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BENEFITS OF VETIVER FOR FLOOD MITIGATION, LANDSLIDES, AND ECOSYSTEM STRENGTHENING IN BETEK TAMAN VILLAGE

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Abstract:

Betek Taman Village in Gading Sub-district, Probolinggo Regency, is an area prone to landslides and flooding due to high rainfall. This study aims to assess the benefits of vetiver grass or vetiver (Chrysopogon zizanioides) in disaster mitigation and evaluate the effectiveness of vetiver in reducing the impact of natural disasters and its role in improving environmental quality. Vetiver has been recognized as a plant with a deep and strong root system, which can help resist soil erosion, reduce the risk of flooding, and strengthen loose soil structures. The method used was qualitative research with data collection techniques through interviews, observations, and literature studies. The results showed that vetiver planting is effective in preventing landslides and soil erosion, thanks to its strong and deep root system and vetiver can improve the quality of degraded soil. The program was implemented by involving the local community, which also raised their awareness regarding the importance of disaster mitigation. The conclusion of this study is that vetiver cultivation not only helps in disaster risk reduction, but also provides economic benefits through potential craft and essential oil businesses. Thus, vetiver can be a sustainable solution to protect the environment and improve community welfare.

Keywords: *Vetiver, disaster mitigation, landslides, erosion.*

INTRODUCTION

Betek taman village in ivory district probolinggo is one of the villages prone to landslides. Landslides are one of the natural disasters that often occur, especially in rain-prone areas, the impact can damage the environment, infrastructure, and worse can threaten human safety. The results of the study show that about 25 meters of land are classified as high landslide prone areas in 2024. Therefore, mitigation efforts were made to reduce the risk of landslides by utilizing vetiver grass (Chrysopogon zizanioides). This community service activity was carried out through cooperation between the community service team, the village government, and the Bettek Taman village community starting from January 11, 2025 to February 9, 2025. The implementation of the program starts from preparation (interview, partner search and PNBP permit, agriculture office), implementation (provision of seeds and planting) and monitoring. Coordination with the village government and the local community is carried out through open discussions. Seed planting activities are carried out by the UNZAH 2025 KKN team to the community and the community in 5 hamlets that have been determined. The monitoring results show that almost all vetiver grass that is planted is able to survive even though it is watered regularly by the UNZAH 2025 KKN Team, the activities of the KKN Team are around the location of caring for vetiver seedlings. (Farista et al. 2024) As mentioned above that the village of Bettek Park helping to stabilize the slope its roots can redeem the soil layer then form a strong root network and can reduce soil erosion. The use of vetiver roots

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can be used as a solution to prevent landslides and floods. cultivating and planting this plant is a positive step towards sustainability and environmental preservation. especially if planted in areas prone to landslides. with good care this plant is a natural potency that is useful to protect itself from the threat of landslides and floods so that we can create a safe and comfortable environment for future generations.
In this perspective, this article aims to determine the benefits of vetiver cultivated in Betek Taman village to prevent erosion (landslides and floods). This research seeks to answer the following questions; how to raise awareness of the people of Betek Park village about the importance of landslide mitigation, what are the benefits of vetiver cultivated in Betek Park village, what are the advantages of vetiver compared to other plants in landslide mitigation.

RESEARCH METHODS

Research methodology is a science that explores research methods. Qualitative Research Methodology, is a research method based on the philosophy of post positivism, used to research on natural object conditions, (as opposed to experiments) where the researcher is the key instrument, sampling of data sources is done purposively and snowball, collection techniques with triangulation (combined), data analysis is inductive / qualitative, and qualitative research results emphasize meaning rather than generalization. In this study using qualitative research methods, qualitative research is a scientific study that aims to understand a phenomenon in natural social contact by prioritizing the process of in-depth communication interaction between the researcher and the phenomenon to be discussed. This research method consists of quantitative and qualitative approaches. Data collection is done through three stages:Observasi Lapangan: This was done to identify soil conditions, the presence of vetiver plants, and the impacts on soil and local ecosystems.

1. Interviews with Local Communities: Interviews were conducted with residents of Betek Taman Village, including farmers and land managers, to gain an understanding of their experiences in using vetiver for disaster mitigation and ecosystem strengthening.
2. Soil Laboratory Analysis: Tests were conducted to determine changes in soil content after vetiver planting, including changes in soil structure, moisture content, and surface water flow velocity.

The data collected was analyzed using descriptive and comparative analysis techniques to see the comparison of soil conditions before and after the application of vetiver. The data collection technique used in this research is to find data and information related to the research Observation, interviews, through books, journals and other sources (Salsabila, 2024).

