



Impact Of Reservoir Construction on Community Welfare

Study on Communities in the Semantok Reservoir Environment Sambikerep Village-Rejoso District-Nganjuk Regency

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Abstract. The construction of the reservoir is expected to function in addition to: preventing floods, storing water for irrigation in the dry season, a recreation area, creating new job opportunities for local residents, it is also expected to have an impact on improving the welfare of the people living in the surrounding environment. Based on the use of survey methods with descriptive quantitative data analysis in the community of Sambikerep Village, Rejoso District, Nganjuk Regency, where the construction of the Semantok Reservoir has been completed, this condition is interesting to find and show the impact of the existence of the reservoir on welfare. The results of the research carried out found the following things: 1). According to the respondents' opinion, the construction of the Semantok Reservoir was 52.2% who felt they were more prosperous, while those who thought the existence of the reservoir was the same was 41.1%, and those who thought the existence of the Semantok Reservoir development had not changed the welfare of the community and tended to decrease their welfare was 6.6% of respondents. . 2). Apart from that, the results of the analysis found that there was a negative correlation between the distance to community settlements and the existence of the Semantok Reservoir. This means that in the research area the greater the distance between community settlements and the existence of the Semantok Reservoir, the less prosperous the community is

Keywords: Impact; Existence of Reservoirs; Public welfare.

1 INTRODUCTION

Development continues and has changed the environment on this earth a lot. Development goals are none other than intended as much as possible for human interests. In the new environmental paradigm it is stated that *The view that humans represent only one among many species on the Planet Earth, that human activities are determined by*

the environment as well as by social and cultural factors, and that humans are strongly dependent upon the environment and its resources [10].

The construction of the Semantok reservoir in Rejos District, Nganjuk Regency is an example of the dynamics of environmental development which has changed the environment which was previously intended for rice fields, settlements, moorland and forestry areas. The inundation area of the Semantok Reservoir is 365 hectares. The construction of the Semantok Reservoir is expected to be useful in reducing the risk of flooding by 137 cubic meters per second in downstream areas during the rainy season. Apart from that, the existence of the Semantok Reservoir is expected to increase employment opportunities for people living in the surrounding environment. The history of the construction of the Semantok Reservoir in Rejos District, Nganjuk Regency, which was planned for 2019, was completed in 2022 and its use was inaugurated in 2023 by the President of Indonesia.

The main function of building a reservoir is to withstand flooding and provide irrigation water in the dry season, so according to the Minister of Public Works and Public Housing (PUPR), it is hoped that it will also function as a tourist attraction so that it will provide added value to the existence of the Semantok Reservoir. The idea of adding value to the existence of the Semantok Reservoir is expected to provide an increase in income for the local community while still ensuring a sustainable environment [6].

Therefore, after 2 years of construction of the Semantok Reservoir, this time period is quite interesting to evaluate whether the development has had an impact on the welfare of the people living around the reservoir. According to [4], increasing community welfare can be used as an indicator of the success of a development process. Thus, the Semantok Reservoir as a new environment that is ecologically-economical and social is expected to have an impact on the lives of humans/communities who live around the environment, and ultimately is expected to create prosperity for the community. The definition of prosperity, according to the Big Indonesian Dictionary, refers to a situation that is safe, peaceful and prosperous. Safe means free from danger and interference. A safe life signifies a life that is free from all difficulties and disasters. So, a peaceful life is living in an atmosphere of safety, peace and no chaos. In a broader sense, prosperity is the liberation of a person from the bonds of poverty, igno-

rance and fear so that he can gain life. which is safe and peaceful both physically and spiritually [8].

