



Community Responses to Climate Change: Adaptive Practices in Coastal Villages of Java

Boby Kharisma¹, Hanif Muhammad¹

¹Faculty of Law, Batam International University, Indonesia

*Corresponding Author: Bobby Kharisma

E-mail: bobykharisma192301@gmail.com

Article Info

Article History:

Received: 19 September 2025

Revised: 2 December 2025

Accepted: 15 December 2025

Keywords:

Climate Adaptation,
Community Resilience,
Coastal Communities,
Climate Change,
Institutional Support

Abstract

Climate change poses significant environmental and socioeconomic challenges for coastal communities, particularly those dependent on fisheries and coastal agriculture. This study aimed to describe climate change adaptation and community resilience among coastal communities in Java, Indonesia, using an integrated analytical framework. A quantitative cross-sectional survey was conducted involving 420 respondents selected through purposive sampling from four coastal villages. Data were collected using a structured questionnaire and analyzed using descriptive statistics. The findings indicate that coastal flooding, shoreline erosion, declining fish catches, and saltwater intrusion were perceived as the major climate-related impacts. Respondents reported adopting various adaptation practices, including mangrove restoration, adjustments to fishing seasons, and raising house foundations. Institutional support was perceived as moderate, while financial limitations, inadequate technical knowledge, and limited access to climate information remained key adaptation challenges. Overall, the study provides a comprehensive descriptive overview of environmental, institutional, socioeconomic, and community resilience dimensions, highlighting the importance of strengthening participatory governance, climate information services, and long-term adaptation support for sustainable coastal resilience.

INTRODUCTION

Climate change has become one of the most significant global challenges affecting environmental sustainability, economic development, and human well-being. Coastal regions are particularly vulnerable because they experience multiple climate-related hazards, including sea-level rise, coastal erosion, saltwater intrusion, tidal flooding, and declining marine resources. These changes threaten the livelihoods of millions of people who depend on fisheries, aquaculture, and coastal agriculture while simultaneously increasing food insecurity, poverty, and social vulnerability (Gul et al., 2024; Onyenekwe et al., 2022; Saidu, 2025). Recent studies emphasize that climate adaptation is no longer viewed solely as an environmental issue but as a multidimensional process requiring the integration of ecological conservation, socio-economic resilience, and institutional governance to achieve sustainable coastal development (IPCC, 2023; Yadav et al., 2024; Farny & Dentoni, 2025).

Indonesia, as the world's largest archipelagic country, faces substantial climate risks due to its extensive coastline and high dependence on coastal resources. Java Island represents one of the most vulnerable regions because it accommodates a dense population while serving as a center for fisheries, agriculture, tourism, and industrial activities. Increasing climate variability has intensified coastal flooding, shoreline erosion, declining fish catches, and saltwater intrusion, creating persistent challenges for local communities (Mishra et al., 2024; Vinayachandran et al., 2022; Sultana et al., 2023). These environmental pressures are further exacerbated by rapid urbanization, ecosystem degradation, and uneven access to financial resources, climate information, and institutional support, thereby reducing the adaptive capacity of coastal households (Setiawan et al., 2025; Suntoro et al., 2025; Syam, 2025). Consequently, strengthening community resilience has become an important policy priority for ensuring sustainable coastal livelihoods under changing climatic conditions (Niu et al., 2023; Saha et al., 2024; Islam et al., 2025; Choudhury et al., 2024).

Research has also gained momentum in recent years on the importance of social capital, local knowledge, and collaborative governance at the local level for successful climate adaptation. EBA, livelihood diversification, mangrove restoration and community participation have been found to be effective interventions in improving resilience, while maintaining ecosystem functions (Rölfer et al., 2022; Yadav et al., 2024). Similarly, traditional ecological knowledge remains central in local decision making processes, for example when determining fishing seasons, managing coastal resources and when facing environmental uncertainty. However, these local solutions are often constrained by a variety of factors that limit their sustainability and effectiveness in the long term, such as poor financing, lack of technical expertise, institutional fragmentation, and unequal access to adaptation programs (Pakidi & Tambaip, 2025; Sdunzik et al., 2025; Pacillo et al., 2024; Anjanappa et al., 2024).

Many gaps in the existing knowledge related to climate adaptation have been addressed in previous studies, but there are still a few gaps. Existing research largely covers individual factors of adaptation, such as ecosystem restoration, disaster preparedness, fisheries management, or institutional policies, and less on how community perceptions, adaptation practices, institutional support, adaptation challenges and social resilience work together. Furthermore, empirical studies that specifically address multiple coastal villages in Java are still rather limited, although the region is of strategic importance and is highly vulnerable to climate change. This means that the connection between these dimensions and their overall impact on the adaptive capacity of coastal communities in varying socio-economic situations remains unclear.

