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The Poor's Coping Strategies in Overcoming Water Scarcity in Small Island, Eastern Seram Regency, Maluku

Strategi Coping Masyarakat Miskin dalam Mengatasi Kelangkaan Air di Pulau Kecil Kabupaten Seram Bagian Timur, Maluku

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ABSTRACT

This study aims to describe views on poverty through limited natural resources in the form of clean water scarcity and coping strategies for the poor in overcoming it in rural areas on a small island. It took place in Rumeon Village, East Seram Regency, Maluku Province, Indonesia. This study was conducted using a qualitative method with a phenomenological approach. In-depth interviews, observations and documentations were used to collect data. The data was analyzed by following the steps proposed by Moustakes and the source triangulation method was used to examine the data validity. The results shows that community has been suffering from water scarcity for a long time and has received no assistance. Factors causing the water scarcity included seawater contamination on the water sources, climatic and environmental changes, and population growth. The community attempted to overcome the clean water scarcity by utilizing resources available to them as a coping strategy applied included water harvesting and the use of alternative water sources. In addition, as a result of the long-standing condition of clean water scarcity in Rumeon Village, the community had to utilize the social and cultural values as an effort to overcome it so as to reduce the high cost and not to cause conflicts between them.

Keywords: *coping strategy, water scarcity, and poverty*

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INTRODUCTION

The phenomenon of poverty experienced by many people in a certain area has recently become one of the most widely topics discussed and debated in various scientific formus, although it has existed for hundreds of years. To this date, poverty has always been associated with an economic dimension related to inequality or the low income an individual has (Breunig and Majeed 2020). In fact, poverty is related to various other aspects of life, such as social (Celikay and Erdal 2017; Mood and Jonsson 2016; Sun, Zhao, Wang, Zhang, Xinyu and Wan 2021), gender (Newman and Adesina 2018; Mwiti and Goulding 2018), and even natural and geographical (Dutta and Kumar 2016; Hallegatte and Rozenberg 2017) aspect. This view implies that the poverty is multidimensional, so that it can be assessed using various existing approaches. A study by Wang and Wang (2016) showed that the poverty in China was caused by three factors – main, common, and secondary factors. The main factors were related to the lack of facility and poor housing condition, and the low level of health and education services. Further, the common factors were related to school age, the lack of fuel and poor sanitary facility. Meanwhile, the secondary factors were related to the availability of clean water and access to information.

Meanwhile, a study by Mohanty (2011) examining the conditions and indicators of poverty in India revealed that the indicators of poverty in India could be seen through aspects of education, health, housing condition, water condition, electricity condition, and agricultural production facilities. Similar problems were also found by Surung and Dahlan (2012). They stated that the poverty within the community included the availability of natural resources, technology, human resources and institutions. Further, their findings explained that the poverty occurred was not only caused by the economic aspect (low income), but was also closely related to the aspect of limited access to natural resources, whereas the limitation or scarcity of clean water was an inseparable part of the existence of natural resources (Alrasyid, Rofieq and Nuryono 2016; Martha 2017; Kristijanto, Utami, Wahyono and Jocom 2016).

In relation to the clean water scarcity, Lawrence and Sullivan (2002) stated that the community who did not have sufficient water to meet their basic needs could be categorixed as "water-poor" condition. In the context of this present study, this "water-poor" condition can be interpreted as the condition of a community who are trying to get clean water, but first they must walk to the location of a water source that is quite far away. This indicates that the water scarcity is a situation in which the water resources are no longer sufficient to meet the community's daily needs in a sustainable manner which force them to try to find or invent new water sources (Loon and Lanen 2012). At this level, it is obvious that one of the basic human abilities is to provide clean water for the household purposes (Sen and Drèze 2011; Caroline 2002). Therefore, the community's inability to meet the basic needs can be categorized as the poor (Jiang and Wang 2016; Sa'diyah 2012; Usman 2013).

Rumeon Village, Gorom Island, is one of the villages categorized as Disadvantaged Village (Kemendesa Republik Indonesia 2021). In other words, the Rumeon Village community in Gorom Island is categorized as the poor. This phenomenon of poverty or underdevelopment is not the only problem they experience caused by their low income, but it is also related to the clean water scarcity occurred in the village. The geographical condition of Rumeon Village – which is also close to the coastal area – cannot be a guarantee that they have abundant water sources, especially fresh (clean) water. On the contrary, they have experienced the clean water scarcity for decades and it has been a major problem for the Rumeon Village community. Moreover, their economic condition also worsens the condition where there is a total of 114 community members (Statistik Desa Rumeon 2021) who make a living as farmers and fishermen. On the one hand, they are faced with the efforts to meet the household needs which continues to increase and be more varied. At the same time, they must also strive to ensure that their needs for clean water can continue to be met. It is at this level that the authors view that the ability to provide the clean water as a basic necessity of life is related to the poverty and has broad implications for the economic, social, gender, and environmental condition.

