Indonesian Journal of Community Engagement
Jurnal Pengabdian kepada Masyarakat
Vol. 9, No. 2, June 2023, Page. 68-75
DOI: http://doi.org/10.22146/jpkm.83292

Empowerment and Development of Kajhu Village as a Disaster Resilient Village Based on Fasterization and Ecotourism

Hasnan Hanif[1], Adelia Maulida[2], Maulana Kamal[3], Rina Suryani Oktari[4*]
[1]Department of Geophysical Engineering, Faculty of Engineering, Universitas Syiah Kuala, Banda Aceh, Indonesia
[2]Department of Early Childhood Education, Faculty of Teacher Training and Education, Universitas Syiah Kuala, Banda Aceh, Indonesia
[3]Department of Communication Studies, Faculty of Social and Political Sciences, Universitas Syiah Kuala, Banda Aceh, Indonesia
[4]Department of Family Medicine, Faculty of Medicine, Universitas Syiah Kuala, Banda Aceh, Indonesia

Submitted: March 03rd 2023; Revised: April 28th 2023; Accepted: May 24th 2023

Keywords:
Climate change
Coastal village
Disaster
Sustainable resilience

Abstract Kajhu Village is a coastal area within the Baitussalam District of Aceh Besar. In 2004, the village suffered significant damage due to an earthquake and ensuing tsunami, resulting in loss of life and damage to infrastructure. Despite the inherent disaster risk, Kajhu Village possesses great potential, including the scenic beauty of its coastline and the abundance of mangrove ecosystems. These natural resources can be harnessed to develop environmental and disaster-based tourism opportunities. In recognition of this potential, the Fasilitator Tangguh Bencana (FASTANA) - Tsunami and Disaster Mitigation Research Center at Universitas Syiah Kuala (TDMRC USK), an organization dedicated to community service and disaster mitigation, launched a disaster risk reduction program aimed at empowering the community and reducing the risk of disaster in Kajhu Village. Data collection involved observation and interviews with local residents. Community service activities focused on education and empowerment, including disaster preparedness education for the community and schools, promotion of the importance of protecting coastal ecosystems, and training and empowering the creative economy. Additionally, disaster literacy corners were established in schools within Kajhu Village. Through these programs, the goal was to create a community that is resilient to disaster and economically self-sufficient. By providing support and empowerment to the community, it is hoped that a new mindset can be fostered, resulting in greater independence and resilience. The disaster education provided aims to help individuals and families understand and implement effective disaster prevention strategies. The implications of the community service program in Kajhu Village are increasing community resilience and preparedness in dealing with natural disasters and developing the potential of coastal ecosystems to become sustainable ecotourism attractions, providing inspiration for communities in other areas to adopt a participatory and structured approach in an effort to increase resilience and disaster preparedness and developing the potential of coastal ecosystems.

1. INTRODUCTION

Kajhu Village is situated in Aceh Besar District, Aceh, Indonesia, covering an area of 2.87 km^2, making it the second largest village in Baitussalam District. The majority of the village's area consists of non-rice fields, covering 2.22 km^2. Considering its quality of life and community development, Kajhu Village was included in the 2018 list of the 100 best villages by province and district in Indonesia issued by the Ministry of Villages. The village's administrative structure comprises a village head, secretary, 11 hamlet heads, and four heads of affairs. In terms of

ISSN 2460-9447 (print), ISSN 2541-5883 (online)
*Corresponding author: Rina Suryani Oktari
Department of Family Medicine, Faculty of Medicine, Universitas Syiah Kuala, Jl. Teungku Tanoh Abee, Kopelma Darussalam, Syiah Kuala, Banda Aceh, Aceh, 24415
Email: okta@usk.ac.id

government facilities, Kajhu has one village head office and one village hall. The village has a population of 6,070, consisting of 3,099 men and 2,971 women, resulting in a population density of approximately 445 people/km^2. This density is supported by the highest birth rate compared to other villages in Baitussalam District, estimated to be 63 people until 2020. The village's proximity to the coastline, at a distance of only 1.5 meters, makes fishing, fish pond cultivation, salt ponds, and salted fish processing the primary livelihoods of the majority of the population. Infrastructure in Kajhu Village includes three Elementary Schools, one Junior High School, one Madrasah Tsanawiyah (Islamic junior high school) for education, one Community Health Center, one Polyclinic for healthcare, one mosque, and 11 meunasah (small mosque) for religious services.

