

Improving Community Literacy in Environmental Management Through Community-Based Education in Muara Kaman District, Kutai Kartanegara District, East Kalimantan Provision

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Abstract: Increasing community literacy in environmental management is a strategic step to realize sustainable development. One practical approach that can be implemented is through community-based education. This article examines how local communities can become agents of change in increasing public awareness and understanding regarding environmental issues, such as waste management, natural resource conservation, and adaptation to climate change. Through a participatory approach, community-based education encourages direct community involvement in designing and implementing environmental programs that suit local needs. Case studies from various regions show that collaboration between communities, government, and the private sector can increase the effectiveness of educational programs and create long-term impacts. The work programs are processing organic and inorganic waste, processing agricultural land, planting trees, preventing dengue fever and making anti-mosquito spray, providing information related to Hoaxes and phishing link modes, and collecting data on MSMEs. Apart from that, there are also work programs regarding learning posts, introducing waste banks, making street signs, and creating village websites. The results obtained from this activity are an approach to the community through social activities carried out with residents and increasing community insight through the outreach and training programs provided. Apart from that, village facilities can be improved by creating street signs and village websites. It is hoped that the results of this study can become a practical guide in developing a sustainable community-based education model for environmental management.

1. INTRODUCTION

Environmental damage and its various negative impacts, such as water, land, and air pollution, as well as the threat of climate change, have become global issues that require serious attention. In this context, public literacy regarding environmental management plays a vital role in encouraging the creation of collective awareness and concrete action in maintaining ecosystem sustainability. Unfortunately, the level of ecological literacy in society in general is still relatively low, especially in areas with limited access to information and education (Azami & Kustanto, 2024).

One promising approach to increasing environmental literacy is community-based education. This approach directly involves the community in the learning and empowerment

process to create awareness, understanding, and more effective collective action. Community-based education enables the transfer of more relevant knowledge to the local context while strengthening social networks within the community to face environmental challenges together. This activity is widely practiced in the community, so its existence directly benefits the surrounding community. This activity is related to research, where students conduct research and formulate problems that arise, looking for potential and deficiencies in society so that problem-solving can be obtained. (Anwas, 2011)

Education is a process that will continue and be a path to maturity. Education gives humans the ability to acquire better abilities in all fields. Education is a key to improving human abilities and qualities. Education focuses on improving the quality of thought, action, behavior, heart, and faith (Lazwardi, 2017). Community service is an application of the Tri Dharma of Higher Education, which provides opportunities for students to carry out practice and service directly to the community and obtain direct learning from social life so that there is a synergistic interaction between academic-theoretical and empirical-practical worlds (Syardiansayh, 2019).

Benua Puhun Village is one of the villages in Muara Kaman District, Kutai Kartanegara Regency, East Kalimantan Province, Indonesia. Benua Puhun Village is in the middle of the Muara Kaman District area, with a total area of 9,327.36 ha. Benua Puhun Village is divided into two hamlets consisting of 10 RTs. Based on the data collection results in 2024, the Puhun Continent has a male population of 1,427 people and 1,245 female people, with a total of 783 family heads. Most Continental Puhun village people work as company employees, state civil servants, and fishermen.

Various community initiatives in environmental management have shown great potential in creating positive change, such as household-based waste management programs, reforestation activities, and preserving local natural resources. This article examines the role of community-based education in increasing community literacy regarding environmental management. In addition, various challenges and opportunities in implementing this approach will be discussed, as well as examples of best practices that can inspire implementation in various regions.

2. METODE

The method used in community service is fieldwork to obtain accurate results so that objects can be presented accurately. Apart from that, the author also uses literature by making readings from several journals, book sources, journals, scientific works, and the internet, using them as reference material. The techniques used are:

1. Observation

This technique is suitable for use in field research because observation is a technique that is carried out by going directly down and observing various things, which can then be used as objects. In analyzing the problems and potential in Benua Puhun Village, the group used observations on the education, government, and environmental sectors. All group members observed, namely, participating in work programs or activities in the village environment and the Benua Puhun Village office.

