Provision of community based clean water in Tonggo village, Nangaroro District, Nagekeo Regency

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Abstract. The development of the clean water sector in rural areas is intended to help rural communities who do not have access to safe and decent clean water, especially the poor. Clean water facilities that have been built, then managed by the community with the establishment of a village institution called LPPAM (Drinking Water User Management Agency). Service reliability is indicated by the quality and continuity of water received by the water customer community. To test these allegations, research has been conducted using field observation techniques, interviews, and filling out questionnaires. The results showed that rural clean water management in Tonggo Village, for the majority of service aspects, was still in the category of less satisfied, and the quantity aspect was still insufficient. For water, quality is tasteless, colorless, and odorless. As for the continuity aspect, it still cannot flow 24 hours for some parts of the region in Tonggo Village. It is hoped that with this research, LPPAM - Tonggo will learn more or take courses and training to get community-based management so that they can work and serve the community better.

1. Introduction

The implementation of drinking water development and the health of the community environment, especially in its operations and maintenance, are very much needed for the sustainability of the development itself. Development patterns that are top-down and do not involve the participation of the community are suspected to be the cause of failure both in the implementation process and in continuous management. One important obstacle is poverty experienced by most rural communities. This community group has limited access to safe and decent water needs. Through several programs, the Government of Indonesia is trying to improve clean water services in rural areas. Several clean water programs have been running, including the Rural Infrastructure Oil Fuel Subsidy Reduction Compensation Program (PKPS-BBM IP). The Ministry of Public Works will develop a community-based drinking water supply program (PAMSIMAS) that reaches 5000 villages or 6 million people.

Tonggo Village, Nangaroro Subdistrict, Nagekeo District has an institution, namely LPPAM (Drinking Water User Management Agency) Tonggo. This institution is tasked to meet the needs of the people of Tonggo Village, with a total of 786 people consisting of 394 men, 392 women scattered in nine Neighborhood Associations (NA). The purpose of this study is to find out how much the LPPAM - Tonggo institution's performance is, with indicators, quantity, quality, continuity of water received by the water customer community and what factors inhibit the manager.

2. Theoretical framework

2.1. Water resource management

Water as part of natural resources, is part of the ecosystem. Therefore, water resource management requires an integrative, comprehensive, and holistic approach that is the reciprocal relationship
between engineering, social, and economical and must be environmentally sound in order to maintain its sustainability and sustainability. The research emphasized the same thing [1,2]. Because water concerns all life, water is a factor that influences the development of various sectors. Therefore, water resources management needs to be based on the participatory approach of all parties, including stakeholders. All public decisions must pay attention to the interests of the community by means of public consultation so that any policy that is established will be accepted by the community.

2.2. Management aspects
In general, water resources management departs only from one side, namely how to utilize and benefit from the presence of water. But it is not forgotten that if there is a profit, there must be a loss. Three aspects of water resource management that must not be forgotten, namely, aspects of utilization, conservation aspects, and aspects of protection.

- Aspects of Use: in the human mind, when it comes to water, the mind comes to be used immediately. Only after there is an imbalance between the needs and the available, humans begin to realize other aspects.
- Conservation Aspects: so that the utilization can be sustainable, the water needs to be preserved in terms of both quantity and quality. Maintaining the catchment area/springs from upstream to the receiving area is one part of the management, so the difference in the discharge of the dry season and the rainy season is not large. Likewise, keeping water protected from waste pollution.
- Control Aspects: we need to realize that in addition to providing benefits, water also has physical and chemical damage. Accustomed to being a dumping place for unused goods, either in the form of liquid (household and industrial waste) or other solid objects in the form of garbage in the water source area. Therefore, in the management of water resources should not be forgotten is the control of the destructive power in the form of waste or other.
- Aspects of Water Resource Management: one aspect of conservation, if it will not bring bad consequences.

2.3. Public services
The definition of public service according to the Minister of PAN Decree No. 25 of 2004 is all service activities carried out by public service providers as an effort to meet the needs of service recipients, as well as in the implementation of the provisions of legislation [3]. The grouping of these types of services is based on the characteristics and nature of the activities and the resulting service products, namely [1]:

- This type of administrative service is a type of service provided by a service unit in the form of recording, research, decision making, documentation and other administrative activities which as a whole produce final product in the form of documents, for example, certificates, permits, recommendations, information and others.
- Types of goods services are services provided by a service unit in the form of activities to provide and/ or elaborate physical, tangible materials, including distribution and delivery to direct consumers (as units or individuals) in a system.
- Types of services are types of services provided by service units in the form of facilities and infrastructure and their support.