Based on the results of observations and interviews with the people of Kajhu Village, the community service team found several problems in Kajhu Village. First, the high risk of people being affected by the tsunami and climate change, both physically and psychologically. Second, the position directly facing the Indian Ocean and the almost complete absence of mangrove vegetation as a green belt caused the serious damage and losses suffered by these coastal villages during the 2004 tsunami. BPS (Central Bureau of Statistics) and BRR (Reconstruction and Rehabilitation Agency) 2005 stated that the number of victims who died/disappeared as a result of the 2004 tsunami in Aceh Besar District was the highest compared to other Regencies in Aceh and Nias. A total of 107,342 people, or around 25.68% of the total fatalities, died/disappeared (Badan Pusat Statistik Aceh Besar, 2016; Oktari et al., 2021). Third, apart from that, from an economic perspective, many people in Kajhu Village still depend on traditional fishing, the majority of which are still below the poverty line. Fourth, apart from that the road access in this village is very bad with rocky road conditions and potholes, making it difficult to carry out the evacuation process in the event of a disaster. Fifth, there is no signboard for the tsunami evacuation route at this time in Kajhu Village.

On the other hand, Kajhu Village also has enormous coastal potential, namely a very extensive mangrove ecosystem that was replanted after the tsunami in 2004. However, it is very unfortunate that many people in Kajhu Village are less aware of preserving the environment and utilizing the potential of natural resources around them. The community service team also found that rehabilitation and reconstruction efforts, such as building houses and providing basic food assistance to tsunami victims, had not yet answered the community's long-term needs. This is because after having a permanent residence, coastal communities also need a green and comfortable ecosystem to protect their settlements from the impacts caused by disasters and recover economically to start a new wheel of life.

Based on the problems, potentials, and needs that the service team found in Kajhu Village, the Disaster Resilient Facilitator Student Activity Unit (FASTANA), together with the Kajhu Village apparatus and the community has a solution to carry out coastal ecosystem rehabilitation combined with increased disaster education and environmental preservation as well as economic empowerment community through utilization of existing natural resources. This preservation activity was carried out through a Student Organization Capacity Building program entitled "Empowerment and Potential Development of Kajhu Village as a Disaster Resilient Village based on Fasterization and Ecotourism".

Fasterization stands for FASTANA Action for Disaster Mitigation, which is FASTANA's flagship program so far to improve community disaster preparedness. In addition, the disaster education program provided to the community takes the form of outreach on disaster preparedness and building evacuation routes in Kajhu Village. This course will be very useful for the basic knowledge of disaster mitigation for the community. In addition, knowledge that has been received by the community can continue to be shared with families and other communities. With sustainable disaster education, it is hoped that it will not only provide knowledge for the community cognitively (know-what) but also be able to make the right choices/decisions (know-how), and with the knowledge they have can be used in actionable knowledge.

2. METHOD

The target of this community service program was the community of Kajhu Village, Baitussalam District, Aceh Besar, which consists of groups of mothers who are members of the Women's Organizations (PKK), and school-age children ranging from Kindergarten (TK), Elementary School (SD), junior high school (SMP) and senior high school (SMA). The method of implementing service activities was carried out through two methods, namely, education and empowerment. In this activity, the education provided was an effort to increase knowledge on earthquake and tsunami preparedness in the community and in schools in Kajhu Village which consisted of three Elementary Schools, one Junior High School, and one Madrasah Tsanawiyah. This education program was carried out through the formation of disaster resilience student cadres in schools as agents of change to increase disaster preparedness knowledge in a sustainable manner. Subsequently, the empowerment activity carried out was empowering women members of the PKK to be able to utilize the potential of natural resources from the Mangrove ecosystem to become superior MSME products such as flour and various processed products. In addition, this empowerment activity could also increase the household economy of the Kajhu community and public awareness to participate in protecting the Mangrove ecosystem environment as an effort to reduce disaster risk.

