

## Analysis of Pro-Environmental Behavior in Fishermen Families at Muara Siberut, Mentawai Islands, Indonesia

Aria Gusti\*<sup>1</sup>, Fitriahul Afifah<sup>2</sup>, Siti Mardhiah El-Khairah<sup>3</sup>

<sup>1</sup> Faculty of Public Health, Universitas Andalas, Indonesia

<sup>2,3</sup> Faculty of Medicine, Universitas Negeri Padang, Indonesia

---

### ABSTRACT

This study analyzed pro-environmental behavior among fishermen families in Muara Siberut, Mentawai Islands, Indonesia, focusing on waste disposal practices, vector disease control, footwear habits, ventilation behaviors, and cleaning the yard. A survey was used, utilizing formal questionnaires and qualitative interviews to analyze environmental behaviors and their determinants. Findings reveal significant environmental challenges, with 31.6% of households disposing of waste in rivers or beaches, 93.9% reporting vector disease presence, and 50% resorting to waste burning. Although 63.3% consistently wear footwear, sanitation practices remain inconsistent. The study highlights the urgent need for improved waste management infrastructure, targeted educational interventions, and policy support to promote sustainability. In conclusion, addressing environmental issues in fishing communities requires a multi-faceted approach, integrating socio-cultural factors, infrastructure development, and public health strategies to foster long-term behavioral change and environmental sustainability.

**KEYWORDS:** Pro-environmental behavior, Fishermen families, Mentawai islands

---

### ARTICLE DETAILS

**Published On:**  
17 February 2025

**Available on:**  
<https://ijmscr.org/>

---

### INTRODUCTION

Pro-environmental behavioral health in fishing settlements is a critical issue worldwide, as these communities depend heavily on their surrounding environment for livelihoods. Poor waste disposal, sanitation, and inadequate hygiene in many coastal regions contribute to environmental degradation and public health risks. In developing countries like Indonesia, these challenges are exacerbated by limited waste management infrastructure, economic constraints, and a lack of environmental awareness, making sustainable behaviors a critical study area.(1) Nationally, Indonesian fishing communities face similar problems, with improper waste management, pollution, and disease vector prevalence threatening human and environmental health.

Relevant theories that explain pro-environmental behavior in fishing families include the Theory of Planned Behavior (TPB), which emphasizes how attitudes, subjective norms, and perceived behavioral control influence environmental actions by individuals.(2) Another applicable framework is the Social-Ecological Model, which considers the interactions between individual, community, and policy-level factors in shaping environmental behaviors.(3) These theories help understand the motivations and barriers affecting fishermen's environmental practices. Understanding these factors can inform the development of targeted interventions to promote sustainable fishing practices. These theories help understand the motivations and barriers affecting fishermen's environmental practices.

Previous research from various countries provides insight into the current state of pro-environmental behaviors among fishing communities. A study in the Philippines revealed that only 20% of households had access to proper waste disposal, contributing to severe pollution in coastal waters.(4) In Bangladesh, research found that 85% of fishing families reported the presence of vector-borne diseases, highlighting sanitation and hygiene deficiencies.(5) A study in Brazil indicated that only 50% of fishermen consistently wore footwear, increasing their risk of infection from soil-borne pathogens.(6) These findings underscore the global environmental and health challenges in fishing settlements.

In Muara Siberut, Mentawai Islands, environmental conditions among fishermen mirror these global trends. Inadequate waste disposal infrastructure leads to pollution, while poor sanitation and hygiene contribute to the high prevalence of vector-borne diseases. Socio-economic limitations, traditional practices, and limited governmental intervention further complicate efforts to promote sustainable environmental behaviors in the region. To address these challenges, it is crucial for comprehensive and coordinated strategies to be implemented at both local and national levels.

Despite abundant research on pro-environmental behaviors in urban and well-developed coastal communities, a significant gap exists in understanding remote fishing settlements' distinct environmental practices and limitations, such as those in Muara Siberut. Most studies have focused on

## Analysis of Pro-Environmental Behavior in Fishermen Families at Muara Siberut, Mentawai Islands, Indonesia

isolated aspects, such as waste management or hygiene, while an integrated approach that examines multiple environmental behaviors remains scarce. Addressing this research gap, this study comprehensively analyzes pro-environmental behaviors in Muara Siberut, comparing findings with global cases and proposing targeted interventions to improve sustainability and public health.