2.4. Concept of customer satisfaction
The research states that satisfaction is the level of consumer feeling gained after consumers do/ enjoy something [2]. Thus, it can be interpreted that customer satisfaction is the difference between what consumers expect (the value of expectations) and the situation given by the company in an effort to meet consumer expectations. The level of customer satisfaction as a user of a product is strongly influenced by the products produced for consumers and the expectations of the products used. As for measuring the level of customer satisfaction, the system of complaints and suggestions and customer satisfaction surveys can be used. Conceptual consumer satisfaction can be described as figure 1.
2.5. Likert scale

Likert scale is a psychometric scale used in questionnaires and is one technique that can be used in evaluating a program or planning policy. Rensis Likert has developed a scale to measure the attitude of the community in 1932, which is now known as the Likert scale [4]. This Likert scale is a scale that can be used to measure attitudes, opinions, and perceptions of a person or group of people about a phenomenon or phenomenon. On a Likert scale, there are two forms of statements: positive statements that function to measure positive attitudes, and negative statements that function to measure the object's negative attitude. Positive statement scores start from 1 to strongly disagree (SD), 2 to disagree (D), 3 for doubt/Neutral (N), 4 for agree (A), and 5 to strongly agree (SA). Negative statement scores start from 1 to strongly agree (SA), 2 to agree (A), 3 to doubt/neutral (N), 4 to disagree (D), and 5 to strongly disagree (SD).

Likert scale is used to measure the agreement and disapproval of someone against a program plan, program implementation or the success rate of a program [4]. The procedure for creating a Likert scale is as follows:

- The researcher collects items that are quite a lot, relevant to the problem being studied, and consists of items that are quite clearly liked and disliked.
- Then the items were tried to a group of respondents who were quite representative of the population they wanted to study.
- The respondent above is asked to check each item, whether he likes (+) or does not like it (-). The response is collected and the answers that give an indication of the pleasure are given the highest score. There is no problem to give number 5 for the highest and score 1 for the lowest or vice versa. What is important is the consistency of the direction of the attitude shown. Likewise, whether the answer "agree" or "disagree" is called the preferred one, depending on the contents of the question and the contents of the items compiled.
- The total score of each individual is the sum of the scores of each item from that individual.
- Responses are analyzed to find out which items are very real boundaries between high scores and low scores on a total scale. For example, respondents at the upper 25% and lower 25% were analyzed to see how far each item in this group was different. Items that do not show a real difference, whether entered in high or low scores, are also discarded to maintain internal consistency of questions [5].

3. Methodology

The study was conducted in Tonggo Village, Nangaroro District, Nagekeo District, which consisted of 9 (nine) Neighborhood Associations (RT) and 2 months of study time. This research was conducted with a case study approach, so the data taken was a sample of the population using water in the form of filling out a questionnaire. In addition to interviews, data collection includes the physical data of the region, socio-economic data and data on the condition of the management of clean water facilities.
Research instruments that support data collection are data collection in the Tonggo village area. In this study, four alternative answers were taken to measure the adjusted Likert's scale, namely:

- Very Satisfied
- Satisfied enough
- Less satisfied
- Not satisfied

Parameters measured:
- Service Level
- Quantity
- Water quality
- Continuity

4. Analysis and discussion

Analyze the level of service satisfaction, quantity, quality, and continuity, proportional samples are used based on a large number of people or many souls in the area of residence. The answers from 65 respondents, the total value of 105, or the answer to the approach were less satisfied with the service carried out by LPPAM. The overall results of service satisfaction levels are found in table 5 below.

From the results of the recap above, it can be seen the results of service satisfaction, each NA has an answer that varies according to the service they receive. Very satisfying service according to the respondent's answers in NA 05, NA 06, NA 07 and NA 09. Judging from the amount or quantity of water needed by humans, the basic need for clean water is the minimum amount of clean water that needs to be provided so that humans can live properly, namely being able to obtain water needed to carry out basic daily activities or in short, quantity involves the amount of water that humans need in certain activities.

| NA | Village            | Family Head (FH) | Population | Number |
|----|--------------------|------------------|------------|--------|
|    |                    |                  | Male       | Female |
| 01 | Mautonggo          | 23               | 39         | 42     | 81    |
| 02 | Mauliti – Puuluto  | 22               | 47         | 41     | 88    |
| 03 | Wosambhi           | 18               | 20         | 28     | 48    |
| 04 | Puuwudhi           | 15               | 29         | 27     | 56    |
| 05 | Pauwua.A           | 23               | 57         | 42     | 97    |
| 06 | Pauwua.B           | 22               | 54         | 46     | 100   |
| 07 | Tonga Embo         | 25               | 49         | 56     | 105   |
| 08 | Maubare            | 24               | 44         | 52     | 96    |
| 09 | Maembo             | 32               | 55         | 58     | 103   |
|    | Total              | 204              | 394        | 392    | 774   |

| No | Facilities/Supporting Means | Number |
|----|------------------------------|--------|
| 1  | Village Office               | 1      |
| 2  | Primary School Building      | 1      |
| 3  | Clinic                       | 1      |
| 4  | Church                       | 1      |
| 5  | Mosque                       | 3      |
Table 3. Sample size.

