Devotion : Jurnal Pengabdian Kepada Masyarakat
Vol.4, No.1, December 2026, hal.46-56
e-ISSN: 3031-5913
DOI: 10.62282/devotion.v4i1.46-56
https://jurnal.yayasanyutapendidikancerdas.com/index.php/devotion

Submitted on 21/09/2026;
Revised on 06/10/2026;
Accepted on 16/10/2026;

Eco Awareness Movement at Payum Beach, Merauke: Participatory Environmental Education, Beach Cleanup, and Mangrove Planting

Mulkhaeri Ikram[1]*, Wa Ode Sitti Mardiana[2], Firda Weri[3],
Wilhelmina Jeujanan[4], Umiyati Haris[5], Rachmat Agung Puank Parukka[6]
[1,2,3,4,5,6]Musamus University, Merauke, Indonesia
*Corresponding Author: ririmulk@unmus.ac.id

Abstract
Payum Beach, Merauke Regency, faces coastal environmental concerns related to waste management and the need for continued attention to coastal vegetation. This community service program involved 50 participants in a three-hour activity conducted on 11 September 2026. The program integrated environmental education, beach cleanup, mangrove planting, discussion, and a sustainability commitment through a participatory approach. Preparation and coordination, initial field observation, activity implementation, documentation, and descriptive evaluation were used to organize the program. The activity included education on coastal ecosystems, waste reduction, environmentally responsible behavior, and the ecological functions of mangroves; direct cleanup of the beach; planting of 50 mangrove seedlings; and a post-activity discussion on environmental problems, waste management, mangrove maintenance, and possible follow-up actions. The available records document participation, activity duration, and the number of seedlings planted, but do not provide quantitative measurements of waste volume, pre- and post-activity knowledge, behavioral change, or seedling survival. Accordingly, the program is interpreted as an initial participatory environmental education and action activity rather than evidence of long-term behavioral or ecological outcomes. The activity demonstrates the feasibility of combining education and direct environmental action while highlighting the need for standardized baseline data, participant profiling, and follow-up monitoring in subsequent activities.

Keywords: coastal ecosystem; coastal revegetation; community participation; community service; environmental education

DEVOTION is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

INTRODUCTION

Coastal ecosystems provide ecological functions and support social and economic activities, but their condition can be affected by pollution, habitat degradation, and unsustainable human use. Marine and coastal litter is a persistent environmental problem that can move between land, rivers, beaches, and the sea, making prevention and community-level action important components of coastal management (United Nations Environment Programme [UNEP], 2021). Environmental education can complement physical interventions by helping participants understand environmental problems and engage in civic or community action. A systematic review of environmental education programs found that hands-on and participatory approaches can be associated with civic-engagement outcomes, although the strength of outcomes depends on program design and evaluation (Ardoin et al., 2023).

The local context of Payum is particularly relevant. An ecological assessment of the Payum–Lampu Satu coastal area reported mangrove damage associated with sand extraction and mangrove wood use. The study estimated approximately 2 ha of damaged mangrove area along a damaged stretch of about 1.5 km in the Payum area (Wizdam Lumera et al., 2017). Although these data are not a current 2026 baseline, they provide documented evidence that mangrove degradation has previously occurred in the target coastal landscape. This historical evidence supports the need for site-specific

Copyright © 2026: The Authors. Published by DEVOTION, ISSN: 3031-5913 (Online)

environmental education and rehabilitation-oriented action, while also indicating the importance of obtaining updated baseline measurements before making current claims about ecological condition.

Mangroves are important components of coastal ecosystems. They provide habitat and ecosystem services and contribute to coastal protection and carbon storage (Alongi, 2008; Donato et al., 2011; Macreadie et al., 2021). Recent research emphasizes that mangrove restoration should be site-specific and should consider ecological and social conditions rather than treating planting alone as a sufficient restoration strategy (Gerona-Daga & Salmo, 2022; Beeston et al., 2023; Villarreal-Rosas et al., 2024). Site selection, hydrology, substrate, exposure, species suitability, local participation, and post-planting monitoring are among the factors that influence the likelihood of successful mangrove establishment.

