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Community Empowerment in Household Wastewater Management in Songan A Village, Kintamani Sub-District, Bangli

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Abstract. The management of household wastewater is basic sanitation and does not get enough attention; poor sanitation conditions affect decreasing the quality of the environment, especially public health. The identification and analysis of sanitation problems, especially in the treatment of household wastewater, was carried out in Songan A Village, Kintamani District, a densely populated area located on the shores of Lake Batur and the necessities of living and agriculture using lake water, this condition requires pollution control. The research was conducted by means of field surveys, interviews, and literature studies on household waste management and public health knowledge, analysis, and descriptive qualitative studies. The research shows that 30% of the experience of public health and household wastewater treatment in Songan A Village is still lacking, and waste treatment does not meet the requirements. Community empowerment was needed in public health knowledge and household wastewater management to create a village of Songan A that was comfortable, clean, and supports the Mount Batur geotourism area's image as a world tourist attraction.

Keywods: Community Empowerment; Household Waste; Community Health; Songan a Village.

Introduction

Disaster-prone areas and common public health knowledge often get less attention and are not a priority in infrastructure development in several places. It was sustainably structuring tourism infrastructure, especially settlements around the geopark of Mount Batur and Lake Batur, comprehensive arrangement, especially public health and avoiding high to very high landslide threat locations [1]. The average rainfall intensity in the Caldera area of Mount Batur is 125 mm/day with five hours, which affects the amount of infiltration that causes inundation and slope collapse. The higher the infiltration that occurs, the more significant the change in pore water pressure and the longer the duration causes inundation or surface runoff that causes flash floods and damage to the residential sanitation system [2]. Poor sanitary conditions certainly endanger the community itself, and the impact will cause various types of diseases. It must be supported by adequate sanitation facilities and infrastructures, such as the availability of clean water, the availability of proper Bathing, Washing, and Toilet equipped with a sewage system or sewage treatment it liquid or waste solid. People should treat domestic wastewater before being discharged into water bodies. Treatment

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ideally uses a piping system connected to each building, which was then collected for waste to be processed in the Wastewater Treatment Plant before being disposed of into the environment.

The villages of Songan A and B are one of the villages that have a beautiful panoramic view of the caldera of Mount Batur but are also prone to disasters [3], located on the coast of Lake Batur with a background of forest vegetation, and the uniqueness of the socio-cultural-religious community of Bali Aga. The sanitation problem, especially in the treatment of household wastewater, occurs in Songan A Village, which consists of 15 banjars or hamlets. The area of Songan A Village has an unstructured settlement. Most of the village community has dense colonies with inadequate sanitary conditions, giving a slum impression to the environment. This slum condition will damage the image of the geotourism tourism area of Mount Batur and has the potential to make the community vulnerable to disease.

In his research, Santiyadnya (2016) states that the low quality of public health, environmental health conditions, especially those concerning basic sanitation, and people's behavior that does not support a clean and healthy lifestyle have contributed to the low status of the poor and public health [4]. The chances of contracting dengue fever and other endemic diseases in the Kintamani, Batur, Songan, and Trunyan areas are very high because people's productive activities are not environmentally friendly. Lake Batur, one of the Kintamani tourism labels, was often used as an estuary for household, agricultural/livestock, and industrial waste canals that can damage Lake Batur's ecosystem, cleanliness, and beauty and even threaten the community fishery cultivation business in Lake Batur ponds.

It was necessary to empower the community, especially in the management of household wastewater, to achieve clean and healthy environmental sanitation. Community participation is essential in protecting the environment starting from the smallest environment, namely the household, until finally the village of Songan A is created which is comfortable, clean and the image of the geotourism of Mount Batur is maintained.

Literature Review

Community Development

Sunyoto Usman, quoted by Abu Huraerah in Community Organizing and Development, said that community empowerment is a process within the framework of an effort to strengthen what is commonly called community self-reliance or independence [5]. In this process, the community is assisted in analyzing the problems at hand, assisted in finding alternative solutions to these problems. It is shown strategies to utilize the various abilities they have.

According to quoted in his book Edi Suharto, empowerment contains two key definitions: power and vulnerable groups [6]. Management here is defined not only in terms of political power in a narrow sense but the authority or control of clients over:

Personal choices and life opportunities, the ability to make decisions about lifestyle, place of residence, and work.