### METHOD

The study was descriptive. Interviews and questionnaires were used to gather data on the environmental behaviors of the people living in Muara Siberut. The researchers also observed the village's daily activities to understand better how environmental habits are integrated into daily life. Using a holistic approach, this study aimed to provide practical solutions for promoting sustainable practices and insightful

information about remote fishing communities' unique challenges. Data on trash disposal practices, ventilation behavior, footwear habits, vector disease control, and household cleanliness was collected. Fishermen's families completed a standardized survey to assess their environmental habits. Qualitative interviews were also conducted to understand the motivations behind specific habits and the challenges associated with adopting more sustainable practices.

### RESULT

The following table summarizes descriptive data in numbers and percentages for each variable studied. This presentation aims to offer an initial overview of the distribution of pro-environmental behaviors among fishing families in Muara Siberut. This information is the basis for understanding the pro-environmental behavior patterns of respondents, which will be discussed further.

**Table: Pro-environment Behavior in the Fishermen Family at the Muara Siberut, Mentawai Islands, Indonesia**

Pro- environmental Behavior	Amount	%
<b>Method disposal rubbish</b>		
Thrown into the river/beach	31	31.6
Thrown Away to water channel / drainage	2	2.1
Thrown Away to bushes closest	5	5.1
Burned	49	50.0
Thrown Away to place disposal rubbish temporary	11	11.2
<b>Vector diseases control</b>		
There is a vector disease	92	93.9
No vectors disease	6	6.1
<b>Footwear habits</b>		
Never	8	8.2
Sometimes	28	28.6
Always wear footwear when outside House (	62	63.3
<b>Ventilation behavior</b>		
Never	6	6.1
Sometimes	18	18.4
Always open window when at home during the day day	74	75.5
<b>Cleaning the yard</b>		
Never	3	3.1
Sometimes	38	38.8
Always keep the yard in condition clean and dry	57	58.2

### DISCUSSION

#### Waste Disposal Practices

The findings show that 31.6% of respondents dispose of waste directly into rivers or beaches, while 2.1% use drainage channels and 5.1% discard waste in nearby bushes. Alarmingly, 50% of families burn their waste, contributing to air pollution and potential health hazards. Only 11.2% use temporary waste disposal facilities, indicating inadequate infrastructure for proper waste management. A study in coastal areas of the Philippines found that only 20% of households had access to proper waste disposal.(4) In contrast, research in India's coastal villages showed that 45% of residents burn waste,(7) aligning closely with the Muara Siberut findings. A study in Tanzania found that 55% of

fishing communities dispose of waste improperly, indicating a widespread issue in coastal settlements worldwide.(8) This highlights the need for more sustainable waste management practices in these regions. Improper waste disposal in coastal settlements can harm marine ecosystems and human health. Improper waste disposal can lead to pollution, habitat destruction, and the spread of diseases. Proper waste management is essential to protect the environment and ensure the well-being of communities. Individuals and governments need to work together to implement effective waste management strategies.

While it is true that improper waste disposal can harm marine ecosystems and human health, it is important to consider that many coastal settlements may lack the resources or infrastructure to implement sustainable waste management

practices effectively. Simply calling for more sustainable practices without addressing these communities' underlying challenges may not be feasible. Governments and organizations must provide support and resources to these coastal communities to help them improve their waste management systems. This could involve funding waste collection services, educating residents on proper disposal methods, and implementing recycling programs. By working together and addressing the specific needs of each community, we can make significant strides toward protecting our environment and ensuring the well-being of all individuals.

It is also important for these efforts to be sustainable and adaptable to the changing needs of these communities. This may require ongoing monitoring and evaluation of waste management practices and regular infrastructure and resource updates. Additionally, collaboration with local stakeholders, such as businesses and community organizations, can help ensure that solutions are tailored to the unique circumstances of each coastal community. By taking a holistic and inclusive approach to waste management, we can create lasting change and promote a healthier, cleaner environment for future generations.