2. Interview

Wawancara adalah kegiatan tanya jawab lisan antara pewawancara dan narasumber. Setelah melakukan observasi, teknik ini cocok digunakan untuk mendapatkan informasi yang lebih akurat tentang lingkungan sekitar khususnya Desa Benua Puhun.

3. Documentation

This technique is used to obtain evidence that various work programs are implemented.

Community service activities will occur from July 1 to August 18, 2024, in Benua Puhun Village, Muara Kaman District, Kutai Kartanegara Regency. The methods used in implementing this activity include socializing efforts to prevent dengue fever, socializing the optimization of swamp land into agricultural land, socializing social media outreach to minimize fraudulent link phishing methods, and socializing to prevent the spread of hoaxes on social media, socializing the introduction and design of waste banks.

Apart from the socialization method, another work program is training for the community. Training in the form of making use of citronella plants in the form of anti-mosquito spray as an effort to prevent dengue fever, implementing zero waste through training in recycling inorganic waste using the eco brick method, processing organic waste into compost and management at waste banks, practicing tree seedlings, making and Benua Puhun Village website training. Other work programs with community education include learning posts for elementary school children—village service methods such as making street signs and collecting data on MSMEs. The main work program consists of making village profile videos.

The subjects of the existing work programs come from the local community, some of whom come from village officials, village institutions, schools, and community organizations. The subject of the work program is socializing efforts to prevent dengue fever, making use of citronella plants in the form of anti-mosquito spray as an effort to prevent dengue fever, socializing the implementation of zero waste through training in recycling inorganic waste using the eco brick method, processing organic waste into compost and management at waste

banks are the Village Government, Head of RT, Benua Puhun Village community, PPK. The subjects of the work program to socialize the optimization of swamp land into agricultural land and socialize the introduction and design of waste banks are the Village Government and the PPK. The social media outreach work program to minimize fraudulent link phishing methods, outreach to prevent the spread of hoaxes on social media, and planting tree seedlings are students from SMPN 3 Muara Kaman. The subjects of the study post-work program are elementary school children—the subject of the MSME data collection work program for business owners in Benua Puhun Village. The subject of the work program for making street signs is the entire village community. The subject of the work program for creating and training the Benua Puhun Village website is the operator of the Benua Puhun Village Government.

3. RESULTS AND DISCUSSION

Main Work Program

a. Making a Video Profile of Benua Puhun Village



Figure 1. Making a Video Profile of Benua Puhun Village

Village Profile Videos are short videos containing information and a general description of a village, which effectively introduce a village through electronic media to the outside community.

The village profile video is a short video containing information and a general overview related to Benua Puhun village regarding the population, geographical conditions, potential, livelihoods of the village community, and the village's natural beauty. Data from the village profile video was obtained through official documents provided by the village government and interviews with the village head on August 9, 2024. The village profile video aims to introduce the advantages and potentials in Benua Puhun village and be exposed and better known to the broader community.

Featured Work Program

a. Renewal of Benua Puhun Village Road Nameplates



Figure 2. Road Nameplate Renewal Process

Street name boards are directional signs that aim to provide written information to all road users in Benua Puhun Village. Street and alley name signs are made so that people can know the names of roads in Benua Puhun village. This work program regarding making street name signs was carried out to help residents recognize the names of streets and alleys in Benua Puhun village, which has around 27 roads and alleys that need to be signposted.

The activities were carried out in the fourth week, July 24, 2024, and finished on August 14, 2024. The activities started with surveying street names, ordering, painting poles, and raising street name signposts. This program is strongly supported by the village government so that it can be completed well, and this superior work program will provide good benefits for the community.

b. Creating an Introduction Website and Social Media for Benua Puhun Village

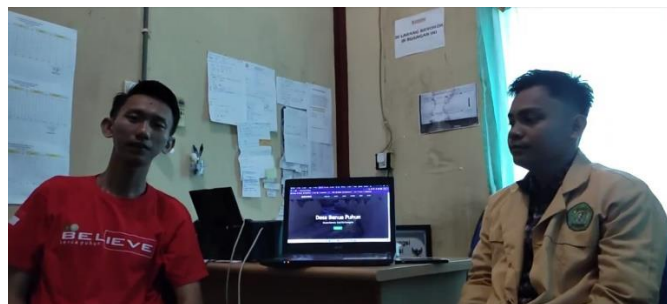


Figure 3. Introduction of the Village Website to the Village Government

A Village Website is a site that contains a collection of information about a village in the form of writing, images, or sound, which can be accessed via the internet network as a means of communication and information between the village government and the village community. The village website was created to contain all information about the village more quickly and with verifiable accuracy. With complete information,

it is easier for residents to access the village, and of course, it is officially sourced from the village itself.