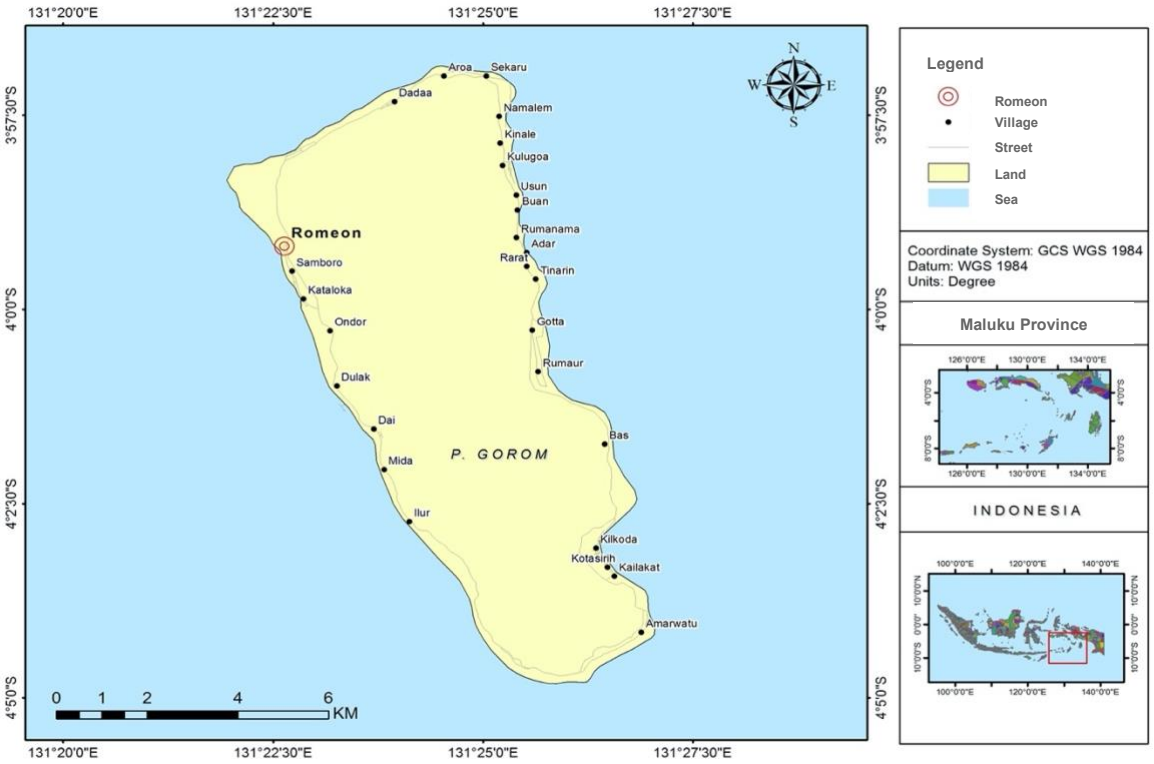
Based on the view related to the clean water scarcity explained above, this study offers the idea that the poverty problems can be approached through studies related to the limited access to natural resources. Therefore, in this context, this study focuses more on the dynamics of clean water scarcity experienced by the community of Rumeon Village, Gorom Island, and the strategies used to overcome it. For this reason, the results of this study are expected to contribute to the development of studies on poverty in relation to the issues of scarcity / limitation of natural resources, rural economy, and island (archipelago) economy. Therefore, the research problems of this study are "What factors influencing the clean water scarcity in Rumeon Village?"; and "How do the Rumeon Village community overcome the scarcity of

clean water as their basic necessity?". Thus, this study aims to understand how the poor in a small island deal with the clean water scarcity as a coping strategy in order to get out of this threatening vulnerability condition.

RESEARCH METHOD

This study was done in a qualitative manner using a phenomenological approach. The use of qualitative method was considered relevant in describing the understanding related to the dynamics of social and economic of the Rumeon Village community in overcoming the clean water scarcity, so that the authors had a room to interpret the empirical facts. Meanwhile, the phenomenological approach was such a tradition in the qualitative study focusing on the human's life experiences (Fauzan and Ghony 2012). These human's life experiences were used as a mean to understand socio-cultural, economic, political, and historical aspect better where the experiences took place. To describe the views of the relationship between poverty and clean water scarcity and the coping strategis used to overcome it, the authors used the coping strategies developed in a study by Pereira, et al. (2009) which included social, environmental, cultural and economic values.

This study was done in Rumeon Village, Gorom Island, East Seram Regency (*Kabupaten Seram Bagian Timur (SBT)*), Maluku, in April – August 2021. The following Figure 1. Displays the map of research location.



Source: Coordinate system, GCS WGS

Figure 1. Map of Research Location, Rumeon Village, Gorom Island, East Seram Regency, Maluku.