The data collection method used was direct observation and interviews with the community and Kajhu Village apparatus. This aimed to find problems and identify the needs of the people in Kajhu Village. Data validation was

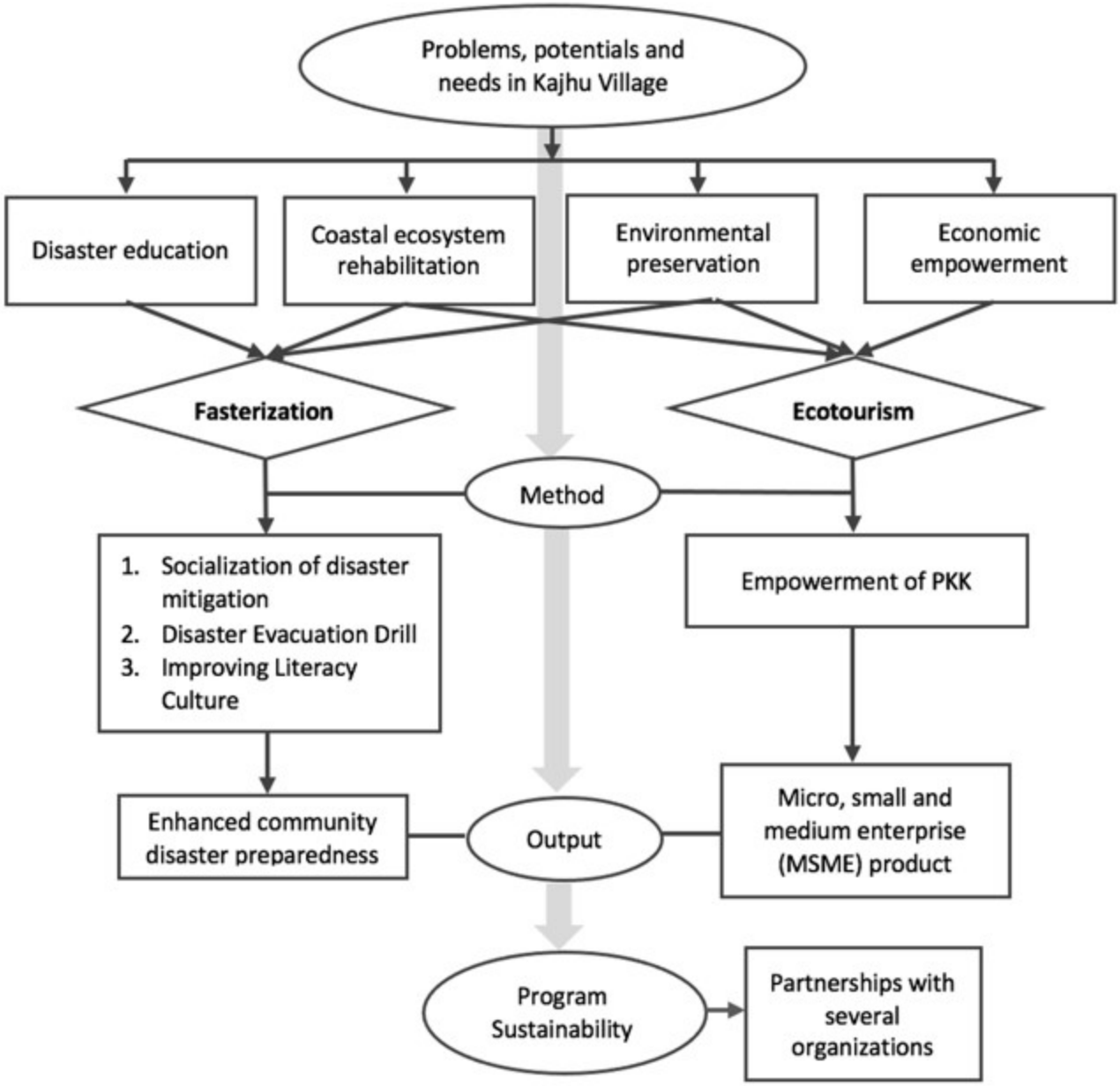

Figure 1 . Program's flowchart

carried out through Focus Group Discussion (FGD) with the target group to find the right solution to address the problems and needs of the Kajhu Village community. The technique for program implementation was carried out by the FASTANA-TDMRC Team through adaptation to the conditions in the field. In the early stages, before implementing the program, the team carried out surveys and interviews in an effort to gather suggestions and input for implementing the program. After the results of the survey and interviews were completed, the team conducted a Strength, Weakness, Opportunity, Threat (SWOT) analysis to get an accurate picture of the condition and nature of the community, so that we could choose the right method of implementing the program. Figure 1 shows the flowchart of the program.