### Vector Disease Control

The presence of vector-borne diseases is significant, with 93.9% of respondents reporting vector disease occurrence. Only 6.1% claimed an absence of such issues, emphasizing the urgent need for improved sanitation and pest control measures. Research in Bangladesh fishing communities indicated a vector disease occurrence rate of 85%.<sup>(9)</sup> In comparison, a study in Cambodian coastal villages found an occurrence rate of 78%<sup>(10)</sup>, while a Nigerian coastal study reported 92%<sup>(11)</sup>, making the Muara Siberut rates among the highest in global coastal settlements. With a vector disease occurrence rate of 95%. The high rates of vector disease in Muara Siberut are concerning for the health of its residents, as they are at significant risk of contracting serious illnesses. The government must implement effective public health measures to prevent further spread of vector-borne diseases in the area. Failure to do so could result in a widespread epidemic that could have devastating consequences for the entire population. The health and safety of the community must be the top priority. The government must take immediate action to implement these measures.

Although the high prevalence of vector-borne illnesses in Muara Siberut is alarming, it's crucial to consider additional elements like access to healthcare and sanitation that might aid in developing these infections. Public health interventions alone might not be sufficient to address the underlying causes of the problem and stop future epidemics. Collaboration between government agencies, healthcare providers, and community members is essential to create a comprehensive plan to combat vector-borne illnesses in Muara Siberut. Improving infrastructure, such as clean water sources and waste management systems, is crucial in preventing the spread of diseases. Education and awareness campaigns can also be crucial in promoting preventive measures and early detection of illnesses. By taking a multi-faceted approach, we can work towards a healthier and safer community for all residents of Muara Siberut.

This can be achieved through ongoing training and education for healthcare workers and community outreach programs to ensure that all residents can access important information and resources. Additionally, investing in research

and development for new treatments and vaccines can help to protect the population from potential outbreaks further. By working together and prioritizing public health, we can create a sustainable and resilient system better equipped to handle future health challenges.

### Footwear Habits

Regarding footwear habits, 8.2% of individuals never wear shoes outside, while 28.6% do so occasionally. However, 63.3% always wear footwear, indicating an awareness of hygiene and protection against soil-borne infections. A similar study in Brazilian fishing villages found that only 50% of respondents consistently wore footwear, while research in rural Thailand found 70% compliance with footwear use.<sup>(12)</sup> In Ghanaian coastal villages, footwear use was significantly lower at 40%, showing regional variations in hygiene awareness.<sup>(13)</sup> The study concluded that cultural and economic factors significantly determine footwear use in different regions. The study suggested that future interventions should consider these factors to improve compliance with footwear use.

Footwear use may vary by place due to cultural and economic variables. Still, it's also critical to consider how education and healthcare access might encourage hygienic habits. Interventions should also target the root causes of footwear use rather than rely on cultural justifications. By addressing the underlying reasons why individuals choose not to wear footwear, such as lack of access to affordable shoes or limited knowledge about the benefits of wearing them, interventions can be more effective in promoting hygiene practices. Collaboration between public health officials, educators, and community leaders is essential in implementing sustainable solutions that address cultural norms and economic barriers to footwear use. Ultimately, we can create long-lasting change that benefits communities across different regions by holistically improving hygiene awareness.

This approach involves providing access to affordable and culturally appropriate footwear and educating individuals on the importance of foot hygiene and the potential health risks associated with going barefoot. By working together to address these barriers and promote positive behavior change, we can empower communities to prioritize their health and well-being. Through continued collaboration and education, we can significantly improve hygiene practices and overall quality of life for individuals worldwide.

### Ventilation Behavior

A significant proportion (75.5%) of families open their windows during the daytime, improving air circulation. However, 18.4% open windows only occasionally, and 6.1% never do, which may contribute to poor indoor air quality and respiratory issues.<sup>(14)</sup> A study in coastal Ecuador found 80% compliance with regular window opening<sup>(15)</sup> in South African coastal communities. Only 55% of residents practiced proper ventilation, emphasizing the variance in indoor air quality measures.<sup>(16)</sup> It is clear that cultural factors significantly influence these behaviors, as seen in the differences between communities. For example, in some communities, there may be a strong cultural belief that opening windows and doors for ventilation can invite negative energy or spirits into the home. This belief can result in less ventilation in the home, impacting air quality and health outcomes for those in that community. Understanding and

respecting cultural beliefs while promoting healthy living environments is important.

