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Training to Improve the Knowledge, Attitude, and Motivation of Communities to Conserve Groundwater in the South Coastal Region of Gorontalo

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Abstract

Groundwater conservation training is a strategic effort to increase the capacity of coastal communities in dealing with the threat of clean water shortages due to environmental degradation. This study aims to determine: (1) groundwater conservation knowledge, attitude to maintain groundwater sustainability, and motivation to conserve natural water resources available in the coastal area of Gorontalo South Coast, (2) effectiveness of groundwater conservation training to improve knowledge, attitude, and motivation of the community in the coastal area of Gorontalo South Coast. This research is an experimental research located in the coastal area of North Leato Village. The sample was 25 people, selected by purposive sampling method. The variables considered were: (1) knowledge of groundwater conservation, (2) attitude towards preserving groundwater, (3) motivation to conserve groundwater resources, (4) effectiveness of training on increasing knowledge, attitude and motivation of the community to conserve groundwater. The experimental design used was One Group Pretest-Postes Design. The data analysis used was descriptive statistical analysis and inferential statistical analysis. The inferential model used was dependent t test. The results showed: (1) knowledge of groundwater conservation, attitudes to maintain groundwater sustainability, and motivation to conserve groundwater resources before training are in the low category, after training are in the high category, (2) training has a very significant effect on increasing knowledge, attitudes and motivation of the community to conserve groundwater in the coastal area of North Leato Village.

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Keywords: Groundwater Conservation, Training, Knowledge, Attitude, and Motivation

INTRODUCTION

Groundwater conservation is an effort to maintain the existence and sustainability of the state, nature, and function of groundwater, so that it is always available in adequate quantity and quality to meet the needs of living things, both now and in the future. (Asdak & Chay, 2007). Water conservation is important to keep the quantity and quality of water available and avoid several problems that may arise such as, nutrients and organic matter contained in the soil are lost; the process of salinization of groundwater; fresh water in the roots and stems is saturated; and soil erosion. To fulfill basic daily needs, it is required that the water used by humans must meet the requirements of Permenkes RI Number 32 of 2017. (Rahma, 2021).

Continued and uncontrolled withdrawal of groundwater from aquifers can lead to environmental disruption. Much damage is caused by excessive groundwater extraction. Environmental damage that can occur due to prolonged and uncontrolled exploitation of groundwater is the lowering of the water table, subsidence, and changes in groundwater quality. (Heru & Doni, 2008).

Gorontalo South Coastal Area is a strategic area in Tomini Bay waters, has potential natural resources to be developed to support the economy and improve the welfare of coastal communities. Tourist attractions located in Gorontalo South Coast include Botubarani Beach, Whale Shark Tourism, Kurinai Beach, Leato Beach and Olele Marine Park. The beauty and potential of the sea is so great, but there is still a lack of utilization and maintenance. This is influenced by natural factors and the low participation of the community in the coastal area. (Salim, Paraweni, & Hidayat, 2011)..

With water availability tending to decrease and water demand increasing, water resources need to be managed by taking into account social and environmental functions, in order to meet the needs of the community. Knowledge about water resources management related to community knowledge about groundwater conservation is very important to be socialized to coastal communities.

The problems of this research are: (1) how is the knowledge of groundwater conservation, attitude to maintain the sustainability of groundwater, and motivation to conserve the natural resources available in the coastal area of South Coast Gorontalo, (2) whether the training is

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effective in improving the knowledge, attitude and motivation of the community to conserve groundwater in the coastal area of South Coast Gorontalo.

This study aims to determine: (1) knowledge of groundwater conservation, attitude to preserve groundwater, and motivation to conserve available groundwater resources in the coastal area of Gorontalo South Coast, (2) effective training to improve knowledge, attitude and motivation of the community to conserve groundwater in the coastal area of Gorontalo South Coast.

LITERATURE REVIEW

Groundwater is water found in layers of soil or rock below the ground surface. Groundwater is the main source of water for living things, especially for humans. However, from year to year the groundwater supply on this earth is decreasing and it is even said that in the future the groundwater supply on this earth will run out if humans continue to exploit groundwater to the maximum without thinking about its management (Heru & Doni, 2008). (Heru & Doni, 2008). The groundwater is stored in a layer called an aquifer. So aquifers are groundwater carriers and groundwater storage beneath the surface. Aquifers can be found in coastal plains, foothill areas, intermontane valleys, alluvial plains and karst topographic areas (Notodarmojo, 2005). (Notodarmojo, 2005).

Groundwater conservation is the management of groundwater to ensure its wise utilization and ensure its sustainable availability while maintaining and improving its quality. Basically, it is an action that needs to be taken in managing groundwater resources so that they can be utilized in a sustainable manner. (Heru & Doni, 2008). Groundwater conservation activities are part of integrated water resources management, regulated in the Water Resources Law which is then detailed in the Draft Government Regulation on Groundwater 2007.