Defining needs, the ability to determine deficiencies in line with their aspirations and wants.

Ideas or ideas, the ability to express and contribute ideas in a forum or discussion freely and without pressure.

Institutions, the ability to reach, use, and influence community institutions such as social welfare, education, and health institutions.

Resources, the ability to mobilize formal, informal, and social resources.

Economic activity, the ability to utilize and manage the mechanisms of production, distribution, and exchange of goods and services.

Reproduction, knowledge to the birth process, child care, education, and socialization

Sondang P. Siaga, quoted by Khoriddin in the book Community Development, explained that empowerment includes several objectives, namely;

Social justice

Prosperity is evenly distributed

The same treatment in the eyes of law

Material, mental and spiritual well-being

Happiness for others

Peace and safety

Household Wastewater

The definition of liquid waste is the residue of a business or activity in liquid form. According to PP 82 of 2001, liquid waste is waste in the form of water because liquid waste produced both household and industrial waste is in the form of water discharged into rivers. Wastewater can also be defined as water or liquid, which is the residue of human activities from household activities or domestic waste and industrial waste.

The Minister of Environment Regulation No.5/2014 states that domestic wastewater originates from residential businesses and activities, restaurants, offices, commerce, apartments, and dormitories. Domestic and non-domestic liquid waste has several characteristics according to its source, the characteristics of liquid waste can be classified into physical, chemical, and biological characteristics as follows [7]:

- Physical Characteristics

This physical characteristic consists of several parameters, including:

Total Solid (TS)

Solids consist of organic and inorganic solids which can dissolve, settle or be suspended. This material will eventually settle to the bottom of the water, causing silting at the bottom of the receiving water body

Total Suspended Solid (TSS)

This is the amount of weight in mg/1 of dry sludge in wastewater after filtering with a 0.45micron membrane.

Color.

Basically clean water is colorless, but over time and the anaerobic conditions increase, the color of the waste changes from gray to black.

Turbidity

Turbidity is caused by suspended solids, both organic and inorganic, and shows the optical properties of water which will limit lighting into the water.

Temperature is a very important parameter due to its effect on chemical reactions, reaction rates, the life of aquatic organisms and the use of water for various daily activities.

Smell

Caused by the air generated in the material decomposition process or the addition of substances to the waste.

- Chemical Characteristics

Biological Oxygen Demand (BOD)

Biological oxygen demand or biological oxygen demand is the amount of oxygen required by microorganisms in environmental water to break down or degrade or oxidize organic waste contained in water.

Chemical Oxygen Demand (COD)

Is the amount of oxygen needed in water for the chemical reaction process to decompose the existing pollutants. COD is expressed in ppm (parts per million).

Protein

Protein is an important part of living things, including plants and unicellular animals. In liquid waste, protein is an element that causes odor, due to the process of decay and decomposition by bacteria.

Carbohydrate

Carbohydrates include: sugar, starch, cellulose and wood threads consisting of elements C, H, and O. Sugar in wastewater tends to be decomposed by enzymes from certain bacteria and yeast produces alcohol and CO2 gas through the fermentation process.

Oil and Fat

Oil and grease are pollutants that are found in various waters, one of the sources of pollution is agro-industry.

Detergent

Detergents include organic materials that are widely used for household, hotel and hospital purposes. The main function of detergents is as a cleaner in washing, so that soil, grease and others can be separated.

Degree of acidity (pH)

Normal water which meets the requirements for life has a pH of about 6.5 t 7.5. Water will be acidic or alkaline depending on the size of the pH. If the pH is below normal pH, then the water is acidic, while water that has a pH above normal pH is alkaline.

- Biological Characteristics

Biological characteristics are used to measure water quality, especially water consumed as drinking water and clean water. The parameter commonly used is the number of microorganisms contained in wastewater. Biological wastewater treatment can be defined as a process that involves the activities of microorganisms in the water to transform chemical compounds contained in water into other forms or combinations. Microorganisms consume organic materials to create new cell biomass and organic substances and utilize the energy generated from oxidation reactions for their metabolism [7].