Rumeon Village was chosen as the research location because it was one the villages on Gorom Island experiencing the clean water scarcity for decades and to this date, they had not been assisted by the government through the clean water program. Most of the residents made a living as farmers and fishermen, so that at the same time, they were facing a reality between meeting the household needs and the need for clean water.

The data was collected through in-depth interviews and observations. The key informants participated in this study were based on several criteria. *First*, the key informants must be the residents living in Rumeon Village. *Second*, the key informants must have the experience in overcoming the water scarcity in their households. The selection of key informants was done using the purposive sampling method and there was a total of 37 key informants participated in this study. The participants' profile could not be

publicly described, considering their privacy rights. However, their identity could be distinguished by initials as follows: ARL, WA, AG, SR, ARM, AA, BR, ARS, JR, EA, HG, MU, AT, RR, HK, WRN, RL, GRI, RU, AK, SR, LA, MMR, SK, MT, NR, KA, MS, AS, NT, DK, HN, GM, LK, LR, MN, and IR. Further, the in-depth interviews were done for sixty to ninety minutes. They were audio-recorded and transcripted. Meanwhile, the observations were done by visiting the research location to observe the behavior and activites of the key informants and compare them with the interview results. This process explained the source triangulation technique implemented by the authors to validate the data.

After the interview and observation data were collected, the data was analyzed following the stages proposed by Moustakes (1994) in his phenomenological research. The stages included *first*, organize and transcript all data that had been successfully collected (both in local language and Indonesian); *second*, decode the data by making notes on the ones considered importand; and *third*, reduce or eliminate things unrelated to the research topic. In this stage, a horizontalization was carried out by grouping statements with similar values and unrelevant or overalapping statements to avoid deviations or bias. The statements were grouped into "meaning units" and described (the key informants' experiences) using clear and understandable language. Then, this became the focus of research discussion as well as the results on the Results and Discussion section.

RESULTS AND DISCUSSION

Determinants of Clean Water Scarcity in Rumeon Village

Rumeon Village was an administrative village and part of Kataloka Village (Eastern Seram Regency (SBT) Regulation Number 07 of 2010). Geographically, Rumeon Village was located on Gorom Island and close to the coastal area. Empirical findings in this study show several factors causing (determinants) the scarcity of clean water in Rumeon Village, as follows:

Source and Location of Clean Water

The clean water was now a vital and urgent need for the community in Rumeon Village. Various efforts continued to be made so that every household could enjoy drinkable water. However, Rumeon Village had not been assisted by the government through the clean water supply program. The authors found that Rumeon Village itself had several water sources usually used by the community to meet their daily needs, such as drinking, bathing, washing and other needs. The water sources in Rumeon Village came from *parigi*[1] and springs located in mountainous areas. The water source from *parigi* was the result of independent excavation carried out by each household.

A key informant hoped that when the *parigi* had been completely dug, they could have their own source of clean water that could be used to meet all their household needs. However, in reality, the water from the *parigi* tasted like *salobar*[2], so that the informants did not use them for their daily drinking water. On the other hand, the water from the *parigi* was only used for other purposes, such as washing, as shown in Figure 2. below:

Source: Field research documentation, 2021.

Figure 2. *Parigi* (well) of the Rumeon Village community

[1] A local emic term meaning a well of water
[2] A local emic term meaning brackish water

One of the informants explained his experience regarding the condition of water from *parigi*:

> *"Almost all houses in Rumeon Village have a parigi whose water was expected to be drinkable, but in fact, it tastes like a salobar. It is not only the water from my parigi, but all water from the parigi in Rumeon Village taste similar – like salobar. It is probably because Rumeon Village is close to the coastal area, so that the clean water is hardly found here. This lack of clean water has also been going on for a long time in Rumeon Village." (ASA – 48 years old; March 28, 2021)*

The experience shared by the key informant above showed that the clean water in Rumeon Village were very difficult to find. The above statement confirmed the condition of Rumeon Village which was close to the coastal area. Therefore, although the Rumeon Village community had tried to dig a *parigi* which was quite far from the beach, the water would still taste brackish. It was undeniable that, geographically, the location of Rumeon Village was close to the coastal area and this might affect the fresh (clean) water sources.

In addition to the fresh water sourced from *parigi*, the Rumeon Village community also had other sources of clean water in the form of springs located in the mountainous areas as an alternative source of drinking water. The results of observations reveal that the location of this spring was quite far. It was located in a mountainous area and to reach the location, they had to walk as far as 1.5 km for about 40 minutes. Moreover, the road accessed by the community was very difficult. A key informant stated that:

> *"The road to the water sources in the mountains is inaccessible for vehicles. We must walk carefully, because the road is steep and rocky. Moreover, on the right side, there is a fairly deep chasm. In one day, we can only take water once while the amount of water depends on the strength of each person who carry the water. Usually, the men can 'pikol' (shoulder) four containers full." (NT – 46 years old; May 3, 2021)*

In a day, the community of Rumeon Village had to at least shoulder the water from the location to their house once and it was done by both men and women. However, it was still not easy because the road to the water location was very steep with uphill road conditions, so that each person could only shoulder 5-10 liters of water. Usually, for adult men, they could shoulder as much as 20 liters of water consisting of four 5-liter-containers. This activity could even be more frequent, when the Rumeon Village community held an event or celebration.