3. RESULT AND DISCUSSION

3.1 Potential resources of Kajhu Village

Kajhu Village, located on the coast, is endowed with a range of resources that can be exploited for economic development. However, the local populace is not fully aware of these resources, and thus they remain underutilized. Exploiting natural ecosystems, specifically, mangroves that grow extensively on the village's coast, has enormous potential to boost the community's economy if utilized optimally. By preserving the mangrove ecosystem while utilizing its resources, Kajhu Village can become the first Mangrove Tourism village in Aceh. The human resources available in the village contribute to the vital role in sustaining the mangrove ecosystem shown in Table 1.

Table 1 . Results of SWOT Analysis

Strength	Weakness	Opportunity	Threat
Kajhu Village possesses a serene and picturesque rural environment, accentuated by the scenic vistas of its expansive rice fields and stunning coastal views. Consequently, the village holds immense potential to be utilized as an ecotourism destination. Ecotourism can provide a viable and sustainable source of income for the community, by attracting visitors who are willing to pay to experience and appreciate the village's unique natural and cultural resources. Through this approach, Kajhu Village can preserve its natural environment and cultural heritage, while contributing to the economic development of the region.	Kajhu Village is an area that remains largely untapped in terms of its potential. Despite its proximity to the city center, which is only a 30-minute drive away, many residents are yet to fully comprehend the vast opportunities present in their locale. Furthermore, the village lacks adequate tourism infrastructure to cater to the needs of tourists. This scarcity of amenities could hinder the development of the village as a popular tourist destination, which could result in missed opportunities for economic growth and development. Therefore, it is imperative to create awareness and encourage investment in the area to harness its potential, as well as to provide the necessary infrastructure and services required to attract tourists to Kajhu Village.	Despite being situated 30 minutes away from the city center, Kajhu Village enjoys a strategic location in proximity to human settlements and several universities, rendering it a potentially alluring tourist destination. Moreover, owing to the prevalence of a youthful population in Kajhu Village, there exists an optimal opportunity to foster and capitalize on its environmental tourism potential, as a means of livelihood.	The geographical location of Kajhu Village, situated within 200 meters of the shoreline, renders it highly susceptible to tsunamis. In the devastating Aceh-Nias Earthquake and Tsunami of 2004, Kajhu Village suffered significant damage. Given the inherent vulnerability of this area, it is imperative to provide disaster education as a means of mitigating disaster risk.

Organization such as PKK, the village government, and educational institutions can contribute significantly to the conservation of natural ecosystems, especially mangroves. Furthermore, Kajhu Village has great potential to become a disaster-resilient village based on FASTERIZATION (Fastana Action for Disaster Mitigation) and can serve as a model for other coastal villages in disaster risk reduction. The results of the SWOT analysis that the team has carried out are described in

3.2 Activity implementation process

The community service program conducted in Kajhu Village aimed to disseminate knowledge and awareness regarding disaster mitigation, evacuation drill practices, empowering women through processing mangroves into food, and enhancing the culture of reading literacy for children by creating disaster literacy corners at schools.

3.2.1 Socialization of disaster mitigation

Dissemination of disaster mitigation is crucial to enhance awareness and understanding of disaster risk reduction. A pretest and a posttests were conducted to evaluate the effectiveness of the socialization program The program targeted children and mothers as they are a vulnerable group with limited knowledge about disaster risk reduction. The village and hamlet heads emphasized the need to educate children about disaster mitigation as they have never experienced a disaster like the 2004 Earthquake and Tsunami. Continuously educating children on disaster mitigation will help them develop resilience and preparedness to cope with disasters that may occur in the future.