Management of Household Wastewater/Domestic Waste

According to Mubin (2016) Wastewater management can be done naturally or with the help of equipment. Natural wastewater treatment is usually carried out with the help of stabilization ponds. The stabilization pond is a pond that is used to treat wastewater naturally. Stabilization ponds are highly recommended for wastewater management in tropical and developing countries because the costs involved are relatively inexpensive but require a large area of considerable retention time (20-50 days). Commonly used stabilization ponds are anaerobic ponds (anaerobic ponds), facultative ponds and maturation ponds (anaerobic/maturation pounds). Anaerobic ponds are usually used to treat wastewater with highly concentrated organic matter, while maturation ponds are usually used to destroy micro-organisms in wastewater [8].

The things that are taken into consideration in selecting a domestic wastewater treatment system according to the guidelines for urban wastewater treatment of the Kimpraswil Department in 2003 are based on factors of population density, available water sources, groundwater level depth, and the ability to finance.

Based on these factors, a wastewater treatment system is selected by considering these conditions to the possibility of implementing a centralized treatment system (Off-Site System) or a local treatment system (On-Site System) by comparing the advantages and disadvantages as in Table 1[9]:

Table 1. Comparison Between Off-Site System dan On-Site System

Off-site System	On-Site System
Advantages: Providing the best service Fits high density areas, Pollution of water bodies and groundwater can be avoided, Has a longer service life,	Advantages: Using simple technology, Low cost required, The community and each family can provide their own, Operation and maintenance by the community, Benefits can be felt immediately.
Disadvantages: Requires high investment, operation and maintenance costs, Using high technology, Cannot be done by individuals, Long time in planning and implementation, It needs good management, operation and maintenance	Disadvantages: Cannot be applied to every area, for example soil permeability, soil density, etc. Limited function is only from disposal of human waste, does not serve bathroom waste water and used washing water, Operation and maintenance is difficult.

Source : Asmadi and Suharno, 2012

Method

Research was a qualitative descriptive study with the location of research activities in Songan A Village, Kintamani District, Bangli Regency. Primary and secondary data collection was carried out by means of literature studies and field surveys. In qualitative research, data analysis was carried out from the time of collection to the completion of data collection.

According to Miles and Huberman (1992:15) [1], in qualitative analysis, the data appearing in the form of words rather than a series of numbers. Activities in analyzing data related to that data may have occurred in a variety of ways (observation, interviews, document digest, tapes) and which are usually processed before they are ready for use (through recording, typing, editing, or transcribing), but the qualitative analysis still uses words, which are usually arranged into an extended text, data analysis in qualitative research is carried out from before entering the field, during the area, and after completion in the field [10].

Results and Discussion

Songan A village is located in Kintamani District, Bangli Regency, Bali Province. Songan A Village has 15 Banjars with an area of 1280 ha. This area is mostly agricultural 98 ha, housing with an area of 19.27 ha and 365.73 ha of wetland, graves 20 are. Geographically, Songan A village can be seen on the location map in Figure 1;

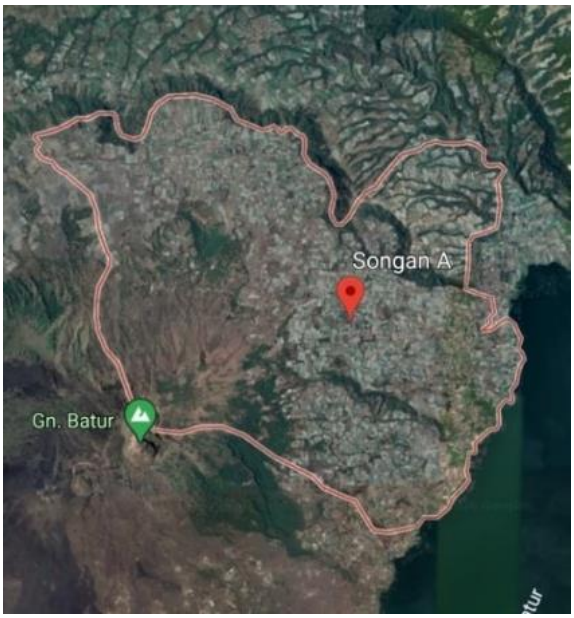

Figure 1. Map of Songan Village A

Source : www. Google Earth, 2020

Based on the Demographic Data by Population by Region of Songan A Village, 8175 people, consisting of 4095 men, 4080 women, spread across 15 hamlets or banjars. Judging from the population, Desa Songan A is an area with a high level of density where the things that are taken into consideration in the selection of a domestic wastewater treatment system according to the guidelines for urban wastewater treatment of the Kimpraswil Department in 2003, one of which is based on population density factors. From the population, it can be determined that the capacity of wastewater that is produced every day.

