Research Article

Sustainable Management of Water Resources in Ngesrepbalong Village, Kendal

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Abstract.

Water plays an essential role in human life. However, destructive behavior and a lack of awareness about its preservation have contributed to an crisis. Proper management is key to ensuring the sustainability and continued availability of water. Ngesrepbalong village, located on the slopes of Mount Ungaran in the Limbangan District of Kendal Regency, Indonesia, is home to abundant water sources. This study explores the village's water resource management model and its conservation efforts. A qualitative, descriptive research approach was used, employing source triangulation for analysis. Data collection was carried out by in-depth interviews, document analysis, and field observations. The findings reveal a conflict in the utilization of water resources between the community and the Kendal Region Water Company (PDAM), affecting the availability of water for the lower hamlet. Additionally, problems arise in the agricultural sector, which has limited sources of irrigation. Various efforts have been made to control water usage by the community, including the Community-Based Drinking Water and Sanitation Provision Program (PAMSIMAS).

Keywords: conflict, Ngesrepbalong Village, sustainable, water resources

1. Introduction

Water is a renewable natural resource (1)–(3). However, if its use is not managed properly, it can cause problems (4), (5). Pollution of water sources, scarcity of water and abundant water runoff that results in flooding are the three main problems related to the management of these resources (2), (6)–(8).

In the Law of the Republic of Indonesia No. 32 of 2009 concerning the protection and management of the environment, it is emphasized that the conservation of natural resources aims to ensure their wise use and continuity of availability while maintaining and increasing the quality of their values and diversity (9). In practice, various water resources management methods have been developed, such as Integrated Water Resource Management - IWRM (7), (10), (11). In addition, in the context of rural areas,

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in general there are various forms of local wisdom in managing natural resources, including water resources (5), (12)–(14).

Ngesrepbalong Village, which is located on the slopes of Mount Ungaran, is an example of a rural area with problems related to water resources. Even though the water discharge is abundant in this area, conflicts over utilization and other problems that arise can threaten the sustainability of water availability in the village. This study aims to identify various problems related to the use and management of water resources in Ngesrepbalong Village. In addition, it also reveals conservation effort made by local communities as a model for sustainable water resource management.

2. Research Methodology

This research was conducted in Ngesrepbalong Village, which is located in Limbangan District, Kendal Regency. This village is located on the slopes of Mount Ungaran with an altitude of 524 - 1,437 above sea level. The area is dominated by hilly topography with slopes varying between 12.5% - 15% which is included in the gentle category. Ngesrepbalong Village is bordered by Margosari and Tabet Village on the north, Jawisari and Gonoharjo Village on the east, Mount Ungaran Protected Forest on the south and Sriwulan Village on the west.

This study used a qualitative approach with data triangulation analysis techniques. This research is a descriptive study that provides an explanation of the phenomenon of problems and water resource management in Ngesrepbalong Village. Data were collected from interviews with eight village officers, six community leaders, and six village residents. All of them are inhabitants of the six hamlets across the Ngesrepbalong Village.

3. Research Result and Discussion

3.1. Potential of water resources in Ngesrepbalong Village

Ngesrepbalong Village is located on the western slopes of Mount Ungaran. Mount Ungaran is known to have a wealth of abundant springs. Likewise, in Ngesrepbalong Village, it has several springs scattered in each hamlet. In addition, there are the Siratangi and Kaligading rivers which are used for irrigation of agricultural land. The distribution of clean water sources in each hamlet in Ngesrepbalong Village is as follows:

- 1) Gedongan Hamlet has clean water sources in the form of springs and rivers. The spring is used for the Community-Based Drinking Water and Sanitation Provision Program (PAMSIMAS) which is channelled to the residents' houses. Meanwhile, rivers are a source of water for agricultural irrigation. The source of water flows throughout the year and the discharge in the irrigation channel will decrease when the dry season arrives. Farmers are able to plant rice up to two times a year and also manage part of their land to plant crops/ tubers.
- 2) Gempol Hamlet has springs and rivers to meet daily water needs. In general, springs flow throughout the year and the discharge in the irrigation channel will decrease when the dry season arrives.
- 3) Gunungsari Hamlet only has a source of water from mountain springs, but it is more than sufficient to meet community needs. Currently this spring is used for PAMSIMAS which is channeled to the houses of residents and the Kendal Region Water Company (PDAM Kendal Regency) to meet the needs of the wider Kendal Regency residents. The condition of the spring is quite good and flows throughout the year.
- 4) Londer Hamlet relies on the fulfillment of water needs from springs, rivers and rainwater. The source of raw water for daily needs in this hamlet is available all year round, however for agricultural irrigation it is only available during the rainy season.
- 5) Ngesrep Hamlet also has clean water sources from springs, rivers and rainwater. Similar to the conditions in Londer Hamlet, in Ngesrep Hamlet, raw water sources for domestic needs are available all year round. However, the availability of water for irrigation of agricultural land is only available during the rainy season.
- 6) Separe Hamlet only depends on water sources to meet the needs of its people every day. There are almost no problems regarding the availability of raw water during the rainy or dry seasons. This means that the water source is available all year round.