Community welfare is the main source of the development goals that we implement. The definition of society that is the target of development is a number of people who are bound by a culture that they consider to be the same. According to [5] the definition of society is something comprehensive that includes various parts that are related systematically-functionally. In general, the definition of society can be concluded that a group of people who live together in a certain area for a relatively long time then form rules and norms which will later become a culture [7]. Then, community welfare referred to in this research is the condition of fulfilling basic needs which is reflected in a decent house, adequate clothing and food needs, cheap and quality education and health costs or a condition where each individual is able to maximize his utility at a certain level of budget limit and conditions. where physical and spiritual needs are met. [2]

With the background of the completion of the construction of the Semantok Reservoir, it is interesting to research by formulating research problems in the form of research questions, namely 1). After the completion of the construction of the Semantok reservoir, will it also have an impact on the welfare of the people of Sambikerep Village, Rejos District, Nganjuk Regency? Then proceed with formulation 2). What is the correlation between the distance between people's residence and the location of the Semantok Reservoir and the welfare obtained after the construction of the Semantok Reservoir?

2 RESEARCH METHODOLOGY

2.1 Type of Research

This research uses survey research methods, quantitative descriptive. The research location is in Sambikerep Village, Rejos District, Nganjuk Regency. Sambikerep Village is where the Semantok Reservoir is located. In this way, the impact of the construction of the Semantok Reservoir can be felt directly by the Sambikerep village community [12].

2.2 Population and sample

The population in this study were people who lived in Sambikerep Village, Rejoso District, Nganjuk Regency, East Java before the construction of the Reservoir. The construction of the Semantok Reservoir has now been completed. The population for this research is people who are registered as residents of Sambikerep Village - Rejoso District with a total of 3,003 people [1].

Then in the research carried out, to carry out sampling, a random sampling technique was chosen. The Slovin method was used to determine the sample size. The Slovin formula for determining the sample size is as follows:

$$n = \frac{N}{1 + N(e)^2}$$

Information:

n = Sample size/number of respondents

N = Population

e = Percentage of allowance for sampling accuracy that can still be tolerated (tolerance level)

The tolerance level in the Slovin formula is :

Mark e = 0,01 (1%)

Mark e = 0,05 (5%)

Mark e = 0,1 (10%)

In this study, researchers took the value "e" with a tolerance level of 0.1 (10%).

Based on the existing population of 3,003, based on the Slovin formula, the number of samples obtained was 90 respondents.

2.3 Data Collection Techniques

There are various techniques used to obtain research data, including: interviews, questionnaires, observation and documentation. Interviews and questionnaires were used to obtain data from respondents regarding their current welfare after the construction of the Semantok Reservoir. Then observation and documentation techniques are carried out to find out records of the condition of facilities in the environment which become supporting data for community welfare [13].

2.4 Data Analysis Techniques

The data analysis technique in this research uses quantitative descriptive statistics. Based on the information on questions/responses, the community is classified into

three categories, namely: 1) More prosperous, 2). It's the same, and 3) Not prosperous. Based on the 10 questions that have been prepared, the answer to the item, if the answer is more prosperous, is given a point/weight of 3, if the answer is prosperity, the answer is the same, it is given a point/weight of 2, and if the answer is less prosperous, it is given a point of 1.

Thus, according to the classification of welfare measures, if they are categorized into 3 classes, the welfare classification is as follows:

Table. 1. Range Figures & Welfare Classification

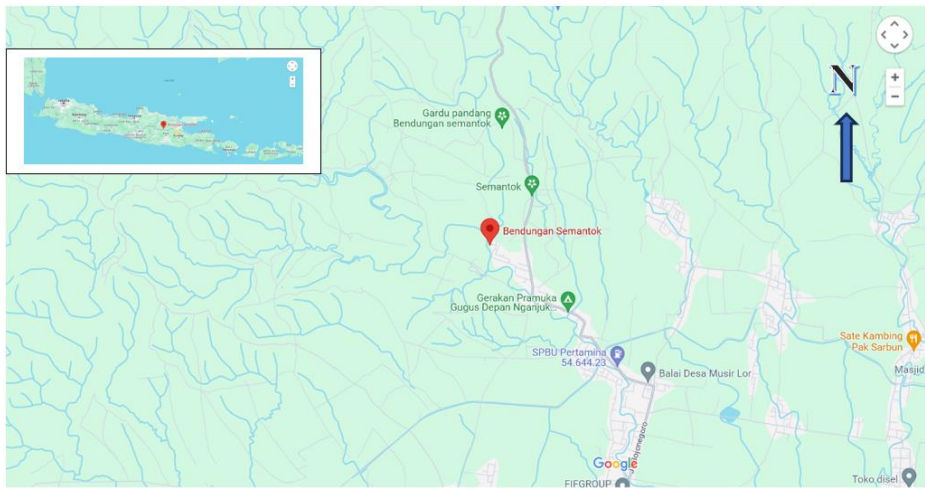
No	Score Range of Welfare	Classification Welfare
1.	>23-30	More prosperous
2.	17-23	It's the same
3.	10-<17	Not prosperous