Training is one of the effective alternatives in learning methods for a community collectively. This is done as an effort to increase the capacity of the community, through the process of community empowerment (community development) in a sustainable manner. (Notoatmodjo, 2009). Training is related to improving abilities or skills that are already owned. Skills can be interpreted as competencies that are displayed or demonstrated in carrying out an activity or work related to the achievement of a goal, so that the higher a person's ability to achieve goals, it can be seen as more skillful through training or training efforts. (Bakharani, 2010),

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According to Noe (1986), training effectiveness can be seen from four levels, namely: 1) trainees' reactions to the content of the training program and process; 2) knowledge and skills of the training subjects; 3) changes in attitudes of the training subjects; and 4) increased individual or organizational productivity. As for the training program, it has three stages of activity which include: (1) training needs assessment, (2) training program development, (3) training program evaluation. This training and learning model is a reference for conducting training to improve the knowledge, attitudes, and motivation of the community to conserve groundwater in the South coastal area of Gorontalo.

According to (Bloom, 2001) and (Suriaumantri, 2010), states that knowledge is all that is known about something through memory regarding various methods, patterns, and structures or conditions. Knowledge is a very important domain in the formation of one's actions. Knowledge consists of three components: cognitive, affective, and psychomotor.

According to (Azwar, 2012) and (Ojedokun, 2011) and (Notoatmojo, 2007) states that attitude is a tendency to act towards environmental objects based on knowledge and experience. Human attitudes are formed with information and experience, so it can be said that knowledge is one of the factors forming attitudes. Attitude consists of three components, namely: cognition, affection, and conation.

According to (Adnil & Edwin, 2011) states that motivation is an individual's drive to carry out activities to achieve goals, hopes and desires. (Sarwono, 2007) states that motivation is a stimulus from within and outside a person that causes him to do something. Motivation is an energy that exists in a person that can encourage, activate, move, and direct a person's behavior.

RESEARCH METHODS

The research site is located in the coastal area of Gorontalo South Coast, precisely in North Leato Village. Coastal communities have a high dependence on groundwater as the main source of clean water needs. However, the high utilization of groundwater without proper management has resulted in a decrease in groundwater quality and quantity. On the other hand, low public awareness of the importance of groundwater conservation leads to actions that are not environmentally friendly. Therefore, community empowerment is needed to increase groundwater conservation awareness and actions at the community group level. One approach that can be used is training that involves the community directly in the process of learning and managing groundwater conservation in coastal areas.

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The type of research is experimental research located in North Leato Village, Gorontalo City. The population of this research is coastal communities with a sample of 25 people, selected by purposive sampling method.

The variables considered before and after the experiment were as follows: (1) knowledge of groundwater conservation, (2) attitude towards maintaining groundwater sustainability, (3) motivation to implement groundwater conservation. The experimental design used was One Group Pretest-Post (Borg and Gall, 2008). The experimental steps were as follows: (1) conduct an initial test, (2) conduct experiments or training, and (3) conduct a final test to determine the ability of the community after being given counseling and training.

Data on groundwater conservation knowledge before and after the experiment was obtained by giving tests to the trainees, data on community attitudes and motivation before and after the experiment was obtained by giving trainees questionnaires. The questionnaire construction used was adopted from the Likert model by adjusting field conditions. The data analysis used were: (1) descriptive statistical analysis, (2) inferential statistical analysis. The inferential statistical analysis model used is the dependent t-test.

RESULTS AND DISCUSSION

Research Results

1. Description of Groundwater Conservation Knowledge - Before Training

The results of the statistical analysis of the description of groundwater conservation knowledge from 10 True-False questions before being given training, showed that the average value of groundwater conservation knowledge = 5.07, maximum value = 7, and minimum value = 0. The average value is in the low category. It can be concluded that the groundwater conservation knowledge of the community in North Leato before being given training is in the low category.

2. Description of Groundwater Conservation Knowledge - After Training

The results of the statistical analysis of the description of groundwater conservation knowledge from 10 True-False questions after the training, showed that the average value of groundwater conservation knowledge = 8.43, maximum value = 10, and minimum value = 7. The average value is in the high category. It can be concluded that the groundwater conservation knowledge of the community in North Leato before the training was in the high category.

3. Description of Attitude Towards Groundwater Sustainability - Before Training

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The results of the statistical analysis of the description of community attitudes to maintain groundwater sustainability from 10 attitude statement items adopted from the Likert scale, before training showed the average value of community attitudes to maintain groundwater sustainability = 39.93. With a maximum value = 50, and a minimum value = 16. The average value is in the low category, thus it can be concluded that the attitude of maintaining groundwater sustainability in the coastal area before being given training is in the medium category.