Previous community service activities in Indonesia have commonly combined environmental education and mangrove planting. For example, community-service programs in Dumai and Kuala Bubon integrated education with direct planting activities, while more recent programs have added quantitative pre/post evaluations or post-planting monitoring (Azuga et al., 2024; Marlian et al., 2022; Saifullah et al., 2024). These studies indicate an important gap for one-day community service programs: implementation is often reported more clearly than measurable longer-term outcomes. The present activity addresses this practical gap by integrating education, beach cleanup, mangrove planting, discussion, and sustainability planning in a single participatory sequence, while explicitly distinguishing immediate outputs from outcomes that require longitudinal measurement.

The specific objectives of the Eco Awareness Movement were to: (1) provide contextual environmental education on coastal ecosystems, waste reduction, and mangrove functions; (2) involve participants directly in beach cleanup and mangrove planting; (3) create a discussion space for identifying environmental problems and possible solutions; and (4) formulate follow-up commitments related to coastal cleanliness and mangrove maintenance. The measurable outputs available from the activity were participant number (50 people), activity duration (3 hours), completion of the planned activity components, and number of seedlings planted (50 seedlings).

The novelty of the program lies in its integration of environmental education, direct beach cleanup, mangrove planting, reflective discussion, and sustainability planning within a single community-service sequence at Payum Beach. Rather than presenting planting as an isolated symbolic activity, the program connects education and direct action with reflection and proposed follow-up. This integrated orientation is consistent with recent community-based restoration practice emphasizing participation, learning, and monitoring, while the present manuscript explicitly limits its claims to the documented outputs of the one-day activity (Beeston et al., 2023; Cellu et al., 2024).

Copyright © 2026: The Authors. Published by DEVOTION, ISSN: 3031-5913 (Online)



Figure 1. Eco Awareness Movement activity process.

METHODS

The activity was conducted at Payum Beach, Merauke Regency, South Papua, on 11 September 2026 and lasted approximately three hours. The target group was the community and participants involved in environmental activities at the site. A total of 50 participants took part in the activity. The available field record does not provide a ver ified breakdown by age, gender, occupation, stakeholder category, or recruitment method; therefore, no unverified participant characteristics are reported.

The program adopted a participatory community-engagement orientation, in which participants were involved in education, direct environmental action, discussion, and formulation of possible follow-up actions. Participatory and community-engaged learning approaches are consistent with literature emphasizing experiential learning, reciprocity, and community involvement in sustainability-oriented higher education (Nguyen & Jessen Condry, 2023; Rodríguez-Zurita et al., 2024).

The implementation was organized into six activity components so that the written method is consistent with the six-part infographic in Figure 1: (1) environmental education; (2) awareness and field observation; (3) beach cleanup; (4) mangrove planting; (5) discussion and solution formulation; and (6) sustainability commitment. Preparation, coordination, documentation, and evaluation were treated as supporting procedures rather than additional activity stages.

Educational materials addressed coastal ecosystem functions, waste problems, waste reduction, environmentally responsible behavior, and the ecological functions of mangroves. Field activities used cleaning equipment, planting equipment, documentation facilities, and supporting materials. The education component was delivered communicatively and interactively, followed by direct field activities and group discussion. The available record does not specify the exact education-session duration, facilitator allocation, or detailed media/equipment list; these are therefore not inferred.

Program success was assessed using process and output indicators: (1) number of participants; (2) completion of the planned activity components; (3) number of mangrove seedlings planted; and (4) documented discussion themes and follow-up priorities. No standardized pre-test/post-test instrument,

Copyright © 2026: The Authors. Published by DEVOTION, ISSN: 3031-5913 (Online)

waste-weight measurement, or post-planting survival survey was conducted as part of the reported activity. Consequently, knowledge change, attitude change, waste reduction in kilograms, and seedling survival rate are not reported as measured outcomes.

Ethical and documentation considerations were addressed at the level of activity reporting. The manuscript uses photographs to document the community-service activities and does not analyze individual-level personal data. The available manuscript record does not specify a formal consent instrument or separate ethics approval; therefore, no such procedure is claimed.

Evaluation was descriptive and based on observation during implementation, activity documentation, participant interaction, and joint reflection after the activity. This approach is appropriate for documenting the implementation of a community service activity, but it does not provide evidence of causal or long-term impact. Future activities should add baseline and follow-up measurements to strengthen outcome evaluation.