The community service team has successfully implemented a comprehensive disaster education program in various educational institutions in Kajhu Village, including Early Childhood Education (PAUD) Darul Hikmah, Elementary School (SDN) Kajhu, Junior High School (SMPN) 1 Baitussalam, Islamic Junior High School (MTsS) Darul Hikmah, and Islamic Senior High School (MAS) Darul Hikmah. This program involves a series of three meetings, each designed to provide specific disaster education material to students. During the first meeting, the team introduced the concept of disaster and its potential impact. The second meeting focused on disaster mitigation strategies and evacuation planning, while the third meeting provided information on disaster preparedness bags. The efficacy of this program was evaluated through the pretest and posttest, which showed significant improvements in disaster preparedness and knowledge among the target group. Overall, the successful implementation of this disaster education program in Kajhu Village serves as a model for similar programs in other vulnerable communities.

Furthermore, the community service team has extended the scope of their disaster education program to early childhood education, targeting children aged 5-6 years old at Darul Hikmah Kindergarten. Considering the children's young age and limited attention span, the Early Childhood Education (PAUD) program only consisted of a single meeting. Unlike the SD, MTs, and MA levels,

which followed a structured three-meeting program, we introduced disaster education to children in PAUD and SD through interactive games. The use of games in education has been shown to enhance children's engagement and retention of knowledge. Therefore, incorporating games is expected to increase the effectiveness of disaster education for children in Kajhu Village.

3.2.2 Disaster evacuation drill

The disaster evacuation drill was conducted at SD, MTs, and MA in Kajhu Village as part of the final event of the disaster education program. It is important to note that early childhood children were not involved in the drill, as this group focused on providing disaster education through the playing and learning method. In conjunction with the drill, a disaster literacy corner was established in the schools. The corner is equipped with posters, books, and games about disasters to make it easier for children to understand disaster mitigation. The literacy corner is expected to become a sustainable source of disaster education for the community.

3.2.3 Empowerment of PKK

Knowledge about the utilization of mangrove ecosystems, which can be an economic resource, is still not widely known by the people of Kajhu Village. This is the cause of the lack of public awareness in maintaining and conserving the mangrove ecosystem itself. Based on these problems, we held an empowerment program for PKK with the aim that the people of Kajhu Village, especially women, are able to process and utilize the mangrove ecosystem around them into products that sell value. This empowerment activity consisted of several stages: socialization activities on environmental preservation and utilization of mangrove ecosystems, training on processing mangrove fruit into flour, and training on making processed products from mangrove flour.

In carrying out the activity, the women of the Kajhu Village were very enthusiastic about participating in this empowerment activity. This is because, previously, they had never received training on how to utilize the natural resources in their village. In the last stage, we provided socialization about disaster preparedness bags and, at the same time, distributed disaster preparedness bags as a form of effort to increase community capacity to deal with disasters.

3.2.4 Improving literacy culture

In education, reading culture is needed to increase the insight of students. This is considered important because not all students can immediately grasp the contents of the messages conveyed by educators in the teaching process in class.

This is also our consideration for creating a disaster literacy corner in schools as a form of sustainable disaster education facility. We hope that this disaster literacy corner can be maintained and maintained.

At the implementation stage of this activity, the team used two-way socialization and education methods and adjusted the material and application according to the age and characteristics of the target group. It is important to adapt this method so that the teaching and empowerment activities that we carry out do not use the one-way lecture method.

In implementing disaster education activities, the team uses the discussion learning method and the concept of learning while playing. The concept of learning while playing in its implementation certainly requires several media that can increase the effectiveness of learning activities. The team has various backgrounds in majors, so our team is very capable of arranging creative and active learning activities, and we are able to make interesting media.

The disaster education media that the team has prepared consists of several levels of target groups. For the 2-8-year-old group, the team prepared a POP-UP disaster book (Figure 2), which can have a 3D effect if the book is opened. This is to provide a real, colourful picture of mitigation measures for children who still have difficulty reading.

Furthermore, to target children who are already fluent enough to read, the team prepared disaster comics (Figure 3) so they could deliver disaster mitigation education with illustrated stories that could attract the attention of children readers in the age group of 8-12 years. This disaster comic educational media can help children who are fluent in reading to have a high spirit of creativity and imagination, as well as instill disaster mitigation values. Apart from disaster comics, the team also arranged sequenced puzzle games in order to train the children's memory.