RESULTS AND DISCUSSION

Betek Taman Village, Gading Sub-district, Probolinggo Regency, is located in a hilly area, so that some areas in the area have the potential to experience disasters, one of which is landslides and floods. In relation to the condition of the area, the community is expected to have the attitude, knowledge and skills in dealing with natural disasters that can occur at any time, hence the need for disaster management. The potential for landslides can be minimized by empowering the community to

recognize the typology of landslide-prone slopes, early symptoms of landslides, and early anticipation efforts that must be made, so that the development and improvement of ground motion mitigation management on a national, regional and local scale is sustainable by utilizing the development of information technology and mobilizing togetherness of all levels of society. Research shows that vetiver has a significant role in reducing soil erosion. In Betek Taman Village, planting vetiver on steep slopes has reduced the speed of surface water flow and retained sedimentation, which in turn reduces the risk of landslides and flooding. In addition, vetiver also improves soil quality by increasing organic matter content and improving soil structure. Local communities reported that after the application of vetiver, agricultural productivity increased as the soil became more fertile and stable. The importance of awareness of every citizen to know about disaster emergency response (especially landslides) is considered very important, so that if at any time a landslide occurs, it is hoped that every citizen knows what to do, at least it can reduce the impact arising from the disaster (landslide), the author took the initiative to refresh knowledge about landslide disaster emergency response with this program. It is hoped that after this program runs the community can know more about how to respond to disaster emergencies (landslides). Basically, landslide is a natural phenomenon that we do not know when it can happen, so it is appropriate for people who live in the midst of this phenomenon to be able to understand the characteristics of this phenomenon so that it does not become a disaster (causing casualties) for the community. This program should be able to provide a little knowledge or refresh the community's knowledge about landslide emergency response. Based on previous research, it can be concluded that community participation in landslide mitigation is high. The community conducts a series of mitigations to cope with landslides before, during and after the disaster. Areas that have a high level of disaster vulnerability require community participation for mitigation. Community participation in disaster mitigation (before) is needed to minimize the number of victims.

Betek taman is a landslide-prone area that requires community involvement in disaster mitigation. Community participation in Betek Taman village needs to be studied in order to know how much participation in landslide mitigation. If the participation is high then the level of awareness towards disaster management is high, but if the participation is low then the level of awareness towards disaster management is low.Therefore, disaster mitigation is needed to be carried out by KKN Unzah 2025. The work program that we do is one of the prevention of natural disasters, namely landslides and floods by planting vetiver (akar wangi) seeds. Where the benefits of this plant are to prevent landslides and floods. The way it works is that the roots of this plant can extend about 6-8 meters into the ground. So that it can overcome the occurrence of landslides and floods.

Vetiver, or vetiver, has a range of significant benefits, especially when cultivated in Betek Taman Village. Here are some of the main benefits of the plant The plant has very deep and massive roots. They can reach 3-4 meters in length in the first year. The shape of the vetiver root is able to bind the soil and the plant has a chance to remain strong even when hit by heavy currents. Its deep, fast-growing roots make vetiver very drought tolerant and it is suitable for stabilizing steep slopes.

Although vetiver is as tolerant of some soil and climate extremes as any other grass, it is intolerant of shade. Its stiff, upright stems are able to remain standing even in deep currents. When planted densely, its dense hedgerows serve as effective sediment filters and water dispersers. It is also resistant to pests, diseases, and fire. Vetiver roots can be processed into a variety of unique and interesting handicrafts that are highly marketable. Vetiver roots that are good for handicrafts are those that are 10-12 months old because the length has reached 40 centimeters so that it is adequate to be woven at once in order to release a long-lasting fragrance. After the vetiver is harvested and cleaned, the roots are woven. Root size

Vetiver has been successfully used to rehabilitate mine waste rock and phytoremediate mine waste in many countries.Vetiver (Vetiveria zizanioides) has several advantages over other plants in landslide and flood mitigation Strong and deep root system Vetiver has a strong and deep root system, which can reach depths of up to 6-8 meters. These roots help bind the soil and prevent erosion, thereby reducing the risk of landslides Drought-resistant Vetiver is drought-resistant and can grow in a wide range of soil conditions. This makes it suitable for planting in landslide-prone areas, which often experience drought. Fast growth Vetiver grows quickly and can form dense vegetation in a short period of time. This dense vegetation helps to strengthen slopes and reduce the risk of landslides. Vetiver can be propagated by grafting or dividing. This makes it easy to plant and cultivate in various locations, making it an easy asset to develop in Bettek Park Village. Besides being able to cope with landslide and flood disaster mitigation. The roots of the vetiver plant can also become a perfume business field if processed properly and well. If bred and nurtured until it grows up, the fragrant roots can be sold at a high price.

CONCLUSION

S of this article shows that vetiver has significant benefits in mitigating landslides and floods in Betek Taman Village, Gading Sub-district, Probolinggo Regency. Vetiver has proven to be effective in mitigating floods, landslides, and strengthening the ecosystem in Betek Taman Village. The plant not only provides a solution to erosion problems and natural disasters, but also contributes to the improvement of soil quality and the welfare of the local community. Therefore, vetiver planting can be a sustainable alternative in ecosystem management, which can be adapted for other areas facing similar problems. For this reason, further efforts are needed to socialize the benefits of vetiver to the wider community and expand its application in various disaster-prone areas. Through vetiver planting, the roots of this plant can stabilize the soil, prevent erosion, and reduce the risk of landslides, especially in disaster-prone areas. The community service program conducted by the UNZAH 2025 KKN Team succeeded in raising community awareness about the importance of disaster mitigation and the use of vetiver as a sustainable solution. In addition to ecological benefits, vetiver cultivation also opens up economic opportunities for the village community through the utilization of vetiver for various handicraft products and essential oils. Thus, vetiver cultivation not only helps in maintaining the stability of the ecosystem, but also provides the community with a sustainable solution.

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