Sources : Primary data processing

3 RESEARCH RESULTS

3.1 Conditions of the Research Area

Figure 1. Map of Researched Area



Sources : Google Map and By Modification

General Condition.

Sambikerep Village is a village that is part of the area within Rejos District, Nganjuk Regency, East Java Province, Indonesia. Sambi Kerep Village is located at the coordinate point, latitude: -7.4646112 and longitude: 111.9000093, has an area of 2,614.83 square km. With a total population of 3,303 people, consisting of 1,633 people who are male and 1,670 people who are female. The position of Sambikerep Village is on the Nganjuk to Bojonegoro road.

The distance between Sambikerep Village where the Semantok Reservoir is located and the sub-district capital is 8 kilometers, while the distance from the district capital is 30 kilometers. Sambikerep Village also borders the teak forest area belonging to the Forestry Department. The Semantok Reservoir was built in December 2017 with a vertical core zone type which has a height of 38.5 meters and a peak length of 3,100 meters. The reservoir, which is located in Kedungpingit Hamlet, Sambikerep Village, Rejos District - Nganjuk Regency, is designed to have a capacity of 32.67 million m³, sourced from the flow of the Semantok River. This reservoir, which is equipped with an irrigation network, can function as a water channel during the dry season to prevent drought in the 1,900 hectares (ha) of rice fields. Thus, the existence of reser-

voirs/dams will increase agricultural production in the area. With a pool area of 365 hectares, another benefit of the Semantok Reservoir/Dam is reducing the risk of flooding by 137 m³/second in downstream areas flowed by the Semantok River during the rainy season. The Semantok River with a length of around 18.19 km and a catchment area of around 54,032 km² has an average inflow volume of 64.77 m³/year.

Community Work.

Based on data from the Central Statistics Agency of Nganjuk Regency in 2017/2018, the types of work of the people of Sambikerep Village, Rejoso subdistrict, Nganjuk Regency are as follow

Table 2. Sambikerep Village Community-Rejoso District According to Type of Work

No	Type of Work	Account
1.	Farming	681
2.	Farmer worker	158
3.	Carpenter	15
4.	Enterprenuer	43
5.	Civil servants/Police/Army	25

Sources: the Central Statistics Agency of Nganjuk Regency in 2017/2018

Educational Level.

The education of the people of Sambikerep Village according to their level is as follows

Table 3. Community of Sambikerep Village-Rejoso District-Nganjuk Regency According to Educational Level

No	Educational Level	Account
1.	Pre-school/Early Childhood Scholl	127
2.	Elementary Scholl	967
3.	Junior Scholl	638
4.	Senior Hight Scholl	331

Source: Sambikerep Village Monograph, 2023

3.2 Community Welfare After Reservoir Construction

The welfare conditions of the people of Sambikerep village, Rejoso subdistrict, Nganjuk district after the completion of the construction of the Semantok Reservoir are as follows:

Table 4. Community Welfare Conditions According to Respondents' Opinions After the Construction of the Semantok Reservoir

No	Variabel of welfare	More Prosperous	Just the same	Less prosperous
1.	Income now compared to before the existence of the reservoir	35	45	10
2.	The amount of financial expenditure now compared to before the existence of the reservoir	45	25	20
4.	The condition of residential facilities now is compared to before the existence of the reservoir	70	20	0
5.	The availability of health facilities is now compared to before the reservoir existed	80	10	0
6.	The state of health services now compared to before the reservoir existed	80	10	0
7.	The current state of educational services compared to before the dam existed	10	70	10
8.	Ease of getting a job now compared to before the reservoir	40	50	0