Another educational media is targeted at students in the age group of 12-18 years, where this educational media is in the form of fun and competitive games to train their intelligence and ingenuity. The disaster education media in the form of this game is the card game Resilient Wolf Disaster (SERGANA) and Acehnese local wisdom (Maulana et al., 2019), where this game is in the form of a role card (Figure 4).

Furthermore, the team also designed a 1st Ranking Disaster Resilient game (Figure 5), which is a meticulous game. In this game, accuracy and speed are prioritized. In the first ranking game, questions will be given, and given a short time to answer questions with correct or wrong answers. Of course, the questions that are contested are related to disaster education materials. The third game is a

Figure 2 . POP-UP book product for earthquake and tsunami disaster mitigation education

Figure 3 . Disaster education comic with attractive illustrations

Figure 4 . Disaster education - Wolf Card game media

Figure 5 . 1st Ranking Disaster Resilient game

competition for making school evacuation maps, where students will be divided into groups to be given the freedom to make school evacuation maps and present them in front of their friends.

The potential of the coastal ecosystem located in Kajhu Village is still underutilized, and this is evident from the interviews we conducted, where many residents do not know the function of mangrove trees apart from protecting the coast from tsunamis and coastal abrasion. Therefore, the urgency to make people aware so that they are able to take advantage of this coastal potential to become an object of ecotourism and to process mangrove fruit into products that have a selling value is increasingly important.

The implementation technique carried out by the team is to provide socialization on the introduction of mangrove ecosystems, types of mangrove plants, and the benefits we get from protecting this ecosystem. The purpose of this initial socialization is to provide initial provisions for the PKK team to understand that the existence of mangrove ecosystems is very important.

After the socialization was completed, the team then carried out an empowerment program by teaching the community to be able to process mangrove fruit into flour which can be processed into various food products that have a sale value. After the mangrove fruit was processed into flour, the team then held packaging and marketing skills training for mangrove flour in the digital era for community groups, namely the Kajhu Village PKK team.

We named this mangrove flour Avicennia Flour (Figure 6), which comes from the Latin name of mangrove plants, which are often found on the coast of Kajhu Village. The PKK team carried out training and joint processing of lindur-type mangrove fruit into flour (Figure 7) which can be processed into various types of delicious food and has nutritional value.

Figure 6 . Flour brand made from Lindur Mangrove fruit with the name Avicennia

Figure 7 . Processing of mangrove flour into processed food

After processing mangrove flour with the women, the team carried out mangrove flour empowerment activities by training on making various types of cakes using mangrove flour as basic ingredients. We do this to instill knowledge and test the taste and texture of the mangrove flour that we have made together and whether it is suitable to be used as processed food products. The food we managed to process included marrow porridge, dumplings, pudding, and klepon (a snack of sweet rice cake balls filled with molten palm sugar and coated in grated coconut).

Furthermore, after the community understands the importance of the ecosystem and the potential for ecotourism in Kajhu Village, we carry out preparedness training so that residents realize that preparation before a

disaster occurs is very important. We carry out outreach on disaster preparedness and deliver material on the role of mothers in maintaining family safety, and we close the event by handing over disaster preparedness bags.

To make disaster education more effective, it is important to take a practical approach that will leave a lasting impression on students. This approach should focus on increasing their self-awareness, encouraging them to apply what they have learned in their daily lives, and helping them remember the information for a longer period of time (Oktari & Kumala, 2020).

3.3 Program sustainability

The community service program that we carried out aimed to be sustainable. The following is a diagram of the roadmap for implementing Kajhu Village development activities to become a Disaster Resilient Village and develop the potential of existing coastal ecosystems, to become Ecotourism tourism objects. The involvement of kelurahan (village) government representatives and community representatives, including women and vulnerable groups, is essential in forming a disaster-resilient village (Oktari, 2019).

The community service program conducted in Kajhu Village was successful in achieving its objectives, which included disseminating knowledge and awareness regarding disaster mitigation, evacuation drill practices, empowering women through the processing of mangroves into food, and enhancing the culture of reading literacy for children by creating disaster literacy corners at schools. The program's success was attributed to the structured three-meeting program, which introduced the concept of disaster and its potential impact, disaster mitigation strategies, and evacuation planning. Additionally, disaster literacy corners were established in schools, and disaster evacuation drills were conducted, which equipped the community with practical experience and increased their resilience and preparedness. Finally, the program improved the literacy culture by creating disaster literacy corners in schools, using two-way socialization and education methods, and preparing various disaster education media for different age groups.