Table 1. Activity Components, Objectives, and Indicators

Component	Main activity	Operational objective	Available indicator/output
1. Environmental education	Delivery of material on coastal ecosystems, waste reduction, responsible behavior, and mangrove functions.	Provide contextual information before field action.	Education session delivered; participant responses observed qualitatively.
2. Awareness / field observation	Link the educational material to the environmental conditions encountered at Payum Beach.	Orient participants to the local context and activity priorities.	Participants oriented to site conditions; no standardized awareness score recorded.
3. Beach cleanup	Collect and, where feasible, sort waste found in the activity area.	Enable direct participation in coastal cleanliness action.	Cleanup completed; waste volume/weight not recorded.
4. Mangrove planting	Plant mangrove seedlings at a predetermined point.	Introduce the ecological importance of mangroves through direct action.	50 seedlings planted; species, spacing, coordinates, and survival data not recorded.
5. Discussion and solution formulation	Discuss environmental problems, waste management, mangrove maintenance, and possible solutions.	Document participant perspectives and possible follow-up priorities.	Discussion themes and proposed actions documented qualitatively.
6. Sustainability commitment	Encourage continued cleanliness, reduced single-use plastics, mangrove care, and future environmental activities.	Frame possible follow-up beyond the one-day activity.	Commitment discussed; no longitudinal adherence measurement available.

RESULTS AND DISCUSSION

The activity was conducted at Payum Beach on 11 September 2026 for approximately three hours and involved 50 participants. The documented physical output included the planting of 50 mangrove seedlings. The program also included environmental education, beach cleanup, discussion, and a sustainability-oriented commitment. Because the evaluation was descriptive and the available records do not contain quantitative waste measurements or longitudinal outcomes, the results below emphasize implementation, observable outputs, and limitations rather than causal claims.

Copyright © 2026: The Authors. Published by DEVOTION, ISSN: 3031-5913 (Online)

Environmental Education and Contextual Learning

The education component introduced participants to the relationship between coastal environmental conditions and everyday behavior. Topics included coastal ecosystem functions, waste problems, waste reduction, environmentally responsible behavior, and mangrove functions. The sequence placed education before direct action so that participants could approach the field activities with a shared conceptual frame. Evidence from other Indonesian programs suggests that measurable learning outcomes are strongest when pre- and post-activity instruments are included; for example, a recent Pari Island program reported a rise in average knowledge scores from 61.5 to 87.3 after education and planting (Pranitasari et al., 2026). In contrast, the present activity did not administer a standardized test, so it cannot claim a measured increase in knowledge.



Figure 2. Waste education and socialization activity.

Beach Cleanup as Direct Environmental Action

Participants took part in cleaning the Payum Beach activity area. The action involved collecting waste and, as far as field conditions allowed, sorting it by type. The activity provided an opportunity for participants to encounter the physical condition of the coastal area directly. However, the manuscript does not contain measurements of the mass, volume, or composition of collected waste; therefore, the amount of waste removed cannot be used as a quantitative outcome. Similar integrated coastal programs in Indonesia have combined cleanup activities with mangrove rehabilitation and community participation (Jamal et al., 2025; Rahman et al., 2026).

Copyright © 2026: The Authors. Published by DEVOTION, ISSN: 3031-5913 (Online)



Figure 3. Eco Awareness Movement beach-cleanup action.

Mangrove Planting as an Initial Rehabilitation-Oriented Learning Action

Fifty mangrove seedlings were planted at a predetermined point. The planting activity was introduced by an explanation of mangrove ecological functions and followed by direct participant involvement. Recent guidance emphasizes that successful mangrove restoration depends on appropriate site conditions, local participation, realistic objectives, and long-term monitoring; planting alone should not be equated with restoration success (Beeston et al., 2023; Villarreal-Rosas et al., 2024). Accordingly, this activity is described here as an initial rehabilitation-oriented learning action rather than as demonstrated ecological restoration.

The available documentation confirms the number of seedlings planted but does not provide verified information on mangrove species, seedling size, planting spacing, coordinates or site zone, substrate and tidal conditions, or formal site-selection criteria. These details are important for reproducibility and future monitoring. The activity also did not include post-planting survival or growth measurements. Such monitoring would be necessary before making claims about ecological establishment; restoration-tracking research recommends documenting site background, baseline conditions, intervention details, and post-restoration ecological and socioeconomic outcomes in a standardized manner (Gatt et al., 2024).

Copyright © 2026: The Authors. Published by DEVOTION, ISSN: 3031-5913 (Online)



Figure 4. Mangrove planting activity.