9.	The current state of family welfare compared to before the existence of the reservoir	20	60	10
10.	The state of environmental security now is compared to before the existence of the reservoir	30	50	10
Average		47 (52,2%)	37 (41,1%)	6 (6,6%)

Source: Primary data processing

Based on the results of calculating the average of each community welfare variable, it is presented as follows

Table 5. Recapitulation of Research Area Community Opinions Regarding Welfare After Reservoir Construction

No	Clasification	Account (%)
1.	More Welfare	47 (52,2%)
2.	Same	37 (41,1%)
3	Least	6 (6%)

Sources : Processing of Primary data

Based on table 5, it is relatively known that the existence of the Semantok Reservoir has made the community prosperous by 52.2%, while 41.1% stated that the existence of the Semantok Reservoir construction was the same, and 6% said that after the existence of the Semantok Reservoir their welfare was reduced/decreased.

3.3 Correlation between the distance from people's houses and the existence of reservoirs

As a parameter to determine the use of the Semantok Reservoir for the people who live in its environment and ultimately create community welfare, a measure of distance is approached. Hypothetically, people who live closer to the reservoir will gain more benefits and be more prosperous. Conversely, people who live further away from the reservoir get fewer benefits from the presence of the reservoir. The relationship between the benefits of the existence of a reservoir and community welfare is

hypothesized to be positively related. The closer a community's residential location is to the reservoir, the higher their welfare.

Based on the results of secondary and primary data collection, the average distance between community settlements and the reservoir is 850 meters, while the furthest distance between the settlement and the presence of the reservoir is 1500 meters, and the closest distance between community settlements and the reservoir is 200 meters.

Based on the results of correlation analysis of spatial data, especially regarding the correlation between the distance of community residences and the position of the Semantok Reservoir, it is known that the magnitude of the correlation is -0.02948. The meaning of the correlation number is a number that shows the direction and strength of the relationship between two variables. The bivariate correlation relationship is very weak between the distance of the residence and the presence of the reservoir. Two correlated variables run in opposite directions. This means that the farther the people's houses are from the reservoir, the lower the level of social welfare among the residents of Sambikerep Village where the research was conducted.

4 DISCUSSION

4.1 Welfare of the Sambikerep village community after the Semantok Reservoir was built

Refers to a new paradigm in environmental management that development goals culminate in achieving human welfare. The development of a project is expected to have a positive impact on people's live, especially in communities living in the area where the project is being built. However, it is not as easy as expected that the impact of development does not all fulfill one hundred percent of the people's desires in order to achieve a prosperous life.

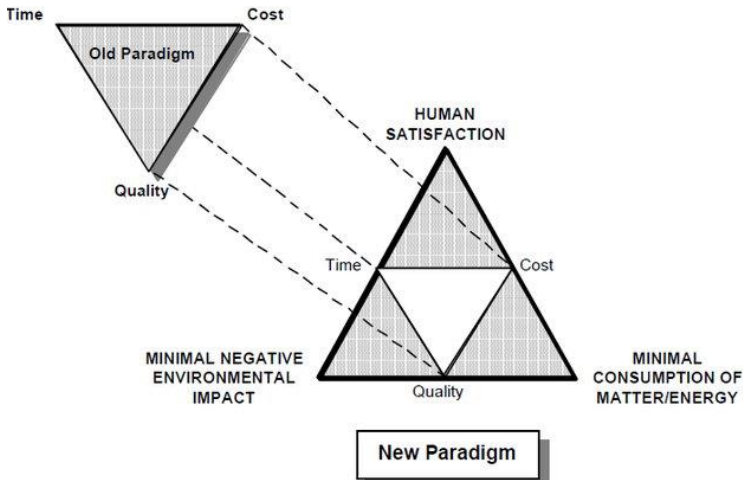


Figure 2. A New Paradigm: Traditional to Sustainable Design and Construction (Vanegas, DuBose and Pearce, 1996)

In the new paradigm, successful environmental management is determined by ecological, economic and socio-cultural factors. The success of sustainable development is supported by minimizing negative environmental impacts, human satisfaction and minimal consumption of energy.