| NA | Village          | Total population | Number of Samples |
|----|------------------|------------------|-------------------|
| 01 | Mautongo         | 81               | 65                |
| 02 | Mauliti – Puuluto| 88               | 65                |
| 03 | Wosambi          | 48               | 36                |
| 04 | Puuwudhi         | 56               | 51                |
| 05 | Pauwua.A         | 97               | 78                |
| 06 | Pauwua.B         | 100              | 78                |
| 07 | Tonga Embo       | 105              | 84                |
| 08 | Maubare          | 96               | 75                |
| 09 | Maembo           | 103              | 84                |
|    | Total            | 774              | 616               |

Table 4. Level of service satisfaction NA.01 Mautongo.

| Satisfaction Level | Number of Respondent Answers | Values | % |
|--------------------|------------------------------|--------|---|
| Very Satisfied     | 0                            | 0      | 0 |
| Enough Satisfied   | 10                           | 30     | 15.38 |
| Dissatisfaction    | 20                           | 40     | 30.77 |
| Not satisfied      | 35                           | 35     | 53.85 |
| Total              | 65                           | 105    | 100 |

Table 5. Recap of service satisfaction.

| Service Level | Answer Percentage |
|---------------|-------------------|
|               | Very Satisfied    | Satisfied | Less Satisfied | Not Satisfied |
| NA 01         | 0                  | 15.38     | 30.77          | 53.85         |
| NA 02         | 15.38              | 30.77     | 30.77          | 23.08         |
| NA 03         | 0                  | 16.67     | 55.56          | 27.77         |
| NA 04         | 15.69              | 21.57     | 43.14          | 19.6          |
| NA 05         | 57.69              | 26.92     | 11.54          | 3.85          |
| NA 06         | 51.95              | 26.92     | 11.54          | 9.59          |
| NA 07         | 66.67              | 23.81     | 4.76           | 4.76          |
| NA 08         | 9.33               | 14.67     | 49.33          | 26.67         |
| NA 09         | 63.09              | 26.19     | 5.65           | 5.07          |

Table 6. Recap of service satisfaction values.

| Service Level | Answer Value | Total |
|---------------|--------------|-------|
|               | Very Satisfied | Satisfied | Less Satisfied | Not Satisfied |     |
| NA 01         | 0             | 30       | 40             | 35             | 105  |
| NA 02         | 40            | 60       | 60             | 15             | 175  |
| NA 03         | 0             | 18       | 60             | 10             | 88   |
| NA 04         | 32            | 33       | 44             | 10             | 119  |
| NA 05         | 180           | 63       | 18             | 3              | 264  |
| NA 06         | 160           | 63       | 18             | 8              | 249  |
| NA 07         | 224           | 60       | 8              | 4              | 296  |
| NA 08         | 28            | 33       | 74             | 20             | 155  |
| NA 09         | 212           | 66       | 10             | 4              | 292  |
Table 7. Recap percentage of satisfaction.

| Quantity | Very Enough | Enough | Less | Not Enough |
|----------|-------------|--------|------|------------|
| NA 01    | 15.38       | 15.38  | 15.38| 53.86      |
| NA 02    | 15.38       | 30.77  | 30.77| 23.08      |
| NA 03    | 0           | 11.11  | 55.56| 33.33      |
| NA 04    | 13.73       | 19.61  | 45.1 | 21.56      |
| NA 05    | 48.72       | 24.36  | 14.1 | 12.82      |
| NA 06    | 51.28       | 26.92  | 11.53| 10.27      |
| NA 07    | 61.9        | 21.43  | 7.14 | 9.53       |
| NA 08    | 9.33        | 12     | 44   | 34.67      |
| NA 09    | 47.18       | 22.62  | 15.1 | 15.1       |

Table 8. Recap of quantity level values.

| Quantity | Quantity Level Values | Total |
|----------|-----------------------|-------|
|          | Very Enough | Enough | Less | Not Enough |
| NA 01    | 40          | 30     | 20   | 25         | 115   |
| NA 02    | 40          | 60     | 40   | 15         | 155   |
| NA 03    | 0           | 12     | 40   | 12         | 64    |
| NA 04    | 28          | 30     | 46   | 11         | 115   |
| NA 05    | 152         | 57     | 22   | 10         | 241   |
| NA 06    | 160         | 63     | 18   | 8          | 249   |
| NA 07    | 208         | 54     | 12   | 8          | 282   |
| NA 08    | 32          | 27     | 66   | 27         | 152   |
| NA 09    | 160         | 57     | 16   | 8          | 241   |

The conclusion from the quantity aspect states that there are still areas that are still not (less) enough for the amount of water received, namely at NA 03, NA 04 and NA 08.