Climate: East Season and West Season

In addition to the location of water sources as the cause of the clean water scarcity in Rumeon Village, climate or weather also affected the availability of water. Rumeon Village had two seasons in a year: the east and west season. When the east season started, the clean water could be enjoyed by all Rumeon Village community. This was such a blessing because they did not need to spend more money to purchase the clean water. When the rainy season started, they would prefer to use the rainwater to meet their daily needs, including for drinking water. The rainy season in Rumeon Village started from May to September.

During this rainy season, the Rumeon Village community would only purchase the clean water once in 3 weeks. In fact, there were also people who only purchase the clean water once a month. In relation to the climate in Rumeon Village, a key informant said that recently, the rainy season had not been as usual:

> *"Now, the rainy season is no longer in accordance with the predicted months or period. In the last years (2019-2020), the rainy season started in June, but now, the rainy season is coming earlier (May). On the one hand, we are grateful to have abundant water, but on the other hand, our garden plants (such as chili) are damaged (rotten). Finally, we have to harvest them early so we do not lose too much..." (AT – 68 years old; May 5, 2021)*

A different condition was encountered when the west season started, making the clean water became a "valuable item" for the Rumeon Village community. The west season lasted for 7 months a year. In the west season, it was difficult to get the clean water from the mountains. The clean water in the springs in the mountainous area had decreased drastically, forcing them to come early in order to get enough water. This climate change also caused a key informant to look for other alternatives in order to meet the water needs for their households by purchasing or taking water from neighboring villages.

Furthermore, the key informant said that, in fact, the climate change had been going for a long time. However, in 2019-2021, it got worse and brought a tremendous impact on the community. This uncertain climate change did not only affect the flow of clean water, but also affected the crops owned by the Rumeon Village community. A poor or low crops production would eventually decrease the amount of farmers' income and in the long term, the key informant were worried about there would be less people who wanted to be farmers.

The Larger The Number of Family Members, The Greater The Amount of Water Needed

In 2020, there was a total of 832 people living in Gorom Island, especially Rumeon Village, consisting of 410 male and 422 female residents. This population was much less when compared to other villages on Gorom Island which had more than a thousand residents. The field findings show that the population had an influence on the availability or need for the clean water for each household in Rumeon Village. This study found that the average demand for the clean water for cooking and drinking purposes was between 60 liters to 78 liters per day. However, it would increase when a family had a large number of dependent family members which could reach 110 liters per day. A key informant explained that:

> *"In one day, I can shoulder the water from the sources in Samboro Village twice using two 30-liter-containers. Usually, I use four 5-liter-containers to shoulder the water from the mountains (forests). I take a lot of water because I have many family members. In my house, there are 3 families so the need for water for cooking and drinking is a lot more than my next-door neighbor. My neighbor only shoulders the water once in Samboro Village." (DK – 45 years old; June 7, 2021)*

The limitation on clean water availability experienced by the Rumeon Village community, as described by the key informant above, could be seen through the additional costs that the community had to pay to purchase the clean water. For people working as civil servants or Indonesian National Army / Police of Republic of Indonesia, this migh not be a big deal for them to purchase the clean water. However, it was different for those working as fishermen, farmers and small entrepreneurs. To get the clean water, they must try to set aside some of their income to purchase the clean water. The purchase was also adjusted to the number of family members and the size of the water reservoir owned.

The larger the number of family members, the greater the consumption of water for drinking and cooking. Similarly, if the poor had a large water reservoir, it would also have an impact on the amount of water purchased. Generally, the poor in Rumeon Village had relatively small water reservoirs, thus, the costs incurred would be relatively smaller compared to the residents with a high income. On average, the people working as the civil servants and Indonesian National Army / Police of Republic of Indonesia could purchase the clean water once in a week. Meanwhile, the fishermen, farmers and small entrepreneurs they had to purchase the clean water 2-14 times a week (twice a day) because they only had 2 containers of 30 liters of water. The people with a high income could purchase the clean water in a big scale, reaching 1,100 liters per purchase. It would cost IDR 13,000 per container, and IDR 150,00 per a water tank car per purchase.

