



Increasing the Utilization of Bamboo for Rainwater Capture Networks in Batu Jaran Hall, Batulayar Village

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Abstract: The problem of clean water for people in the highlands always arises every dry season. Getting clean water every day requires a lot of effort to find a water source that is very far away. Some people even have to spend additional money to get clean water. This is also the case with people in Batulayar sub-district who live in the highlands, especially in the mountains. Surface water sources are not available so that it becomes a routine problem every year. In overcoming this problem, some people make rainwater reservoirs either in groups or individually. The reservoir is made with several materials in the form of a reservoir by making a hole in the ground surface covered with plastic or tarpaulin and a reservoir made of brick/brick masonry. The method of capturing water is directly from the ground surface by making a channel and there is by making a reservoir from local materials in the form of bamboo which then the captured water is channeled into the reservoir. The use of local materials in the form of bamboo is very potential to be used because in the Batulayar area, especially in the mountains, the availability of bamboo is very abundant. Bamboo with an age of 3 years already has quite high strength both for water flow materials and as construction materials. The weakness that is still faced by the community in utilizing bamboo is the connection method which is still very simple, so that when it rains with high intensity the connection comes loose. In using bamboo as a rainwater catchment network, it is very important to socialize the right connection model to be used in capturing rainwater.

Keywords: Bamboo; Rain; Clean water; Reservoir

Introduction

Clean water is one of the basic human needs. Without water, living things cannot live, grow and develop. The existence of water on the surface of the earth is very difficult to predict depending on the function of space and time. Each region has different potential for surface and subsurface water availability. An area has abundant surface and subsurface water sources, while in a region it is very poor in water availability, so that every dry season there is always difficulty in getting clean water. Several things that can affect the occurrence of difficulties in getting clean water in an area are; the unavailability of surface water sources in the form of rivers, springs, seepage and very high elevation areas (Yasa, et al., 2024).

In getting water for the daily needs of people in areas where water availability is limited, people usually look for water sources down very far, even to meet their drinking water needs, people have to buy it. In mountainous/highland areas, there are many local materials that can be used for various purposes such as for house construction materials, paving materials, clean water networks and for other purposes. One of the abundant local materials is bamboo. Bamboo plants have very fast growth, at the age of 3 years it can be harvested with very good quality.

Bamboo has advantages compared to other local materials including: easy to grow, has high physical and mechanical strength, fast harvest age, does not require difficult maintenance and is resistant to drought. The use of bamboo is currently still limited to simple house

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buildings, yard fence materials and used as firewood and used as materials for making traditional musical instruments.

According to Sutiyono (2014) bamboo can be used as paper, particle board, pulp and as energy materials in the form of charcoal. Research on the use of bamboo for construction materials has been attempted, including for truss frames (Janssen, 1980; Morisco and Mardjono, 1995), bamboo layers (Guisheng, 1985; Bamboo Information Center, 1994; Subiyanto and Subyakto, 1996), concrete reinforcement (US Army, 1964; Krisnamurthy, 1990; Surjokusumo and Nugroho, 1993; Lopez, 1996), soil reinforcement (Douglas, 1990) and water channels (Hardjoso, 1959 and 1963; Lipangile, 1985). The use of bamboo to catch rainwater or gutters from the roof of the house can be done simply by splitting the bamboo into 2 (two) parts. The length of the bamboo is cut according to the length of the roof of the house. The bamboo sections are cleaned so that the water flow becomes smooth. Various types of bamboo can be used as gutters, but larger diameter bamboo will catch more water.

Method

Activity Location

The location of the socialization activity to increase the use of bamboo as a rainwater catcher was carried out in Batu Layar District in Batu Jaran Hamlet. The existence of this hamlet is at a high altitude so that it does not have the availability of surface water sources.

Activity Implementation Method

The implementation of socialization is carried out by visiting every community that uses rainwater as a source of clean water. The socialization method is carried out by direct discussion with the community about the provision of clean water, the methods used and the use of bamboo as a means of capturing water.

Socialization Materials

The materials used in the socialization are in the form of pictures of water capture network technology with bamboo. Various models of using bamboo as a water catcher, water channel and water distribution. By utilizing pictures, the community can more easily understand its application.

Result and Discussion

Types of Bamboo for Rainwater Catchers

Various types of bamboo that can be used as basic materials for rainwater catchment networks. The types of bamboo can be bamboo with short or long internodes, thin and thick flesh and susceptibility to insects.

Likewise, each bamboo has different physical and mechanical strength. Based on research by Morisco and Mardjono, 1995, rope bamboo has the highest tensile strength compared to other types of bamboo. Likewise, with susceptibility to insect/termite attacks, rope bamboo is one type of bamboo that is not attacked by insects or termites, this is because the starch content of bitter rope bamboo. The Petung bamboo type has a very large stem diameter so that this type of bamboo is widely used by the community both for construction building columns, particle boards and used by fishermen as boat balancers.



Figure 1. Types of Petung Bamboo



Figure 2. Types of Pole Bamboo



Figure 3. Types of rope bamboo



Figure 4. Types of yellow bamboo

Rainwater Reservoir

Rainwater reservoirs can be made with various types of construction and with various materials. Materials that can be used as reservoirs can be fiber, plastic, reinforced concrete, brick masonry and can use plastic sheets. The construction of the reservoir can be above ground level or below ground level. The dimensions of the reservoir are adjusted to the available land area and the need for clean water during the dry season. Rainwater reservoirs should be equipped with a cover so that they are protected from dirt and do not become a place for mosquitoes to nest.



Figure 5. Rainwater reservoir made from river stone masonry



Figure 6. Rainwater reservoir with plastic lining



Figure 7. Reinforced concrete water reservoir

Rainwater Catchment Network

The rainwater catchment network from the roof of the house to be channeled to the reservoir for rural areas where local bamboo materials are abundant is very effective using bamboo. The main considerations for choosing local bamboo materials are that they are abundantly available, very cheap, efficient and very easy to work with and do not require special skills. The workmanship technique is simply splitting the bamboo and cleaning each section so that the rainwater flow is smooth. Installation on the roof is simply making a hanging model or making a support with a certain slope towards the reservoir.



Figure 8. Water Catchment Network with Bamboo Material



Figure 9. Rainwater Catchment Network towards the Reservoir Tank



Figure 10. Rainwater catchment network from PVC pipes

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Conclusion

The problem of water availability in Batu Jaran Hamlet, Batulayar Village is one of the fundamental problems that routinely occurs every year during the dry season. Limited surface water sources and high elevation areas are one of the causes of the difficulty for people to get clean water. One of the potential water sources that can be used is by harvesting rainwater. Harvesting is done by capturing rainwater that falls on the roof of the building by flowing and collecting it in a reservoir. The use of bamboo as a basic material to capture and channel water into a reservoir is very effective because the material is abundant, cheap and the workmanship is very easy and does not require special skills.

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