Table 9. Recap percentage of quality level.

| NA  | Tasteless (%) | Colorless (%) | Odorless (%) |
|-----|---------------|---------------|--------------|
| 01  | 10            | 10            | 30           |
| 02  | 20            | 20            | 25           |
| 03  | 4             | 20            | 12           |
| 04  | 10            | 23            | 18           |
| 05  | 19            | 11            | 48           |
| 06  | 21            | 9             | 48           |
| 07  | 18            | 6             | 60           |
| 08  | 9             | 33            | 34           |
| 09  | 19            | 8             | 48           |
| Total | 130         | 140           | 323          |
| Average | 14.44      | 15.56         | 35.89        |

4.1. Quality level analysis

Water quality generally shows the quality or condition of water in terms of quality (quality) of water directly or indirectly pollution will affect the quality of water. In accordance with the consideration of the quality of drinking water, the management of water used by humans as drinking water is based on
water quality standards, especially in the assessment of drinking water products produced, as well as in planning systems and processes to be carried out on water resources. Customer perceptions of water quality in this study are only physical parameters. This parameter is taken because the physical parameters which include smell, taste, color, and turbidity can be translated by the human senses, such as the sense of smell (smell), sense of sight (color and turbidity), and sense of taste (taste), so that respondents can provide value. Good quality water will be assessed physically, showing the condition is odorless, tasteless, colorless and not cloudy.

From the research results obtained, the quality of water used and consumed by the community is of good quality because it is tasteless, colorless and odorless.

4.2. Continuity level analysis
The ideal flow continuity is 24 hours non-stop, considering the need for water availability is not time dependent. Continuity is strongly related to water usage habits. During peak hours of use (around 6 and 18 hours), water consumption occurs simultaneously. With the availability of 24-hour water, it can help the welfare of people's lives because it is one of the basic needs. If the availability of clean water is very lacking, it can affect the economy of the community because they have to buy water sold through a tanker car.

| Quality | Respondent Answer (People) |
|---------|-----------------------------|
|         | Tasteless | Colorless | Odorless |
| NA 01   | 10        | 10        | 35       |
| NA 02   | 20        | 20        | 25       |
| NA 03   | 4         | 20        | 12       |
| NA 04   | 10        | 23        | 18       |
| NA 05   | 19        | 11        | 48       |
| NA 06   | 21        | 9         | 48       |
| NA 07   | 18        | 6         | 60       |
| NA 08   | 9         | 33        | 34       |
| NA 09   | 19        | 8         | 48       |

Table 10. Respondents answers quality.

| RT | 24 Hour Flow (%) | Periodic Flow (%) | Unpredictable (%) |
|----|------------------|-------------------|------------------|
| 01 | 8                | 132               | 181              |
| 02 | 9                | 23                | 3                |
| 03 | 9                | 18                | 15               |
| 04 | 10               | 18                | 23               |
| 05 | 48               | 11                | 19               |
| 06 | 52               | 17                | 9                |
| 07 | 63               | 18                | 3                |
| 08 | 9                | 18                | 51               |
| 09 | 52               | 8                 | 17               |
| Total | 260           | 132               | 181              |
| Average | 28.89         | 14.67             | 20.11            |

Table 11. Percentage of the answer to continuity.
The results of the analysis for the level of continuity obtained the flow time is still uncertain. Even though in some other NAs, the flow time is smooth for 24 hours, so there need to be arrangements for equal use of water.

5. Conclusions
The service aspect states that it is insufficient from NA 01, NA 02, NA 03, NA 04, NA 08, NA 09 and which stated enough - enough from NA 05, and NA 07.
- The quantity aspect states that it is not enough from NA 01, NA 02, NA 03, NA 04, NA 08, NA 09 and which stated enough - enough from NA 05, and NA 07.
- Quality Aspects Does not taste 14.44% on average, 15.55% in color, and 35.89% odorless.
- Aspects of Continuity 24-hour flow, 28.89%, 14.67% hourly flow, and 20.11% uncertainty

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