

Rainwater Catchment Reservoir To Support The Development of Community-Based Sustainable Ecotourism In Sumberkima Village Forest In The North of Bali-Indonesia

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Abstract.

Sumberkima Village is one of the villages in Buleleng Regency that has extensive forest land. Despite having vast forests, Sumberkima Village still struggles with poverty, unemployment, and a low level of education among its residents. Sumberkima Village also has significant disaster potential, particularly droughts during the dry season, and the village has previously experienced fires due to extreme dryness. This disaster occurs in accordance with predictions regarding the impacts of climate change, which indicate that several areas will experience significant adverse effects due to climate change (1). In addition to climate change, the summer drought that exacerbates the water crisis in Bali is also attributed to water usage by the tourism sector (2). This Community Service aims to create a mini reservoir to improve the economy and tourism in Sumberkima Village. The implemented community service program involves the application of simple water harvesting technology and empowers village communities through tree planting initiatives.

Keywords: Rainwater reservoir; tourism; Bali; forest and ecotourism.

I. INTRODUCTION

Sumberkima Village is one of the villages with tourism potential, known as "Nyegara Gunung." Sumberkima Village features a forest area with hilly terrain and a stunning beach view. Sumberkima Village covers an area of 754 hectares, divided into eight administrative hamlets, namely: (1) Banjar Dinas Tegal Sari; (2) Banjar Dinas Taman Ayun; (3) Banjar Dinas Taman; (4) Banjar Dinas Sumberkesambi; (5) Banjar Dinas Sumber Bunga; (6) Banjar Dinas Pegametan; (7) Banjar Dinas Sumber Pao; (8) Banjar Dinas Mandar Sari. The number of tourist visits to Sumberkima Village is relatively high because of its proximity to Pemuteran Village, which is a national champion in village tourism. However, this high level of tourist visits is not matched by the length of stay and the amount of money tourists spend when visiting Sumberkima Village. This situation is due to the lack of tourist activities, which forces tourists to stay longer, and the underdeveloped marketing of tourism destinations. Sumberkima village features the beautiful Gili Putih beach, boasting enchanting white sand. Gili Putih beach also boasts beautiful underwater tourism potential, thanks to the efforts of the local community in maintaining its well-maintained coral reefs. Sumberkima has tropical forests and mangrove forests that have great potential to be developed into tourism products. From the top of the hill, tourists can enjoy a vast view that includes the sea with the mesmerizing Gili Putih, the village's green forest, as well as the towering mountains and hills.

In fact, from a distance, tourists can see the islands across, adding to the beauty of the panorama. Although situated in a strategic location on Bali's northern tourism map, Sumberkima Village continues to struggle with poverty, unemployment, and low educational levels. Sumberkima Village also has a significant disaster potential, especially drought during the dry season, as the village has previously experienced fires due to extreme drought. This condition has occurred as predicted regarding the impact of climate change, with some areas experiencing significant adverse effects (1). In addition to climate change, summer droughts that have led to a water crisis in Bali are also caused by water usage by the tourism sector (2). This community service activity aims to help improve the community's economy and enhance its capacity

to cope with the impacts of climate change. The target communities of this community service program is divided into two groups, namely: (1) Social Forestry Business Group (KUPS) of Sumberkima Village. This group is a community that is vulnerable to the impacts of climate change. During the dry season, forest fires often pose a threat to property and lives. During the rainy season, they often experience flooding in the yards of homes around the forest.

II. METHODS

The community mentoring activities to be carried out are based on the 7D Approach, which emphasizes balance, participation, profit orientation, and focuses on the community as the subject (Dhamotharan M, 2009). This approach focuses on achieving improvements in the short-term lives of the community as well as the long-term development of community capacity. The 7D Approach consists of the following systematic stages:

D1 – *Developing relation*

D2 – *Discovering capacities*

D3 – *Dreaming of community future*

D4 – *Directions of community actions*

D5 – *Designing community actions*

D6 – *Delivering Planned Activities*

D7 – *Documenting Outputs, Outcomes and Learning*

The implementation method of this Community Service also utilizes the SLA approach (Sustainable Livelihood Approach). SLA is one of the community empowerment approaches that involves a group of people in learning and engaging in activities sustainably to improve their quality of life (3, 4). In detail, the steps for implementing this community service program are: (1) Preparation Stage. This stage aims to ensure the readiness of all parties involved in this program. This stage includes the preparation of training materials; (2) Coordination with relevant parties. The team has contacted all stakeholders involved in this Community Service Program to discuss the schedule, time, and location of the activities. Some locations require multiple survey visits, such as determining the site for a rainwater reservoir and selecting trekking routes in the village forest, making coordination very important; (3) Implementation stage. After the preparation stage, the program were carried out through several main activities: (1) construction of rainwater storage ponds, (2) training of tour guides, (3) training on packaging of tourism products, and (4) training on marketing village tourism.