Discussion and Formulation of Possible Solutions

After the field activities, participants discussed waste problems, community habits, waste-management constraints, mangrove maintenance, periodic environmental activities, and possible solutions. The discussion functioned as a reflection space in which field experiences could be connected with possible follow-up actions. This is consistent with community-based mangrove programs in which participation in planning, decision-making, monitoring, and feedback can support rehabilitation sustainability (Fatimatuzzahroh et al., 2021; Cellu et al., 2024). However, a single discussion session does not provide sufficient evidence to conclude that durable community ownership was established. Therefore, the present article reports the discussion as an initial participatory reflection and planning mechanism.



Figure 5. Group discussion and reflection.

Copyright © 2026: The Authors. Published by DEVOTION, ISSN: 3031-5913 (Online)

Comparison with Previous Community Service Programs

The present activity shares several features with recent Indonesian community service programs. Mangrove rehabilitation programs in Dumai and Kuala Bubon combined education, site observation, planting, and follow-up maintenance (Azuga et al., 2024; Marlian et al., 2022). A recent program in South Sulawesi combined environmental education with mangrove conservation and community surveys, demonstrating the value of combining educational intervention with measurable assessment (Baua et al., 2025). More recent community-service activities have also incorporated quantitative pre/post evaluation or monitoring, such as the reported improvement in knowledge on Pari Island and documented post-planting monitoring in other programs (Pranitasari et al., 2026; Saifullah et al., 2024).

Compared with these programs, the contribution of the Payum activity is primarily its integrated sequence of education, beach cleanup, mangrove planting, discussion, and sustainability planning in a single short community-service event. Its main limitation is the absence of standardized quantitative outcome measurement. This comparison clarifies that the present program should be regarded as an initial participatory intervention and a foundation for future, more rigorously evaluated activities rather than as evidence of long-term environmental impact.

Participatory Approach and the Role of Higher Education

The program can be understood as a community-engaged learning activity in which environmental knowledge was connected with direct service to the community. Recent literature on community-engaged learning and service-learning emphasizes experiential learning, collaboration, and reciprocal engagement between academic and community actors (Nguyen & Jessen Condry, 2023; Rodríguez-Zurita et al., 2024). In this specific activity, the university service team contributed by preparing and delivering environmental education, facilitating field action, documenting implementation, and supporting the discussion.

The contribution of higher education should therefore be framed as facilitation and knowledge exchange rather than as a claim that the institution independently produced long-term behavioral or ecological change. Such a distinction is important because the present evaluation captures a single three-hour activity and does not include longitudinal follow-up.

Challenges, Practical Constraints, and Lessons Learned

The documented methodological constraints of the activity were its short three-hour duration and the absence of baseline and follow-up measurements for knowledge, waste volume, and seedling survival. These constraints limit the ability to quantify effectiveness and long-term impact. The practical lesson is that future activities should allocate time and responsibility not only for implementation but also for baseline assessment and follow-up monitoring.

The available source records do not provide verified details about specific field challenges such as weather, tide, access, waste-handling difficulties, participant coordination, or planting-site constraints. These details are therefore not inferred. A second lesson concerns mangrove planting: planting should be linked to site assessment, species suitability, clear planting records, and post-planting monitoring. A third lesson concerns community participation: discussion and commitment are useful starting points, but continued participation in maintenance, evaluation, and decision-making is necessary for long-term sustainability (Cellu et al., 2024; Beeston et al., 2023).

Copyright © 2026: The Authors. Published by DEVOTION, ISSN: 3031-5913 (Online)

Program Contribution and Sustainability

The specific contribution of the Eco Awareness Movement is the integration of environmental education with direct coastal cleanup, mangrove planting, participatory discussion, and sustainability planning in one activity sequence. The immediate benefit was to create a structured opportunity for 50 participants to engage in coastal environmental action, including the planting of 50 mangrove seedlings. The program also generated a practical follow-up agenda involving mangrove monitoring, periodic cleanup, continued education, local community involvement, and multi-stakeholder collaboration.

These follow-up actions should be understood as a proposed sustainability agenda, not as outcomes already demonstrated by the present activity. This distinction is important because community participation and ecological restoration require continuing monitoring and adaptive management (Beeston et al., 2023; Gatt et al., 2024).