It is hoped that the creation of the Benua Puhun Village Website will run well and make it easier to introduce the potential activities in Benua Puhun Village. The community can learn about information developments that occur, especially around Benua Puhun Village, and more widely, all people in the area can learn about them. World. A village website is important for villages so they can continue to develop and keep up with the times.

c. Socialization and Design of the Benua Puhun Village Waste Bank



Figure 4. Waste Bank Socialization Activities to Village Government

The group's flagship work program related to waste control is the waste bank introduction work program. This work program is motivated by the publication of a circular regarding the formation of waste banks on April 11, 2024. In this work program, students introduce things about waste banks, such as what a waste bank is, how to create a waste bank, how to manage a waste bank, the range for making one waste bank, and others. This work program is an outreach program aimed at the village government. This program will be implemented on August 2, 2024, in the front yard of the Benua Puhun Village Office. This work program was successful because the students introduced the waste bank to the Benua Puhun Village government.

d. Activities to provide learning posts as learning facilities outside the home and outside the school in order to support the learning process for elementary school students



Figure 5. Learning Post Activities on Saturday and Sunday

The superior work program of the Learning Post by providing learning materials during activities with English and Mathematics material for 4 weeks to elementary school children in Benua Puhun Village is carried out at the Kukar 63 group post, which will be held from July 9, 2024, to August 5, 2024. During this learning activity, the children always come to the house of RT 01 every Saturday and Sunday. The children looked delighted in participating in this activity, and they could see that their English and mathematics knowledge development was much better—every week.

Learning at the learning post regarding English and Mathematics material has its objectives. In Mathematics, children are taught material about adding and subtracting fractions and multiplying numbers with the aim that children can calculate addition, subtraction, and multiplication efficiently and effectively. English learning materials study about Love My Self, Introduce My Self, Conversation, Family, Color, and Animal with the aim that children can love and increase their level of self-confidence and increase their knowledge of the English language so that they can develop themselves so that in the future they will be able to speak good language. It is hoped that at the learning post activities in Benua Puhun Village, the children will be active, motivation and joy in learning activities will be provided, and the situation will be less boring so that children will be more enthusiastic about learning activities.

Individual Work Program

a. Socialization of Efforts to Prevent Dengue Fever (DHF)



Figure 6. Socialization of DHF Prevention Efforts

Individual programs related to environmental cleanliness and health include Socialization of Dengue Hemorrhagic Fever (DBD) Prevention Efforts. This program was carried out because the Kutai Kartanegara Regency area experienced an increase in cases of Dengue Hemorrhagic Fever (DHF), so it was necessary to conduct outreach regarding the prevention of DHF. This work program is a socialization work program with the subject of the general public from RT 1 to RT 10 in Benua Puhun Village. In this work program, students explain the meaning of dengue fever, the symptoms, and how to prevent dengue fever. Students also distribute posters containing a summary of the material disseminated to the public. This work program was implemented on July 27, 2024, at the Tanah Sama cooperative building. This program was declared successful because the students provided the community with an understanding of dengue fever through direct counseling and posters distributed to the people of Benua Puhun Village.

b. Utilization of Citronella Plants in the Form of Anti-Mosquito Spray



Figure 7. Practices for Making Anti-Mosquito Spray

The Work Program for Socialization and Training on Planting Citronella Plants (*Cymbopogon nardus*) in the form of Anti-Mosquito Spray as an effort to prevent dengue fever problems in Benua Puhun Village is one of the individual work programs carried

out as an effort to prevent dengue fever with training in making anti-mosquito spray to repel mosquitoes with citronella plant because this plant has an aroma that mosquitoes do not like. This work program is motivated by the large number of mosquitoes in Benua Puhun Village, which can be prevented by making anti-mosquito spray with natural ingredients that are more environmentally friendly and reducing the use of chemical mosquito repellent.