The involvement of kelurahan government and community representatives, including women and vulnerable groups, is very important in forming a disaster-resilient village (Oktari et al., 2021). In addition, research by Dhyani et al. (2020) shows that implementing programs that involve local communities in managing the potential of coastal ecosystems can improve community welfare and reduce vulnerability to disasters. A participatory approach in empowering women can increase women's participation in developing the potential of coastal ecosystems (Barrios et al., 2020; Lim et al., 2021; Lin, 2019).

The implications of the community service program in Kajhu Village are increasing community resilience and preparedness in dealing with natural disasters and developing the potential of coastal ecosystems to become sustainable ecotourism attractions. In addition, this program also has a positive impact on empowering women through processing mangroves into food and increasing a culture of disaster literacy for children through disaster literacy corners at schools.

More broadly, this program can inspire communities in other areas to adopt a participatory and structured approach to increase resilience and preparedness for natural disasters and develop the potential of coastal ecosystems. In addition, this program also makes a positive contribution to achieving sustainable development goals, especially in efforts to maintain the sustainability of coastal ecosystems and community empowerment.

4. CONCLUSION

The team collaborated with the Kajhu Village institution to implement an innovative strategy to empower the PKK team. The initiative involved processing mangroves into a value-added product named Avicennia, which could be further processed into cakes for sale. This approach resulted in the development of a micro, small, and medium enterprise (MSME) product for the PKK team in Kajhu Village. Moreover, various educational media were created to promote disaster management in schools, including disaster literacy corners, disaster pop-up books, disaster comics, and disaster educational games. The program was implemented in Monsinget hamlet, Meriam Patah hamlet, and Kajhu Indah hamlet, with the primary objective of targeting school-going children, the PKK Team, and the local community. Indicators of success for the program that has been implemented include:

1. Creating Avicennia value-added products that can be processed into cakes for sale, to increase the income of the PKK Team in Kajhu Village;
2. Distributed and well integrated various disaster education media, such as disaster literacy corners, disaster pop-up books, disaster comics, and disaster education games in schools and local communities;
3. Increased awareness of the people of Kajhu Village on disaster management through structured and integrated outreach and education;
4. The establishment of successful partnerships with several organizations, such as the Aceh Besar BPBD, the Press of DETAK Universitas Syiah Kuala, Public Relations of Universitas Syiah Kuala, Mangrove Farmers of Kajhu Village, and Generation of Education of Nanggroe Aceh (GEN-A).

5. ACKNOWLEDGMENT

The authors would like to thank Kemdikbudristek and Universitas Syiah Kuala for their support in implementing the ORMAWA PPK program, enabling the team to effectively carry out community service activities. We also would like to thank all team members for their constant support.

6. CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

REFERENCES

Arthana, I. W., Restu, I. W., Dewi, A. P. W. K., Pratiwi, M. A., Ekawaty, R., & Widiastuti, N. K. (2017). Pelatihan pengolahan produk buah mangrove untuk mendukung pengembangan Nusa Lembongan sebagai destinasi wisata. *Buletin Udayana Mengabdi, 16*(2), 133-137.

Atmaja, I. M. P. D., & Melinita, N. N. S. (2022). Pengolahan buah lindur (*Bruguiera gymnorrhiza*) sebagai pengganti tepung terigu dalam kue semprit. *Jurnal Gastronomi Indonesia, 10*(1), 10–19. https://doi.org/10.52352/jgi.v10i1.684

Badan Pusat Statistik Aceh Besar. (2016). *Kecamatan Baitussalam Dalam Angka 2015*.

Barrios, L. M., Prowse, A., & Vargas, V. R. (2020). Sustainable development and women's leadership: A participatory exploration of capabilities in Colombian Caribbean fisher communities. *Journal of Cleaner Production, 264*, 121277. https://doi.org/10.1016/j.jclepro.2020.121277

Dewi, P. D. P., Sukerti, N. W., & Ekayani, I. A. P. H. (2014). Pemanfaatan tepung buah mangrove jenis lindur (*Bruguiera gymnorrizha*) menjadi kue kering putri salju. *Jurnal BOSAPARIS: Pendidikan Kesejahteraan Keluarga, 2*(1).