The main limitations are the absence of a standardized needs-assessment record, disaggregated participant characteristics, quantitative waste measurements, species and site-specific planting data, pre/post knowledge measures, behavioral indicators, and post-planting survival data. These limitations restrict the study to a descriptive account of program implementation and immediate outputs. The historical Payum mangrove condition cited in the Introduction should not be interpreted as a current 2026 baseline. Future iterations should establish current baseline measurements and standardized monitoring before implementation so that ecological and social outcomes can be assessed more rigorously.

CONCLUSION

The Eco Awareness Movement at Payum Beach, Merauke Regency, was implemented as a three-hour participatory community service activity on 11 September 2026 involving 50 participants. The program integrated environmental education, beach cleanup, mangrove planting, discussion, and sustainability planning, with 50 mangrove seedlings planted as the principal documented ecological output. The program's specific contribution was to connect environmental knowledge with direct coastal action and participatory reflection within a single community-service sequence. The available evidence supports conclusions about implementation and immediate outputs, but it does not demonstrate long-term behavioral change, waste-reduction impact, community ownership, or mangrove survival. Future programs should therefore establish baseline conditions, use measurable knowledge and attitude indicators, quantify waste, document mangrove planting characteristics, and conduct follow-up monitoring to assess social and ecological outcomes. The activity provides a practical foundation for continued community-based coastal environmental action at Payum Beach.

Acknowledgments

Gratitude was conveyed to the community and parties who have supported the implementation of Eco Awareness Movement activities at Payum Beach, Merauke Regency.

Funding

Funding source: Dipa Unmus 2026.

Copyright © 2026: The Authors. Published by DEVOTION, ISSN: 3031-5913 (Online)

Author Contributions

Mulkhaeri Ikram: conceptualization, design of activities, coordination, implementation, and preparation of manuscripts. Wa Ode Sitti Mardiana: implementation of activities, mentoring, and review of manuscripts. Firda Weri: implementation of activities, documentation, and manuscript review. Contribution details can be adjusted based on the actual division of tasks.

Conflict of Interest

The authors state that there is no conflict of interest.

REFERENCES

Alongi, D. M. (2008). Mangrove forests: Resilience, protection from tsunamis, and responses to global climate change. Estuarine, Coastal and Shelf Science, 76(1), 1–13. https://doi.org/10.1016/j.ecss.2007.08.024

Ardoin, N. M., Bowers, A. W., & Gaillard, E. (2023). A systematic mixed studies review of civic engagement outcomes in environmental education. Environmental Education Research, 29(1), 1–26. https://doi.org/10.1080/13504622.2022.2135688

Azuga, N. A., Hendris, S., Ilahi, I., Heltonika, B., Yoswaty, D., Nurrachmi, I., Siregar, N. I., & Siregar, Y. I. (2024). Rehabilitasi mangrove berbasis edukasi bersama siswa SMK perikanan Dumai tahun 2024. Jurnal Pengabdian Masyarakat Multidisiplin, 8(3). https://doi.org/10.36341/jpm.v8i3.6174

Baua, Q. D., et al. (2025). Enhancing environmental education on mangroves and climate change to achieve SDG 13 in coastal communities of South Sulawesi, Indonesia. International Research in Geographical and Environmental Education. https://doi.org/10.1080/10382046.2025.2524673

Beeston, M., Cameron, C., Hagger, V., Howard, J., Lovelock, C., Sippo, J., Tonneijck, F., van Bijsterveldt, C., & van Eijk, P. (Eds.). (2023). Best practice guidelines for mangrove restoration. Global Mangrove Alliance & Blue Carbon Initiative.

Cellu, M. C., Cangara, H., & Unde, A. A. (2024). Strategi komunikasi lingkungan berbasis partisipasi masyarakat dalam rehabilitasi mangrove di pesisir Kabupaten Pinrang (studi kasus Dusun Tanroe). Jurnal Green Growth dan Manajemen Lingkungan, 13(2), 108–126. https://doi.org/10.21009/jgg.v132.02

Donato, D. C., Kauffman, J. B., Murdiyarso, D., Kurnianto, S., Stidham, M., & Kanninen, M. (2011). Mangroves among the most carbon-rich forests in the tropics. Nature Geoscience, 4, 293–297. https://doi.org/10.1038/ngeo1123