3.2. Water utilization conflicts

Problems related to the availability and utilization of water resources in Ngesrepbalong Village are quite diverse. Based on the results of observations and interviews with community leaders, information was obtained about these problems, including the following:

- 1) Water pollution especially occurs in irrigation channels in Gedongan and Gempol Hamlet. This occurs due to domestic waste arising from the activities of the population in Gempol Hamlet itself and Gunungsari Hamlet which are located higher up. The low level of public awareness and weak waste management systems at the household level are thought to be the main factors.
- 2) Springs utilization conflicts, including the case with PDAM Kendal Regency which uses relatively large volumes of water to meet the drinking water needs of the wider Kendal Regency community. This resulted in a decrease in the amount of water discharge that could be utilized by the residents around Ngesrepbalong Village, especially in Gunungsari Hamlet and other hamlets below (which are located lower), such as Gempol and Gedongan Hamlet.
- 3) Decrease condition of watershed. This is indicated by a decrease in the amount of water discharge in the dry season. Especially in rivers which are a source of agricultural irrigation. This can occur due to various factors, including the result of changes in land use. In a broader context, the limited availability of water during the dry season results in decreased productivity of agricultural land. Even in Ngesrep Hamlet, some agricultural land is not used because of limited water during the dry season. It is different when compared to other hamlets which still use their agricultural land to plant crops or tubers in the dry season.

3.3. Local wisdom in water resources conservation

Ngesrepbalong Village community realize that the existence of water sources in their area is a gift that must be maintained. One of them is through periodic traditional activities, namely Iriban or Susuk Wangan. This activity is a tradition to clean irrigation canals and water sources and as a thanksgiving for the flow of water that has been given by God for daily needs and for irrigation of agricultural land.

The implementation of Iriban or Susuk Wangan activities is not concurrent for every hamlet in Ngesrepbalong Village. Ngesrep Hamlet did this on Friday Kliwon in February by cleaning the Siratangi River. Separe Hamlet holds Iriban every Friday Kliwon in the month of Muharram on the Islamic calendar on the Siratangi River. While Gedongan Hamlet performs Iriban / Susuk wangan twice a year in September to clean raw water sources and December to clean irrigation channels.

In addition, for cleaning water sources and irrigation canals, the people of Ngesrepbalong Village also planted trees around the spring. In addition to tree planting activities that coincide with the implementation of the Iriban tradition, the community with the support of various other parties also organizes tree planting periodically. Among them was carried out in February 2019 with the title of the 1001 Tree Climber Planting event, which was attended by the Kendal Regent along with climbers on the Promasan Path, Ngesrepbalong Village (15). This event was attended by the local government as well as volunteers and climbers to the top of Mount Ungaran. In addition, in February 2020, 600 trees were also planted by PDAM Kendal Regency in the context of PDAM Kendal's 34th anniversary (16). These reforestation movements are an effort to conserve water resources, which is one of the potentials of Ngesrepbalong Village.

3.4. PAMSIMAS as a model of sustainable water resources management

The Community Based Water Supply and Sanitation Program, or known as PAMSIMAS, is a rural drinking water and sanitation development platform implemented with a community-based approach. The PAMSIMAS I (2008-2012) and PAMSIMAS II (2013-2015) programs have succeeded in increasing access to safe drinking water for 10.4 million people and access to proper sanitation for 10.4 million people in more than 12,000 villages / wards spread across 233 districts/cities in 32 provinces in Indonesia (17).

At 2020, the PAMSIMAS Program was entering its third phase (PAMSIMAS III) which is implemented in the 2016-2020 period and will target 15,000 new target villages and manage the success of the program in nearly 27,000 PAMSIMAS participating villages throughout Indonesia (17).

PAMSIMAS in Ngesrepbalong Village was implemented in 2018. Currently, there are 3 spring catcher units, 4 pressure release tanks, 2 reservoir units and 2,436 m network. The number of house connections (SR) reached 198 housing units with a served population of 945 people (17), (18).

For the people of Ngesrepbalong Village, PAMSIMAS is a means of exercising control over water utilization. This is because at first, the villagers thought that the existence of an abundant springs could be used forever without worrying that it would decrease.



Figure 1: PAMSIMAS Water Distribution Unit, (a) Water Capture Unit, (b) Reservoir, (c) Distribution Pipe Network (17).

But people feel that the water discharge has decreased. Moreover, after PDAM Kendal Regency used one of the springs in Ngesrepbalong Village to meet water needs in Boja, Kendal. These conditions prompted the Government to implement the PAMSIMAS program and received support from the community because of the large role felt by the community itself in controlling their water use.

PAMSIMAS can be a model for sustainable water resources management. Especially to increase public access to clean water sources. The existence of springs that are not evenly distributed in each region is an important reason why PAMSIMAS can be a solution. Through this program, people whose settlements are relatively far from water sources, can still access clean water at a lower cost. In addition, its management, which is fully given to the community, can guarantee the breadth of access and the role of the community in it. In other words, spring water is not a profitable commodity only for a group or a few people, but will be able to provide benefits for the wider community. The principles of management from, by and for the community, form the basis of a good philosophy to realize the sustainable availability and use of water resources in rural areas.

4. Conclusion

Ngesrepbalong Village has the potential for abundant water resources. Its location in the upstream part of the watershed is one of the factors supporting the potential of existing springs. However, the problem of contamination of raw water sources, conflicts in the use of springs and abnormal watershed conditions have triggered a decrease in water discharge and a threat to the sustainability of water availability in the village. Conservation efforts through the local tradition of Iriban or Susuk Wangan and planting trees around springs are strategies that need to be maintained to conserve water sources. In addition, the PAMSIMAS program can be a model for sustainable water resource management, especially in an effort to increase community access to clean water. By adhering to the principle of service from, by and for the people, the sustainable availability and use of water resources in Ngesrepbalong Village can be maintained.

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