This work program was implemented on July 27, 2024, at the Tanah Sama Cooperative Building, which was declared to have been completed by conducting manufacturing training and the community understanding the steps for making anti-mosquito spray and having distributed pocketbooks during outreach to the community.

c. Implementation of Zero Waste through Inorganic Waste Recycling Training using the Ecobrick Method



Figure 8. Ecobrick Making Practices

The work program regarding the implementation of zero waste through training in recycling inorganic waste using the Ecobrick method aims to provide education and training to the public about processing plastic waste. Ecobricks are a form of processing plastic waste into valuable items to help reduce plastic waste in the environment. This work program was implemented on July 27, 2024, through direct outreach and training, with the target objects being the community and village government. This work program is one of the work programs implemented in Benua Puhun Village so that the community has information regarding how to process plastic waste. The large amount of plastic waste that has not been processed by the community and the disposal of waste only through disposal at final disposal sites (TPA) is the reason for implementing this work program. This work program received a positive response from the community, as seen from the enthusiasm for the activities. This work program was declared successful because it received a good response from the community when it introduced the zero waste lifestyle

and provided education to the community regarding appropriate waste processing methods through ecobrick method training.

d. Socialization of processing organic waste into compost and its management at waste banks



Figure 9. Practices for Making Compost Fertilizer

The work program to socialize the processing of organic waste into compost and the practice of making compost is an effort to help overcome the waste problem and an alternative to reduce organic waste by making efforts to recycle waste, especially organic waste. Benua Puhun Village has the problem of increasing soil fertility with a lot of village land and peat swamp areas that will be processed into agricultural land, so correct composting techniques are required to break down organic waste in Benua Puhun Village. With the village's proposal for a work program (Introduction and Expansion of Waste Banks), Apart from inorganic waste, which will be recycled, the public also needs to know how to process organic waste in waste banks to become compost that can be used. This work program will be implemented on July 27, 2024, at the Same Land Cooperative Building. This work program was declared complete because the students had provided an understanding of how waste processing and composting practices were carried out to the community through outreach and posters distributed to the community.

e. Socialization and Practice of Planting Tree Seedlings



Figure 10. Practices for Planting Tree Seedlings

Environmental management is an effort to maintain and preserve the environment so that it functions as it should. Good environmental management requires a young generation who has broad abilities and knowledge. One effort to preserve the environment is to reforest by planting tree seedlings. In this work program, students provide students with an understanding of environmental management and practice how to plant tree seedlings. This program was proposed by the village theme "Building Villages Towards a Green East Kalimantan." This work program was implemented on July 28, 2024, at the SMPN 03 Muara Kaman field. The output of this individual program is in the form of a poster, which contains steps to plant trees and the benefits of trees for the surrounding environment. Hopefully, this poster can attract students' attention to continue preserving the environment by planting tree seedlings.

f. Socialization of Optimizing Swamp Land into Agricultural Land



Figure 11. Socialization of Optimizing Swamp Land into Agricultural Land

Peat land is an area whose soil layer is composed of organic material with inorganic conditions, which has an organic carbon content of around 18% and is more than 50 cm thick. Generally, the thicker the peat, the lower the fertility level. Most peat in Indonesia is classified as mesotrophic and oligotrophic peat.

According to a survey, Benua Puhun Village has extensive peatlands. This land is planned to be opened into rice fields with an area of approximately 77 ha by the Benua Puhun Village Government.

This individual work program related to rice field printing is about optimizing peat swamp land into agricultural land. It is hoped that the socialization regarding the optimization of peat swamp land into agricultural land will be able to help and be implemented by the Benua Puhun Village Government. This work program was carried out on Tuesday, August 8, 2024, in the yard of the Benua Puhun Village Office, with the target object being the Benua Puhun Village Government.