Furthermore, the efforts to overcome the water scarcity done by the Rumeon Village community were getting more difficult when there were a bigger number of household members when the family income could not meet all household needs. In this situation, the Rumeon Village community took advantages of the harmonious relationship between fellow Rumeon Village community members. This harmonious relationship referred to the family relationship which could occur because they were family-related and the relationship had been maintained for a long time. Besides, the Rumeon Village community was also related to each other as fellow "Rumeons". A key informant illustrated that:

> *"The Rumeon Village community maintain a harmonious relationship that has been going on for a long time. Moreover, there is a big family relationship between us. Therefore, if someone has a difficulty in getting the clean water, then those living in the next doors are obliged to help without having to ask first. It is this kind of relationship that strengthens us as the 'Rumeons'." (HK – 68 years old; August 2, 2021)*

The relationship, as explained by the key informant above, contained the sympathy and solidarity as fellow "Rumeons" when there were community members experiencing difficulties. This relationship had been maintained for a long time and continued to be maintained by the Rumeon Village community to this day. For them, the problem of limited clean water was the one that had existed for a long time. In

fact, according to the key informant, this condition had not received a serious attention or assistance from the government to this day.

How the Rumeon Village Community Get Clean Water

The limitations or scarcity of clean water experienced by the Rumeon Village community caused them to keep trying to find ways to get the clean water, mainly for the drinking and cooking water needs. The Rumeon Village community had tried diverse methods and they all depended on the number of family members in each household. The bigger the number of family members, the more diverse the methods used. Besides, the methods would also depend on the economic condition of the household.

For the people with a quite high income, they would choose to build water reservoirs that could be used to store purchased water or to collect rainwater during the rainy season. The size of the water reservoir was also various, for example 2x2 m with a height of 120 cm and 2.5 x 3 m with a height of 120 cm. Meanwhile, for the people with a poor economic condition or who could not afford it, they preferred to use a water reservoir made of plastic with a water capacity of 100 liters, as stated by a key informant below:

> *"I have my own way of dealing with the difficulty of getting the clean water. The method I use is to make a water reservoir. This reservoir is not only used to accommodate the purchased water, but also to accommodate the rainwater. The size of the container that I have is 2.5 x 3 meter with a height of 120 cm. The size of this water reservoir is quite large because there are also many members in my family." (SK – 34 years old; August 9, 2021)*

From the results of observations, it was found that not all members of Rumeon Village community could afford to build a reservoir or buy a container with a size of 100-150 liters like other informants. There were also several informants who could only use plastic buckets, *tempayang* or *parteng*[3] to collect the water, as shown in Figure 3. below:

Source: Field research documentation, 2021

Figure 3. Types of water storage containers owned by the Rumeon Village community

In addition to the various methods used by the Rumeon Village community above, they also had other ways to obtain the clean water, such as carrying the clean water obtained from the water sources located in mountainious areas which must be reached on foot for 1.5 km. Then, the Rumeon Village community could also purchase the clean water through water tank cars or taking water in a neighboring village (Samboro Village) using two-wheeled vehicles. For the people who had two-wheeled vehicles, they could directly take the clean water in Samboro Village without incurring any cost. The containers used to hold the water were in the form of a 30-liter-container. The Rumeon Village community could use two containers each time they went to take the clean water as shown in the following Figure 4:

[3] A local emic term describing a plastic container with a diameter between 51-55 cm and a height of 22-30 cm.

Source: Field research documentation, 2021

Figure 4. The process of taking water using a two-wheeled vehicle

However, for the people who did not have their own or private vehicles, they were forced to purchase the clean water through the water tank cars owned by the Samboro Village community to meeet their water needs as shown in Figure 5. below:

Source: Field research documentation, 2021

Figure 5. A water car serving buyers in Rumeon Village

The average water purchased by the Rumeon Village community from the tank car was 1,100 liters (seen from the tank profile which could carry 1,100 liters of water) at a price of IDR 150,000 per purchase. They purchased the clean water every two weeks. However, the demand for this amount of clean water would increase whenever they held a celebration or event, and they needed two tank cars of 2,200 liters of water for IDR 300,000. Meanwhile, when the rainy season started, the community would demand less amount of purchased water and it was a drastic decline.

Further, in solving the clean water scarcity in Rumeon Village, it turned out that there was such an unique charm for some people who wanted to help overcome this problem under certain “conditions”. This behavior could be seen when the election period for members of the Regional People's Representative Council (*Dewan Perwakilan Rakyat Daerah,* DPRD) started. The board member candidate would try to win the hearts of the Rumeon Village community by making pipes for the distribution of clean water that went directly to Rumeon Village. This program was carried out twice in a row. At the end of 2014, the first clean water distribution pipe was made and the community also admitted that this had greatly helped the problem of clean water scarcity in their village. However, entering the beginning of 2015, these pipes were no longer functioning.

Then, at the end of 2019, the water was again channelled through the clean water distribution pipes to Rumeon Village. However, at the beginning of 2020, the pipes were no longer functioning. Within the Rumeon Village community itself, rumors circulated that the water distribution pipes were not

functioning because the water discharge capacity at the springs was insufficient for the needs of the Rumeon Village community, so that over time, the water source became dry.