Fatimatuzzahroh, F., Hadi, S. P., & Purnaweni, H. (2021). Community level participation and actor analysis of mangrove rehabilitation in Karangsong Village, Indramayu Regency, West Java. Jurnal Sosial Ekonomi Kelautan dan Perikanan, 16(2). https://doi.org/10.15578/jsekp.v16i2.9420

Gatt, Y. M., Walton, R. W., Andradi-Brown, D. A., Spalding, M. D., et al. (2024). The Mangrove Restoration Tracker Tool: Meeting local practitioner needs and tracking progress toward global targets. One Earth, 7(11), 2072–2085. https://doi.org/10.1016/j.oneear.2024.09.004

Gerona-Daga, M. E. B., & Salmo III, S. G. (2022). A systematic review of mangrove restoration studies in Southeast Asia: Challenges and opportunities for the United Nation's Decade on Ecosystem Restoration. Frontiers in Marine Science, 9, 987737. https://doi.org/10.3389/fmars.2022.987737

Jamal, E., Fendjalang, S. N. M., & Pattinasarany, A. Y. (2025). Pembersihan sampah dan penanaman kembali mangrove di Pantai Poka Ambon. Mestaka: Jurnal Pengabdian Kepada Masyarakat, 4(2). https://doi.org/10.58184/mestaka.v4i2.614

Macreadie, P. I., Costa, M. D. P., Atwood, T. B., et al. (2021). Blue carbon as a natural climate solution. Nature Reviews Earth & Environment, 2, 826–839. https://doi.org/10.1038/s43017-021-00224-1

Copyright © 2026: The Authors. Published by DEVOTION, ISSN: 3031-5913 (Online)

Marlian, N., Zurba, N., Rahmi, M. M., Lubis, F., Rahmayanti, F., & Fithria, D. (2022). Gerakan menanam bibit mangrove (Rhizophora sp.) sebagai upaya rehabilitasi ekosistem mangrove di Desa Kuala Bubon Aceh Barat. Marine Kreatif, 6(2).

Nguyen, J. J., & Jessen Condry, D. L. (2023). Evaluating differences in community-engaged learning and service-learning via the context, input, process, and product model. Frontiers in Education, 8, 1289322. https://doi.org/10.3389/feduc.2023.1289322

Pranitasari, D., et al. (2026). Mangrove planting and blue economy education as an effort to preserve coastal ecosystems on Pari Island, Thousand Islands. AJAD: Jurnal Pengabdian kepada Masyarakat.

Rahman, R., Tulak, N., Togibasa, O., Ansanay, Y. O., Wardoyo, S., Sinaga, E. S., Dahlan, K., et al. (2026). Environmental care action: Coastal clean-up and ecosystem rehabilitation through bakau (mangrove) seedling planting at Cibery Beach, Jayapura City. JATI EMAS, 10(2). https://doi.org/10.36339/je.v10i2.516

Rodríguez-Zurita, D., Jaya-Montalvo, M., Jaya Montalvo, M., Moreira-Arboleda, J., Raya-Diez, E., Díez, E., Carrión-Mero, P., & Carrión Mero, P. (2024). Sustainable development through service learning and community engagement in higher education: A systematic literature review. International Journal of Sustainability in Higher Education, 26(1), 158–201. https://doi.org/10.1108/IJSHE-10-2023-0461

Saifullah, S., et al. (2024). Pemulihan lingkungan pesisir melalui sosialisasi dan rehabilitasi mangrove. JMM (Jurnal Masyarakat Mandiri).

United Nations Environment Programme. (2021). From pollution to solution: A global assessment of marine litter and plastic pollution. UNEP.

Villarreal-Rosas, J., Brown, C. J., Andradi-Brown, D. A., Domínguez, R., Jacobo, P., Martínez, A., Mascote, C., Najera, E., Paiz, Y., Vázquez Moran, V. H., Villarreal, J., & Adame, M. F. (2024). Integrating socioeconomic and ecological data into restoration practice. Conservation Biology, 38(4), e14286. https://doi.org/10.1111/cobi.14286

Wizdam Lumera, et al. (2017). Analisis ekologi mangrove sebagai dasar rehabilitasi di Pesisir Arafura Samkai Distrik Merauke Kabupaten Merauke Provinsi Papua. Agrikan: Jurnal Agribisnis Perikanan, 10(2), 29–35. https://doi.org/10.29239/j.agrikan.10.2.29-35

Copyright © 2026: The Authors. Published by DEVOTION, ISSN: 3031-5913 (Online)