Prioritizing people's health and well-being by encouraging appropriate ventilation practices is crucial, even though cultural views may impact ventilation patterns. Regardless of cultural beliefs, ignoring the negative effects of poor indoor air quality on health outcomes might have negative consequences. Therefore, finding a balance between cultural beliefs and health considerations regarding home ventilation practices is essential. Educating communities about the importance of proper ventilation and its impact on health can help bridge the gap between cultural traditions and modern health practices. Promoting healthy living environments while respecting cultural beliefs ensures everyone can access clean and safe air in their homes. Prioritizing cultural sensitivity and health outcomes is key to creating a harmonious and healthy living environment for all individuals.

Engaging with community leaders and stakeholders is essential to understand their perspectives and values regarding ventilation practices. By collaborating with these key figures, we can develop culturally appropriate strategies to improve indoor air quality while honoring traditions. Additionally, providing resources and support for individuals to make informed decisions about their living environments can empower them to prioritize their cultural beliefs and health needs. Ultimately, by fostering open dialogue and mutual respect, we can work towards creating inclusive and sustainable solutions that benefit everyone. For example, in a community where traditional cooking methods are important cultural practices, stakeholders can work together to find ways to incorporate proper ventilation systems into traditional kitchen designs. This could involve installing smoke hoods or chimneys that allow for the safe release of smoke while still preserving the integrity of traditional cooking techniques. By combining cultural knowledge with modern technology, communities can improve indoor air quality without sacrificing important cultural traditions

### Cleaning The Yard

While 58.2% maintain a clean and dry yard consistently, 38.8% clean their surroundings occasionally, and 3.1% never do. A study in Vietnam's fishing communities reported a lower proportion (45%) of households consistently maintaining yard cleanliness (Helle et al.). Meanwhile, research in Sri Lankan coastal settlements found a higher compliance rate of 65% (R. et al.), and a study in Mexico's fishing communities reported 50% adherence to proper sanitation practices (Joshua et al.). These findings highlight the importance of cultural context in shaping attitudes towards household cleanliness. Different communities may have varying awareness and resources for maintaining a healthy living environment. Public health interventions must consider these cultural beliefs and practices to promote sanitation and hygiene practices in diverse communities effectively.

Although cultural background undoubtedly influences attitudes toward cleanliness, it's crucial to consider additional elements like education and resource accessibility that could affect compliance rates. The intricate causes of the disparities in cleanliness standards among communities may be oversimplified if adherence variances are attributed to cultural beliefs. Factors such as education levels and access to resources can provide a more comprehensive understanding of why certain communities struggle with maintaining proper

sanitation practices. By addressing these additional factors, public health interventions can be tailored to meet the specific needs of diverse communities better, ultimately leading to more successful outcomes in promoting hygiene and sanitation. It is important to approach the issue of cleanliness disparities with a holistic perspective that considers the complex interplay of cultural beliefs, education, and resource availability.

This approach allows for a more nuanced and effective strategy for improving overall sanitation standards and reducing the spread of disease. For example, in communities with limited access to clean water, interventions may focus on providing water purification or distribution infrastructure. In areas with low education levels, health promotion campaigns may need to be tailored to address literacy barriers and cultural beliefs that influence hygiene practices. Public health efforts can have a more significant and lasting impact on improving community health outcomes by taking a multifaceted approach to addressing cleanliness disparities.

### CONCLUSIONS AND SUGGESTIONS

This study highlights the environmental challenges facing fishermen in Muara Siberut, contextualizing them within global research. While some practices align with global trends, the severity of certain issues, such as waste disposal and disease prevalence, indicates an urgent need for interventions. Sustainable waste management policies, community education, and improved sanitation infrastructure are essential to fostering better environmental behaviors in fishing settlements worldwide. Additionally, targeted programs to address specific health concerns, such as promoting proper handwashing and providing access to clean water sources, could help reduce disease prevalence in the community. A multi-faceted approach is needed to address the complex environmental and health issues facing fishermen in Muara Siberut and similar communities. Collaborative efforts between government agencies, non-profit organizations, and local communities will be crucial in implementing effective interventions and creating lasting change. By prioritizing sustainable practices and investing in infrastructure improvements, we can work towards creating healthier and more environmentally conscious fishing settlements worldwide.