The Coping Strategies of The Poor in A Small Island to Overcome The Clean Water Scarcity

The live of people living in small islands often faced various risks of livelihood vulnerabilities. Instead of getting the attention of the government which could help them escaping the livelihood vulnerabilities, on the contrary, their existence had somehow 'escaped' the government's attention (Bapenas 2015; Pratikto 2003). It was at least illustrated by the problem of clean water scarcity on Gorom Island experienced by the Rumeon Village community. As part of natural resources, water could be considered as the main source of life for living things. The absence of water would have a crucial impact on the life of living things themselves. Further, the absence or scarcity of water was not only related to the environmental aspects, but also all aspects of life, including those related to economic, social, gender and natural and geographical aspects (Hallegatte and Rozenberg 2017; Sun, Zhao, Wang, Zhang, Xinyu and Wang 2021; Tekwa, Newman and Adesina 2018). This clean water scarcity phenomenon experienced by the Rumeon Village community was a problem not solved permanently for decades. In fact, a key informant revealed that this problem had existed since Rumeon Village was first occupied.

Therefore, to overcome this problem, the Rumeon Village community continued to make various efforts to meet their daily water needs. The reality showed that the main focus of problem of the clean water scarcity was the use of clean water for drinking and cooking purposes. Meanwhile, the water for bathing, washing and watering plants could still be met through the availability of water in Rumeon Village itself (brickish water). For this reason, it could be seen that the phenomenon of water scarcity in Rumeon Village could be grouped into two parts, namely permanent water scarcity and temporary water scarcity. In this context, the water scarcity could be caused by either environmental factors, human activities or a combination of environmental factors and human activities (Jocom, Kameo, Utami and Kristijanto 2016; Pereira, Cordery and Lacovides 2009). In relation to this, the results of this study show that the problem of water scarcity from a natural aspect was a permanent condition that resulted in a limited availability of clean water, such as sea water intrusion and climate changes. While the factors caused by human activities – such as forest destruction, land destruction and exploitation of water on a large scale – were not found in this study.

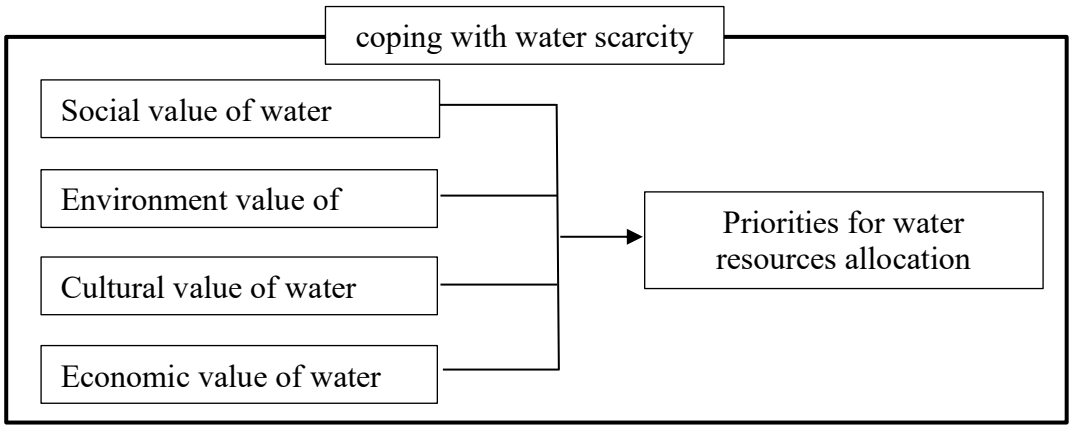
The clean water availability in Rumeon Village, referring to the provisions of Sustainable Development Goals (SDGs) regarding the minimum per capita water need, reached 50 liters per day (without any distribution disruption), and should take no more than 10 minutes to get the water and no more than 30 minutes of a round trip to get the water. In this context, Rumeon Village could be categorized as a village with a high level of clean water scarcity. The empirical findings of this study show that the average water demand varied greatly and there were many disruptions in the distribution of clean water, both from travel time (above 30 minutes) and the very long distance it took to get to the location. In a research by Jocom, Kameo, Utami and Kristijanto (2016), the efforts to overcome the clean water scarcity in rural communities could be done through coping strategies, water harvesting strategies and the use of alternative water sources. Meanwhile, when referring to the "ways" to get the clean water, the Rumeon Village community had been doing the same things. However, considering the "water demand" aspect, there was a difference where the rural communities in East Nusa Tenggara area was experiencing water scarcity conditions in broad terms of "ways" to get the clen water and "water needs" which included the water for drinking, cooking, and other household needs. Meanwhile, the Rumeon Village community only experienced the limitations in the availability of clean water for drinking and cooking.