The output of this individual program is a booklet containing procedures for processing peat swamp land into agricultural land. Hopefully, this booklet can become a reference or guideline in managing swamp land into agricultural land.

g. Social Media Counseling to Minimize Phishing Link Fraud



Figure 12. Delivery of presentation material to students at SMP Negeri 03 Muara Kaman

This community service activity in the form of Social Media Counseling to Minimize Phishing Link Modes to SMP Negeri 03 Muara Kaman students was carried out on Friday, July 28, 2024, in classroom 3 of SMP Negeri 03 Muara Kaman. The results of this counseling were that participants knew how to use social media wisely and provided education on phishing link fraud methods.

Students at SMP Negeri 03 Muara Kaman are currently using smartphones. So, the use of smartphones is no longer foreign to these students. However, some students still do not understand how to use social media properly and lack knowledge about links. Therefore, with this counseling, it is hoped that students can improve their understanding and skills in using smartphones effectively. From the results of this counseling, participants have begun to understand how to use smartphones and social media wisely to avoid fraud or phishing links.

h. Counteracting Hoaxes on Social Media by Filling in Information Boards



Figure 13. Installation of posters on information boards

Hoaxes or fake news are one of the problems faced in the current digital era. Hoax is information made up to cover up accurate information for interests or divisions that irresponsible people attempt. Apart from that, understanding hoaxes in Indonesia is still considered lacking, and interest in reading is still low, which is the main problem as to why hoaxes or fake news can quickly become public consumption. Based on the survey that was carried out, it was found that in RT 1 to RT 10 in Benua Puhun Village, there were information boards, and these boards were still not filled with educational posters. So, filling the information board with educational posters regarding preventing hoaxes is an important means of introducing the anti-hoax concept to the public and information boards with posters in every RT of Benua Puhun Village on July 25, 2024. These posters aimed to make the village community more aware of hoaxes, recognize the characteristics of hoaxes, understand news verification, and understand how to check the truth of hoaxes. This work program also involves grade 7 students at SMPN 3 Muara Kaman in the form of anti-hoax socialization so they can recognize hoax news on social media so as not to spread it, which will be held on July 28, 2024.

i. Data collection and creation of MSME databases to improve the local economy



Figure 14. MSME Data Collection Process

The individual program "Data collection and creation of an MSME database to improve the local economy" was conducted from 7 to August 11, 2024. This activity program aims to obtain the latest data regarding the profile of the business being run to make it easier for the village government or stakeholders to plan and assist MSMEs in Benua Puhun Village.

Data was collected by visiting MSMEs in Benua Puhun Village to obtain the latest data regarding their own businesses. The data that has been obtained is then processed, and an MSME database is created in Excel (soft file) form. Then, the database is handed over to the village for planning program activities such as developing MSMEs.

4. CONCLUSIONS AND RECOMMENDATIONS

Increasing community literacy in environmental management through community-based education is a strategic approach to creating awareness and collective action in maintaining ecological sustainability. This approach involves active community participation in an educational process relevant to local needs, creating more effective and sustainable solutions. Studies and experiences from various communities show that collaboration between communities, government, and the private sector can increase the success of environmental programs. In addition, community-based education can build individual and group capacity, strengthen social networks, and encourage local leadership that cares about the environment. However, implementing this approach still faces challenges, such as limited resources, lack of coordination between stakeholders, and obstacles in changing people's mindsets. Therefore, an integrated and sustainable strategy is needed to overcome these obstacles.

Recommendation

1. **Strengthening Community Capacity:** Government and non-government organizations need to provide training and resources to improve the capacity of local communities to implement environmental education programs.
2. **Partnership Development:** Collaboration between communities, government, private sector, and academia needs to be improved to ensure adequate technical, financial, and logistical support is provided.
3. **Technology Integration:** Information technology, such as digital platforms and social media, can support disseminating information and implementing community-based education programs more broadly.

4. Contextualization of Programs: Educational programs must be adapted to local conditions, including culture, habits, and resource potential, to ensure their relevance and effectiveness.
5. Monitoring and Evaluation: A continuous monitoring and evaluation mechanism is needed to assess the impact of community-based education programs and correct existing weaknesses.
6. By adopting these steps, it is hoped that community literacy regarding environmental management can continue to increase so that the collective contribution to maintaining ecosystem sustainability becomes more accurate and has a long-term impact.

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