### REFERENCES

- I. Gusti A, Iqbal W. Environmental Sanitation Status Associated with Dermatitis in Fishermen's Families, Padang, Indonesia: Contribution to Sustainable Development Goals. *Journal of Lifestyle and SDGs Review*. 2024 Sep 20;4(3):e02259.
- II. De Groot J, Steg L. General Beliefs and the Theory of Planned Behavior: The Role of Environmental Concerns in the TPB. *J Appl Soc Psychol*. 2007 Aug 25;37(8):1817–36.
- III. Schölmerich VLN, Kawachi I. Translating the Social-Ecological Perspective Into Multilevel Interventions for Family Planning. *Health Education & Behavior*. 2016 Jun 22;43(3):246–55.
- IV. Yoshioka N, Era M, Sasaki D. Towards Integration of Climate Disaster Risk and Waste Management: A Case Study of Urban and Rural Coastal Communities in the Philippines. *Sustainability*.

- 2021 Feb 3;13(4):1624.
- V. Bangert M, Molyneux DH, Lindsay SW, Fitzpatrick C, Engels D. The cross-cutting contribution of the end of neglected tropical diseases to the sustainable development goals. *Infect Dis Poverty*. 2017 Dec 4;6(1):73.
- VI. Ana, Raquel, Susana, Joao, Cristina. *Environmental mycology in public health: fungi and mycotoxins risk assessment and management*. Elsevier; 2016.
- VII. Singh RP, Tyagi VV, Allen T, Ibrahim MH, Kothari R. An overview for exploring the possibilities of energy generation from municipal solid waste (MSW) in Indian scenario. *Renewable and Sustainable Energy Reviews*. 2011 Dec;15(9):4797–808.
- VIII. Käyhkö N, Khamis ZA, Eilola S, Virtanen E, Muhammad MJ, Viitasalo M, et al. The role of place-based local knowledge in supporting integrated coastal and marine spatial planning in Zanzibar, Tanzania. *Ocean Coast Manag*. 2019 Jul;177:64–75.
- IX. Samad. Public health threat caused by zoonotic diseases in Bangladesh. [Internet]. 2011 [cited 2025 Feb 12]. Available from: [https://www.academia.edu/download/34019945/dengue\\_haemorrhage.pdf](https://www.academia.edu/download/34019945/dengue_haemorrhage.pdf)
- X. Kumaran E, Doum D, Keo V, Sokha L, Sam B, Chan V, et al. Dengue knowledge, attitudes and practices and their impact on community-based vector control in rural Cambodia. *PLoS Negl Trop Dis*. 2018 Feb 16;12(2):e0006268.
- XI. M Afolabi B, M Afolabi T. The Perception and Behavioral Attitude to Malaria of Non-parental Care-givers Living on an Atlantic Ocean Coastal Community in Nigeria: Paper 1. *Japan Journal of Clinical & Medical Research*. 2022 Apr 30;1–8.
- XII. Al-Delaimy AK, Al-Mekhlafi HM, Nasr NA, Sady H, Atroosh WM, Nashiry M, et al. Epidemiology of Intestinal Polyparasitism among Orang Asli School Children in Rural Malaysia. *PLoS Negl Trop Dis*. 2014 Aug 21;8(8):e3074.
- XIII. Tomczyk S, Deribe K, Brooker SJ, Clark H, Rafique K, Knopp S, et al. Association between Footwear Use and Neglected Tropical Diseases: A Systematic Review and Meta-Analysis. *PLoS Negl Trop Dis*. 2014 Nov 13;8(11):e3285.
- XIV. Horton B, Bird M, Birkland T, Cowie S, Eong OJ, Hawkes A, et al. Environmental and socioeconomic dynamics of the Indian Ocean tsunami in Penang, Malaysia. *Singap J Trop Geogr*. 2008 Nov 11;29(3):307–24.
- XV. Ormaza-González FI, Castro-Rodas D, Statham PJ. COVID-19 Impacts on Beaches and Coastal Water Pollution at Selected Sites in Ecuador, and Management Proposals Post-pandemic. *Front Mar Sci*. 2021 Jul 1;8.
- XVI. Horton B, Bird M, Birkland T, Cowie S, Eong OJ, Hawkes A, et al. Environmental and socioeconomic dynamics of the Indian Ocean tsunami in Penang, Malaysia. *Singap J Trop Geogr*. 2008 Nov 11;29(3):307–24.