Furthermore, in relation to the clean water scarcity, the Rumeon Village community still needed to find effective ways to be resilient in dealing with the vulnerabilities. Maryam et al. (2019) mentioned that the community resilience behavior was a process of connecting adaptive capacity networks with community resources through four instruments, including economic development, social capital, information and communication and community competence. A similar opinion was also expressed by Susilo and Arrozy (2020) who stated that local communities needed to anticipate by utilizing the existing resources they had. In the context of the Rumeon Village community, the behavior of overcoming the life vulnerabilities by utilizing the resources they had could be illustrated through the approach of coping strategies, water harvesting strategies and the use of alternative water sources, as follows:

Coping Strategy

A coping strategy could be defined as an effort made by someone to overcome an unfavorable situation according to physical ability, biological ability and material ability or an effort to manage the situation

and encourage efforts to solve one's life problems and find ways to master and overcome the impact of these problems (Silo and Serome 2018). Meanwhile, Pereira et al. (2009) stated that the approach to coping strategies related to the water scarcity could be seen through social, environmental, cultural and economic values, as shown in Figure 6:



Source: Pereira, et al. (2009)

Figure 6. Coping strategy approach

The approach proposed by Pereira et al. (2009) could be used to understand the clean water scarcity in Rumeon Village. In this context, the authors focuse more on the economic value and social value related to the coping strategies. The economic value could be illustrated through the community's efforts to get the clean water through the amount of costs that must be incurred to get the clean water. The amount of costs incurred was divided into 2 parts, namely the cost of buying water from the water tank car and the cost of motor fuel. In terms of quantity, it was clear that purchasing the clean water through the water tank car was indeed more profitable, although the costs incurred were higher.

However, it should also be noted that not all members of the Rumeon Village community could afford to buy the clean water through the water tank car. It was because of their economic condition where most of them worked as farmers and fishermen, so the alternative method used was through the use of motorcycles although there was a less amount of water obtained and the costs incurred were much lower. However, the authors see that the amount of money spent to get the clean water (both via cars and motorcycles) could not be compared in size. It was because those who had a fixed income and had allocated a large amount of their income to purchase the clean water could purchase them from the water tank car. Meanwhile, those working as fishermen and farmers with uncertain income conditions could only purchase the clean water by using motorcycles because they considered purchasing from the water tank car was a high expenditure.

This indicated that the need of clean water of each household was different, not only related to the amount of water needed but also the amount of costs incurred and the number of family members. For those with a higher income, purchasing the clean water was not a problem. However, it was a problem for the people with mediocre economic conditions or the poor. Therefore, they must try to find additional income that could be allocated for purchasing the clean water, one of which was being a collector of nutmeg (*myristica fragrans*) in the forest. In a day, the Rumeon Village community could collect between 100 and 300 nutmegs and a maximum of 10 kg of nutmegs of IDR 30,000 to IDR 80,000 per week. This behavior reflected the effort to get out of the condition of vulnerability in their lives. Gentle et al. (2018) stated that in dealing with livelihood vulnerabilities, rural households would try to make household adaptation efforts through the use of existing resources with the aim of obtaining additional income.

Meanwhile, the social value could be illustrated through the family relationship among fellow Rumeon Village community members. The findings show that the water scarcity experienced by the Rumeon Village community for decades had triggered the emergence of a sense of sharing due to the scarcity of clean water. This sense of togetherness could be seen as the social capital of the Rumeon Village community in dealing with the scarcity of clean water. Ritzer (2005) viewed that it also referred to the capacity of individuals to obtain valuable material goods based on social relations in a particular community to enjoy the benefits of collective action. The same thing was also expressed by Coleman (2000) who saw the social capital as a whole directed or created to facilitate individual actions.

Therefore, it could be concluded that the social capital actually came from the idea that it was impossible for the community members to individually overcome the various problems they faced (Fathy 2019; Rusydi 2003). At this level, the authors concluded that the life vurnerabilities experienced by the Rumeon Village community in relation to the clean water scarcity could be overcome by utilizing the well-maintained family relationship and the relationship as fellow "Rumeons". This phenomenon could be seen through the provision of water for neighbors for free when someone needed the clean water, as found in this study.

Water Harvesting Strategy and The Use of Alternative Water Resources

The dynamics of water scarcity experienced by the Rumeon Village community could be overcome through the use of water collected during the rainy season. This water harvesting strategy had actually been commonly used. The water utilization model with a strategy or system known as "water harvesting" could only be done when the rainy season started. The strategy of collecting the rainwater from the roof could be done as follows: *First*, the rainwater from the roof (containing zinc) could be directly collected in the containers and barrels that had been prepared in advance. *Second*, then it was channeled through a paralon pipe and put into water reservoirs.