Based on the results of community interviews to measure the welfare of the community in Sambikerep Village after the construction of the Semantok Reservoir in their area, it is known that 52.2% of the community said they were more prosperous, 41.1% said their welfare was the same both before and after the existence of the Semantok Reservoir, and 6% people say they are less prosperous. The facts from the results of this research prove that not one hundred percent of the impacts of this development can be felt by the community properly.

Referring to [15] with the title "Analysis of Factors Affecting Community Welfare in Central Java Province". The results of this research show that of the 8 welfare variables, only 2 factors influence the welfare of the people in Central Java province, namely: Socio-economic factors. Socio-economic factors are the most dominant factors influencing people's welfare in Central Java, namely 48.5%. In the research we conducted in Sambikerep village, Rejoso subdistrict, Nganjuk district, the dominant/larger factor influencing the welfare of the community/respondents was the availability of health facilities, increasing health services, the availability of commu-

nity residence/housing facilities. Thus, the welfare factors from the research we conducted are different from [15] research. This difference occurs because the variables used are different.

Then if the research we conducted is compared with similar research, it has the same object, namely the function of building reservoirs to improve welfare, namely research prepared by [11] on the Gunungrowo Reservoir, Sitaluhur Village, Gembong District, Pati Regency." By using a qualitative approach, the results of this research show that the function of the Gunungrowo reservoir as flood control has created a sense of security in the community regarding the threat of flooding. This sense of security is also an indicator of prosperity. This welfare indicator is different between the research we conducted and [11]. [11] research measures welfare from feelings of security against flooding, while the research we conducted measures welfare referring to BPS. Therefore, in the context of the research we conducted, the welfare of the community that we are paying attention to is after the existence of the Semantok Reservoir, what are the variables such as: income earned, condition of residence, availability of health facilities, condition of health services, condition of education services, ease of obtaining work, family welfare, and security conditions.

4.2 Correlation between Welfare and the Distance of the Reservoir to People's Houses

Based on theorization that analyzes the correlation between welfare variables and the distance variable between the existence of locations which are hypothesized to be the source/cause of community welfare. In the context of distance theory, there are two known types, namely relative distance and absolute distance. The relative distance in question is the distance measured not based on commonly used distance measuring instruments such as meters or miles. Meanwhile, absolute distance is the distance between two points or the distance between two places as measured by a distance measuring instrument, namely meters or miles. [14] [10] In the research we conducted, the distance between the existence of the Semantok Reservoir and the residential location of the community we chose was an absolute distance. The unit of distance measurement used is meters.

Referring to the results of the correlation analysis between welfare and the distance between people's houses of -0.02948 , the meaning of this figure is that there is a negative correlation between the amount of distance and the level of people's welfare. Or it could be said that people whose residential locations are further away from the Semantok Reservoir are less prosperous. Likewise, the people of Sambikerep Village who live closer to the Semantok Reservoir are more prosperous [16].

Discussions about social welfare will focus on two main points, namely (1) what individuals get from their society and (2) how far their needs are met [3][9]. In essence, the correlation between the distance between sources of facilities to meet the needs for achieving prosperity and individuals or communities is farther away, the smaller the correlation. However, in this discussion the distance used for analysis is limited to absolute distance measures.

5 CONCLUSION

Based on the results of research on the impact of the construction of the Semantok Reservoir on the welfare of the people of Sambikerep village, Rejoso subdistrict, Nganjuk district, the following conclusions can be drawn.

1. The impact of the construction of the Semantok Reservoir in the opinion of respondents is that those who feel they are more prosperous are 52.2%, while those who think its existence is the same are 41.1%, and those who think the existence of the Semantok Reservoir development has no impact on the welfare of the community are 6.6%.
2. There is a negative correlation between distance to settlements and the presence of the Semantok Reservoir at Sambikerep Village-Rejoso District-Nganjuk. This means that in the research area the greater the distance between community settlements and the existence of the Semantok Reservoir at Sambikerep Village-Rejoso District-Nganjuk, the less prosperous the community is.

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