To calculate the capacity of domestic waste in Songan A Village as follows:

Total population = 8175 people

The resulting liquid waste = 120 liters/person/day

Total liquid waste = Total population x liquid waste per person

= 8175 people x 120 liters/per person/day

= 981,000 liters/day or 981 m3/day

Thus, the amount of liquid waste produced in Songan A Village is 981m3 per day.

There are 357 academies/undergraduate graduates, 719 high school / vocational school graduates, 663 junior high school graduates, and 2380 elementary school graduates. Educational background will greatly influence the livelihood patterns of the population, such as the people in Songan A Village. They live on the outskirts of Lake Batur, generally working in the informal sector such as farmers/planters, fishers/fisheries, and traders. This will also have an impact on their ability to fulfill and access the available facilities and infrastructure.

From the results of the author's field survey, There was found that the condition of the household wastewater treatment system in Songan A Village still needs further regulation. The sewerage for household waste is still not fully regulated, it is close to clean water sources, and the treatment of household waste has not been developed and integrated. The environmental drainage channel is also not yet available. The conditions of household waste disposal in Songan Village can be seen in Figure 2; 3; 4; 5:

Figure. 2. Wastewater Disposal Conditions (Kitchen) adjacent to clean water sources

Figure. 3. Wastewater Disposal Conditions (Laundry)

Figure. 4. Conditions for Disposal of Wastewater and runoff (No drainage available)

Figure. 5. Source of Clean Water (adjacent to sewage disposal)

Community empowerment efforts are to encourage people to be independent and have the ability to make their own decisions, take their initiatives, and improve their own lives. The involvement can be in the form of activities in the form of donations of thoughts, opinions, or actions, and it can also be in the form of cost-sharing, materials for the improvement of the

environment. Community participation is important in protecting the environment starting from the smallest environment, namely the household, until finally the village of Songan A is created, which is comfortable, clean and supports the image of the geotourism area of Mount Batur as a world tourist attraction.

Basically, community empowerment can be seen from its participation in 5 stages of activities, namely, First, taking the initiative where the community begins to be introduced to community empowerment, which aims to increase the potential of society. In this stage, awareness, encouragement, motivation, and opportunities for the community are carried out, including authority, which is by their function and role. After that began to introduce the various problems faced. Thus, their understanding of the problems in their environment can generate multiple positive ideas and ideas, because without understanding the problems, it is usually difficult to come up with initiatives. The role of official and customary village leaders or rulers is very potential in taking the initiative because they have the authority and ability to mobilize the community in their village environment. Likewise, in Songan A Village, the potential for taking initiatives requires a leadership role; in this case, the official and customary village rulers. By introducing problems through village meetings or in the Balinese language, Sangkap will awaken, encourage, and motivate the community to take action on their environment.

Second, at the planning stage, a community participation approach is necessary because not all communities can plan independently. In this stage, the organization should be given an overview of household wastewater management planning so that the community can try to make it happen. In planning the wastewater treatment system that will be used, it is possible to choose the application of a centralized treatment system (Off-Site System) or a local treatment system (On-Site System) by comparing the advantages and disadvantages.

Third, at the implementation stage, the community can play a role in various fields, for example, in the provision of land, building materials, labor, maintaining order, security, and so on.

Fourth, at the stage of management and maintenance of the household wastewater treatment system, the members of the community need to do so. The success of leadership is very much influenced by the residents' nurturing and caring for their environment. Community empowerment must continue to be carried out to maintain, repair, and carry out maintenance so that the quality of household waste treatment increases with the active participation of community members.

Conclusion

That 30% knowledge of public health and household wastewater treatment in Songan A Village is still lacking, and waste treatment does not meet the requirements and standards. Community empowerment was needed in public health knowledge and household wastewater management. Community empowerment in household wastewater management must involve various components of society, and the role of traditional leaders is very much needed in taking the initiative to identify problems through village meetings or in Balinese called *Sangkep*, which will awaken, encourage and motivate the community to take action on the provision of public health infrastructure. Centralized domestic wastewater treatment infrastructure needs to be implemented to

prevent contamination of groundwater and also Lake Batur water to support the image of the Mount Batur geotourism area as a world tourist attraction.

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