Usually, the rainwater stored in these reservoirs was often also used by other people who needed the water. This behavior of collecting / harvesting the rainwater using containers and barrels was mostly implemented by the people with a lower income. Meanwhile, the use of rainwater accommodated through reservoirs was more favored by the people with a higher income, such as employees. These efforts to get the clean water, in the authors' view, described the condition of the Rumeon Village community who wanted to get out of their vulnerabilities. In this context, the vulnerability experienced by the Rumeon Village community was the condition of clean water scarcity, not the water scarcity in general.

The current scarcity of clean water for drinking and cooking water had forced the Rumeon Village community to try to find alternative ways or strategies to obtain the decent clean water for consumption purposes. The ability of the Rumeon Village community to obtain the clean water was also done by finding new sources of clean water outside Rumeon Village. This was because the natural condition of Rumeon Village which provided no decent source of clean water that could be used as drinking water. The strategy adopted was to obtain the clean water from the neighboring village.

The use of clean water in the neighboring village by the Rumeon Village community was carried out by considering the economic conditions of each household. For those who could afford to purchase the clean water, they did not need to do it. While for those with mediocre economic conditions, they tended to take advantages of the existence of motorcycles to carry the clean water from the neighboring village although there would be costs incurred for the motorcycle fuel. At this point, it could be clearly seen that the poverty could not only be measured through the level of income to meet the basic needs (Suryawati 2004) which was in line with the previous findings. However, the poverty could also be assessed through the availability of natural resources owned by a person or a community. In this context, there was a relationship between the poverty and the low basic human abilities (Sen and Drèze 2011; Martha 2017; Kristijanto, Utami, Wahyono and Jocom 2016).

In this context, the basic human ability could be measured through the ability to provide the clean water or to meet the need of clean water which had a vital role for life (Molinga and Mollinga 2003). Furthermore, the ability to provide the clean water also had a significant relationship with the household economic capacity and climate changes (Asfaw, Pallante and Palma 2018; Gentle, Thwaites, Race, Alexander and Maraseni 2018). For this reason, the problem of limited access to the clean water or the water scarcity actually placed the poor in the poverty without getting any guarantee for their welfare (UNDP 2006; Earthscan and UNESCO 2009; & WWAP and UNESCO, 2006). Through the results of this study, it could be seen that the scarcity of clean water experienced by the Rumeon Village community could be overcome in various ways or strategies as described earlier.

The clean water scarcity that had lasted for a very long time had formed a strong bond among the Rumeon Village community to get out of this vulnerability condition. The relationship maintained was not only through the family relationships as a result of marriages among them, but in the authors' view, the bonds formed could also be caused by the unequal economic conditions among the Rumeon Village community itself. Therefore, to minimize the risks that might arise related to this water scarcity, they took advantages of these family relationship to get out of the life vulnerabilities.

This behavior implied that the community's ability to face various challenges and risks that were local in nature was highly dependent on norms, habits and values that also influenced the way individuals, households and communities responded to pressures and risks (Hahury, Prabawa, Wiloso, Soumokil and Ndoen 2020; Kherallah and Kirsten 2001; Youngae 2006). At the same time, this behavior was also a way to avoid conflicts that could occur as a result of competing for water sources, as found in previous studies (Veisi, Bijani and Abbasi 2020; Pacheco 2020).

For these reasons, the family relationship could be used as a means to work together in order to help others improving their live (Putnam 2000). In the context of the clean water scarcity experienced by the Rumeon Village community, this family relationship could be seen as social capital (norms and values) of the Rumeon Village community in overcoming the clean water scarcity as well as a community strategy in reducing high economic costs.

CONCLUSIONS

The clean water scarcity experienced by the community was part of the life vulnerabilities, especially for rural communities on small islands such as Rumeon Village. The determinants (causes) of water scarcity in Rumeon Village included the source and location of clean water, climates and population so that various efforts were continuously made in order to get out of the existing vulnerability. The various efforts made were different for each region, but in the context of overcoming the life vulnerabilities, each community's effort could be seen as the effort to manage the situation and encouragement to solve the problems. The Rumeon Village community had done several ways or methods in overcoming this vulnerability, such as by carrying out the water harvesting strategy and the use of new alternative water sources, where this strategy or behavior was known as coping strategies. The Rumeon Village community also utilized various existing resources. One of them was through awareness as fellow "Rumeons". This awareness had been raised for a long time, so that it had become part of the Rumeon Village community's life. This also made it easier for them to get out of their livelihood vulnerability in terms of the scarcity of clean water. At this level, the strategies implemented by the Rumeon Village community which utilized the family relationship and cultural relationship in overcoming the clean water scarcity could be seen as the coping strategies. Thus, the use of social values, culture and norms was such a solution that could be offered in overcoming the scarcity of clean water in small islands. However, the efforts to overcome the water scarcity were not only the responsibility of the community, but the involvement of the government through policies was also highly necessary for the people of small islands.

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