Dhyani, S., Karki, M., & Gupta, A. K. (2020). Opportunities and advances to mainstream nature-based solutions in disaster risk management and climate strategy. In *Disaster Resilience and Green Growth*, (1–26). Springer Nature. https://doi.org/10.1007/978-981-15-4712-6_1

Hamzah, H., Yanto, S., & Fadillah, R. (2022). Analisis kandungan tepung buah mangrove jenis lindur (*Bruguiera Sp*) sebagai alternatif bahan pangan lokal. *Jurnal Pendidikan Tambusai, 6*(2), 16383-16391.

Hamzah, M., Bana, S., Gandri, L., Hidayat, H., & Findra, M. N. (2022). Pelatihan pengolahan stik buah mangrove bagi masyarakat Desa Passare Apua Kecamatan Lantari Jaya Kabupaten Bombana Sulawesi Tenggara. *Panrita Abdi-Jurnal Pengabdian pada Masyarakat, 6*(4), 771-779.

Jamili, J., Yanti, N. A., & Oetama, D. (2021). Diversifikasi buah mangrove menjadi produk olahan di Desa Tanjung Tiram, Kabupaten Konawe Selatan, Sulawesi Tenggara. *Jurnal ABDINUS, 5*(1), 20–28. https://doi.org/10.29407/ja.v5i1.14935

Kardiman, K., Ridhwan, M., & Armi, A. (2017). Buah Lindur (*Bruguera gymnorrhyza*) sebagai makanan. *Serambi Saintia: Jurnal Sains Dan Aplikasi, 5*(2).

Lim, V. C., Justine, E. V., Yusof, K., Ariffin, W. N. S. F. W., Goh, H. H., & Fadzil, K. S. (2021). Eliciting local knowledge of ecosystem services using participatory mapping and photovoice: A case study of Tun Mustapha Park, Malaysia. *PLOS ONE, 16*(7). https://doi.org/10.1371/journal.pone.0253740

Lin, P. (2019). Building resilience through ecosystem restoration and community participation: Post-disaster recovery in coastal island communities. *International Journal of Disaster Risk Reduction, 39*, 101249. https://doi.org/10.1016/j.ijdrr.2019.101249

Maulana, G., Hasanah, U., Hanum, S., Urrahmi, S., Dzikri, T. A., & Oktari, R. S. (2022). Disaster education through the adaptation of the werewolf game and acehnese local wisdom. *E3S Web of Conferences, 340*, 03005. https://doi.org/10.1051/e3sconf/202234003005

Oktari, R. S. (2019). Peningkatan kapasitas desa tangguh bencana. *Indonesian Journal of Community Engagement, 4*(2), 189-197. https://doi.org/10.22146/jpkm.29960

Oktari, R. S., & Kumala, I. D. (2020). Improving student internalization of disaster knowledge by participating in learning package development. *Indonesian Journal of Community Engagement, 6*(3), 195-202. https://doi.org/10.22146/jpkm.29960

Oktari, R. S., Kamaruzzaman, S., Fatimahsyam, F., Sofia, S., & Sari, D. K. (2021). Gender mainstreaming in a Disaster-Resilient Village Programme in Aceh Province, Indonesia: Towards disaster preparedness enhancement via an equal opportunity policy. *International Journal of Disaster Risk Reduction, 52*, 101974. https://doi.org/10.1016/j.ijdrr.2020.101974

Perkasa, H. (2013). *Pemanfaatan tepung buah lindur (Bruguiera gymnorrhiza) dalam pembuatan biskuit*. (Bachelor's Thesis, IPB). https://repository.ipb.ac.id/handle/123456789/61348

Seknun, N. (2013). *Pemanfaatan tepung buah lindur (Bruguiera gymnorrhiza) dalam pembuatan dodol sebagai upaya peningkatan nilai tambah*. (Bachelor's Thesis, IPB). https://repository.ipb.ac.id/handle/123456789/63295