III. RESULT AND DISCUSSION

This community service activity began with identifying a location for the placement of a reservoir. Then, a focus group discussion was held with the tourism stakeholders of Sumberkima Village. The result of the discussion was a mutual agreement that the reservoir would be placed in the Tukad Salak forest area. This area is a forested region with a small spring that has the potential to become a village reservoir. With funds from the Directorate of Research and Community Service of Indonesia in 2025, the community collaborated to build a reservoir in Sumberkima Village. From a small spring and with the added spirit of communal cooperation, the village's rainwater reservoir was finally realized. The local community's dream of having a water reserve in the village forest during the dry season was finally achieved. Photo of the rainwater catchment pond can be seen in picture 1 and picture 2.



Fig 1. The team is spreading fish into the reservoir



Fig 2. University team with local people in front of the water reservoir

The construction of rainwater catchment ponds prevents rainwater from causing floods and becomes a valuable water source during the dry season. With the presence of rainwater catchment ponds in the village forest, the trees that were previously planted using CSR funds from PT Vale Indonesia and Undiksha can grow well during the dry season. As these trees grow, they will become a long-term beneficial water source for the welfare of farmers, livestock breeders, and the entire community. Additionally, the risk of fires during the dry season can be mitigated by the presence of rainwater catchment ponds at various points in the village forest. Following the construction of the reservoir, this community service program conducts training activities to enhance the skills and knowledge of tour guides, enabling them to provide tourists with relevant and engaging information. Additionally, the training provides basic language knowledge that is effective for interacting with tourists. The community service team has also conducted Training on Forest Village-Based Tourism Product Packaging. The training was designed to equip local people with the skills to create attractive and comprehensive tourism packages, including planning routes, activities, accommodations, and transportation. Participants will learn about various types of tourism packages (e.g., cultural, nature, and religious packages) and how to combine them effectively. This training also includes skills in calculating competitive selling prices for tourism packages. The training photos can be seen in picture 3 and picture 4.



Fig 3. Training activity



Fig 4. Photo session after training

The construction of a reservoir in Sumberkima Village is directly related to efforts to achieve the Sustainable Development Goals (SDGs), namely:

(1) Climate Change Mitigation

The forest in Sumberkima Village is experiencing extreme drought and frequent fires. Conversely, during the rainy season, flooding occurs. Tree planting efforts continue to be carried out with the assistance of CSR from PT. Vale Indonesia and Undiksha. Therefore, the construction of a reservoir in the forest will help address drought and revive the trees that have been planted. The rainwater reservoir to be built with PKM funds will greatly help store water during the rainy season, prevent flooding because the water is collected, and significantly assist in handling drought in the dry season.

(2) Decent Work and Economic Growth

This community service program also aims to enhance the capacity of the local guide in managing tourism within the village forest. This program also promotes economic growth in Sumberkima Village by providing training for tour guides, instruction in packaging forest-based tourism products, and training in tourism marketing.

This community service activity also supports the Asta Cita program. The Asta Cita program is the eighth priority program of President Prabowo Subianto and Vice President Gibran Rakabuming Raka's administration aimed at realizing a Golden Indonesia 2045. In relation to the Asta Cita Program, this community service activity strengthens the national defense system. It promotes the nation's self-sufficiency through self-sufficiency in food, energy, water, creative economy, green economy, and blue economy. The construction of a rainwater catchment pond helps mitigate droughts in the summer and prevent floods during the rainy season. Indirectly, it also helps to improve the food self-sufficiency of farmers in the Sumberkima village forest. The tree planting carried out with the support of PT Vale Indonesia is expected to thrive with the help of this rainwater catchment pond. Thus, in the long term, it increases water reserves, achieves food self-sufficiency, and enhances the overall economy of the village community. Additionally, this activity enhances human resource development, health, and the empowerment of youth in development. This community service is part of the Social Humanities research focus related to rural development and tourism. Using a social engineering approach to build the capacity of local people in managing tourist villages, the capacity in preserving forests, and mobilizing youth groups to assist in marketing tourism products in the village.

IV. CONCLUSION

Water resources are a basic necessity for the life of humans, animals, and plants. The availability of water is critical, but it must be in adequate quantities. Reservoirs are one way to harvest and provide water, especially for agriculture during the dry season and to prevent flooding during the rainy season. The community service program for the construction of reservoirs in Sumberkima Village, funded by the DPPM of the Ministry of Higher Education, Science, and Technology (Kemdiktisaintek) in 2025, has been successfully carried out. Collaboration with the local community is the key to the successful implementation of this program. The community is very grateful for the provision of this reservoir in Sumberkima Village, as it will benefit the preservation of the village forest, while also providing economic benefits for farmers and livestock farmers in the surrounding area. The community hopes to get additional reservoirs at several other locations in the Sumberkima Village forest.

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