4. Description of Attitude Towards Groundwater Sustainability - After Training

The results of the statistical analysis of the description of community attitudes to maintain groundwater sustainability from 10 attitude statement items adopted from the Likert scale, after training showed the average value of community attitudes to maintain groundwater sustainability = 46.60. The average value is in the high category, thus it can be concluded that the attitude of maintaining groundwater sustainability in the coastal area after being given training is in the high category.

5. Description of Motivation to Conserve Natural Water Resources - Before Training

The results of the statistical analysis of the description of motivation to conserve natural resources in coastal areas, from 10 items of motivation questions adopted from the Likert scale, before the training showed the average value of community motivation = 39.50. The average value is in the moderate category, thus it can be concluded that the motivation to preserve natural resources in the coastal area before being given training is in the moderate category.

6. Description of Motivation to Conserve Natural Water Resources - After Training

The results of statistical analysis of the description of motivation to conserve natural resources in coastal areas, from 10 items of motivation questions adopted from the Likert scale, after training showed the average value of community motivation = 42.93. The average value is in the high category, thus it can be concluded that the motivation to preserve natural resources in coastal areas before being given training is in the high category.

7. Effect of Training on Increased Knowledge of Groundwater Conservation

The results of the t-test analysis of groundwater conservation knowledge before and after the training are shown in Table 1.

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Table 1. Results of t-test Analysis of Groundwater Conservation Knowledge Before and After Training

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pre Test Post Test	-3,357	2,345	0,443	-4,266	-2,448	-7,577	24	0,001

Based on Table 1, the results of the paired t-test show that the average difference between the pretest (before training) and posttest (after training) scores is -3.357. The minus sign (-) means that the value of community knowledge is greater than the value of knowledge before the training. This means that there is an increase in the value of groundwater conservation knowledge of coastal communities after the training with an average increase of 2.345.

While tcount = -7.577 > t_{tabel} = 2.056. At the level of α = 0.05 and the value of proobalniltas (ρ) Sig.=0.001<α= 0.05. This means rejecting Ho and concluding that in the population (from which the sample was taken) there is a statistical difference between the average value of groundwater conservation knowledge in coastal communities before and after being given training.

8. Effect of Training on Improving Attitudes towards Maintaining Groundwater Sustainability

Table 2: Results of t-test Analysis of Attitudes toward Maintaining Groundwater Sustainability Before and After Training

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 2 Pre Test Post Test	-6,642	10,99	2,079	-10,907	-2,377	-3,196	27	0,04

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Based on Table 2, it can be seen that significant t = 0.04 < α = 0.05. This means that the attitude of maintaining groundwater sustainability before and after being given training, there is a statistically significant difference between the average value of the attitude of maintaining groundwater sustainability in coastal communities.

Based on the results of the paired t-test, it can be seen that the average difference between the pretest (before training) and posttest (after training) scores is -6.642. The value (-) means that the attitude towards groundwater conservation after the training has increased by 10.99.

9. Effect of Training on Increasing Motivation to conserve natural resources of coastal areas

Table 3. Results of t-test Analysis of Motivation to Preserve Natural Resources in Coastal Areas Before and After Training

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 3 2 Pre Test Post Test	-3,428	8,0711	1,5253	-6,558	-0,298	-2,248	27	0,033

Based on Table 3, the results of the paired t-test show that the average difference between the pretest (before training) and posttest (after training) values is -3.4285. The value (-) means that the value of motivation to preserve water resources after training has increased by 8.0711.

From the statistical data, it can be seen that significant t = 0.033 < α = 0.05. This means that the motivation to preserve the natural resources of coastal areas, before and after being given training, there is a difference between the average value of community motivation.

DISCUSSION

The training conducted for coastal communities proved to have a positive impact on improving their knowledge, attitudes, and motivation in maintaining and preserving the coastal

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environment. Based on the evaluation results, there was a significant increase in the community's knowledge level, as seen from the pre-test and post-test results that showed a better understanding of groundwater conservation concepts.

On the attitude aspect, there was a positive change, where the community showed increased awareness and commitment to the importance of maintaining the coastal ecosystem. This is reflected in their statements in discussion sessions as well as more proactive behavior in maintaining beach cleanliness and sustainable use of natural water resources and groundwater.

Community motivation also increased after the training, marked by their enthusiasm in participating in follow-up activities, such as group discussions and implementation of simple conservation practices. However, some constraints such as the limited time of the training and the need for follow-up assistance.

In order to maintain the positive impact achieved, it is recommended that a sustainable training program involving various stakeholders is established, and adequate resources and technical support are provided.

CONCLUSIONS

The research results can be concluded as follows:

1) Knowledge of groundwater conservation, and attitude to maintain groundwater sustainability, as well as motivation to preserve natural resources in the coastal area of Gorontalo South Coast, from the test results before the training was in the low category, and after the training there was an increase or in the high category.
2) The groundwater conservation training that has been carried out is effective in increasing the knowledge, attitudes and motivation of the community to conserve groundwater in the southern coastal area of Gorontalo.

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