The cause of residents no longer use ground water as a source of clean water is the incidence of smell like rotten eggs, the change of taste becomes salty, and water becomes turbid. With these physical conditions, ground water is slowly no longer used as a source of clean water. Since 2003 countless people no longer use well water as a source of clean water.

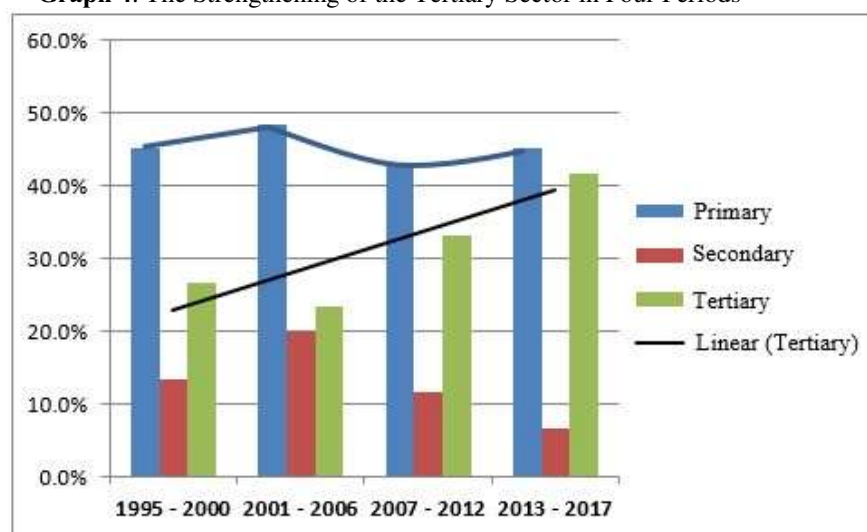
The community's current water needs are obtained by purchasing through an individual private water company, which is transported by truck to the house of an ordering citizen or to an existing storage tank. Until now the activity is still ongoing, to meet the needs of clean water citizens. Water transport trucks usually deliver water to residents in the morning and evening.

3.2. Changing Occupational Structure

Based on the results of a survey, the main livelihood changes in the period of 1995 - 2017 can be concluded that the environmental condition of TanjungBurung Village has changed. One of the impacts of environmental degradation resulted in shrimp farming business developed by the community in the 1990s experiencing crop failure due to disease in 1996. The incident then triggered the early shift of the livelihood of the people of TanjungBurung Village.

Livelihood changes are a normal condition when a community group is under pressure. However, in the context of Indonesia, it is not in accordance with the opinion of Adger, N., because changes in livelihood structures in the last 20 years in TanjungBurung Village show people again choose to work in the primary sector after changing the livelihood structure in 10 years as seen in graph 4.

Graph 4. The Strengthening of the Tertiary Sector in Four Periods



Source: Data Researcher, 2017

Graph 4 shows that the primary sector is still becoming the main livelihood of TanjungBurung Village community for the time being. Although in the period 2007 - 2012 has decreased, the decrease in the number of people working in the sector is due to the increased intensity of ground water pollution that occurred in the previous period. However, after changing their livelihoods, 1.8% of people chose to work in the primary sector again in the next period (2013 - 2017).

The tertiary sector is a very significant increase of 15%, as shown by the linear line on the graph 5. The increasing number of people choosing to work in the tertiary sector is likely to be caused by fishing ponds visited by visitors from outside Tanjung Bird every weekend. These conditions led to the opening of opportunities for entrepreneurship as small traders who provide fishing and food stalls.

Ideally the changes that occur improve the quality of life of the people of TanjungBurung Village who have been under pressure due to environmental changes. Therefore, to measure the quality of life of the community after undergoing changes in occupational structure, further analysis on the quality of life of the people of TanjungBurung Village.

3.3. Quality of Life Analysis of TanjungBurung Village Community

Based on the results of the analysis of the existing literature [14] obtained six indicators that can be used in measuring the quality of life of the community of TanjungBurung Village [15]. The six indicators are housing, education, employment, business ownership, finance, and vehicles. Based on the calculation of existing scores, the category of quality of life of the people of TanjungBurung Village can be grouped into three levels in accordance with the acquisition of the total score of all respondents surveyed. Grouping of these categories is as follows:

1. High quality of life if the total score is in the range 2582.8 - 3303.6 points
2. Medium quality of life if the total score is in the range 1862 - 2582.8 points
3. Low quality of life if the total score is in the range 1141.2 - 1862 points

The division of the three categories above is done by dividing the value between maximum and minimum ranges into three equal intervals. The use of the method is done because there is no preliminary data about the quality of life of TanjungBurung villagers. Based on the results of survey and data processing on the quality of life of the people of TanjungBurung village obtained a total score of 1709 points, with details of the scores for each indicator is as follows:

Table 1. The Acquisition of Life Quality Indicators of TanjungBurung Village Community

Life Quality Indicator	Obtaining score	Maximum Score	Minimum Score
Housing	620	1380	480
Education	218	540	120
Working	311	420	180
Entrepreneurship	197	303,6	121,2
Finance	172	360	120
Vehicle	191	300	120
Total Score	1709	3303,6	1141,2

Source: Data Survey, 2017

Table 1 shows that the quality of life of TanjungBurung Village is at a low level with a total score of 1709 points, ranging from 1141.2 to 1862 points. If referring to the observation result, this condition is very appropriate. Particularly on the housing and education aspects, both indicators received the lowest rating scores because most of the houses belonging to the TanjungBurung villagers were still semi-permanent, while access to the nearest primary school education. For the education level, most household heads are also at the lowest level, ie 60% of household heads only complete primary school education.

With the scoring at low level, it can be concluded that the strengthening of tertiary sector occupational structure in the TanjungBurung Village community in responding to environmental quality changes has not been able to improve the quality of household life. The result of the analysis shows that the education level of head of household becomes one of the causes. With low levels of education, understanding and knowledge of new livelihoods is limited.

4. Conclusions

Based on the findings obtained in this study can be drawn conclusions:

1. The form of environmental degradation occurring in TanjungBurung Village has changed from polluted category to highly pollute for river water quality indicators and groundwater quality. While the flood frequency indicator included in the category often, with the number of occurrences an average of 5 times a year.
2. Changes in occupational structure have not occurred significantly yet, but the analysis shows that there is a strengthening of occupational structure in the tertiary sector in the four time periods studied. The strengthening of occupational structure in the sector is influenced by the increasing number of people who become small traders in TanjungBurung Village.
3. The environmental quality of TanjungBurung Village has decreased in the three indicators

reviewed, namely river pollution intensity, flood frequency, and intensity of groundwater contamination. The main livelihood changes are then changing the occupational structure of society from the primary sector to the tertiary sector.

4. The strengthening of tertiary sector occupational structure in TanjungBurung Village communities in responding to environmental quality changes has not been able to improve the quality of household life. The results of the analysis indicate that the quality of life of TanjungBurung Village is still at a low level.

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