This study tackles these shortcomings by creating an integrated assessment of the community's response to climate change in four coastal villages in Java. As opposed to previous studies which focused on one adaptation action or another, this study looks at climate effects, adaptation practices, institutional and government support, adaptation challenges and community resilience together in one analytical framework. This study is unique in considering the holistic nature of community resilience, evaluating both the environmental and socio-institutional aspects of climate adaptation. This study thus focuses on analyzing how the communities respond to climate change, as well as determining the factors that influence the adaptive capacity of coastal villages in Java. The results will inform the creation of community-based adaptation literature, and offer policy and practice oriented recommendations for designing adaptation strategies that are inclusive and sustainable for vulnerable coastal communities.

METHODS

Research Design and Participants

This study employed a quantitative cross-sectional survey design to describe community-based climate change adaptation and resilience among coastal communities in Java, Indonesia. The research was conducted in four coastal villages selected because of their high exposure to climate-related hazards, including coastal flooding, shoreline erosion, and saltwater intrusion. A purposive sampling technique was used to recruit respondents who met the following criteria: (1) aged 18 years or older, (2) permanent residents of the selected villages for at least five years, and (3) directly involved in fisheries, coastal agriculture, or other climate-sensitive livelihoods. A total of 450 questionnaires were distributed, of which 430 were returned. After screening for completeness and consistency, 420 questionnaires were considered valid for analysis, resulting in a response rate of 93.3%. This sample size was considered adequate for descriptive quantitative research involving heterogeneous populations and exceeded the minimum sample size generally recommended for social science research (Hair et al., 2019).

Research Instrument

Data were collected using a structured questionnaire developed from previous studies on climate change adaptation and community resilience. The questionnaire consisted of five dimensions: perceived climate change impacts (5 items), adaptive practices (5 items), institutional and government support (5 items), adaptation challenges (5 items), and community resilience (4 items), resulting in a total of 24 measurement items. All items were assessed using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Prior to the main survey, the questionnaire was reviewed by experts in environmental and social research to ensure content validity and clarity.

Validity, Reliability, and Data Analysis

Construct validity was evaluated using Pearson's Product-Moment correlation, while internal consistency reliability was assessed using Cronbach's Alpha. Questionnaire items with correlation coefficients greater than 0.30 were considered valid, whereas Cronbach's Alpha values of 0.70 or above indicated satisfactory reliability. The validity and reliability results confirmed that all measurement items met the recommended criteria and were therefore suitable for subsequent statistical analysis.

Descriptive statistical analysis was performed using IBM SPSS Statistics version 26. Frequencies and percentages were used to summarize respondents' demographic characteristics and response distributions, while means and standard deviations were calculated to describe each research dimension. Mean scores were interpreted using the following intervals: 1.00–1.80 (Very Low), 1.81–2.60 (Low), 2.61–3.40 (Moderate), 3.41–4.20 (High), and 4.21–5.00 (Very High). Because the study aimed to provide a descriptive overview of community perceptions and adaptation practices, no inferential statistical analyses were conducted.

RESULTS AND DISCUSSION

This section presents the empirical findings obtained from a survey involving 420 respondents from four coastal villages in Java. The analysis is organized into six sections covering respondents' demographic characteristics, perceived climate change impacts, adaptive practices, institutional support, adaptation challenges, and community resilience. The findings are presented systematically through descriptive statistics using frequencies and percentages to illustrate the distribution of respondents' perceptions and experiences. Each table is accompanied by a concise explanation to facilitate interpretation of the results.

Instrument Validity and Reliability

Table 1. Validity and Reliability of the Research Instrument

Variable	Number of Items	Pearson Correlation (r)	Cronbach's Alpha	Interpretation
Perceived Climate Change Impacts	5	0.612–0.781	0.846	Valid and Reliable
Adaptive Practices	5	0.635–0.804	0.859	Valid and Reliable
Institutional and Government Support	5	0.601–0.792	0.831	Valid and Reliable
Adaptation Challenges	5	0.587–0.769	0.818	Valid and Reliable
Community Resilience	4	0.624–0.815	0.867	Valid and Reliable

Source: Processed survey data, 2025

Before conducting the main statistical analysis, the research instrument was evaluated to ensure its validity and reliability. Construct validity was assessed using Pearson's Product-Moment correlation, while internal consistency was measured using Cronbach's Alpha. As presented in Table 1, all questionnaire items produced correlation coefficients exceeding the minimum acceptable threshold of 0.30, indicating that each item adequately represented its corresponding construct. Furthermore, Cronbach's Alpha coefficients ranged from 0.818 to 0.867 across all research dimensions, exceeding the recommended criterion of 0.70. These findings demonstrate satisfactory internal consistency and indicate that the questionnaire reliably measured respondents' perceptions regarding climate change impacts, adaptive practices, institutional support, adaptation challenges, and community resilience. The satisfactory validity and reliability results confirm that the collected data were appropriate for subsequent descriptive statistical analysis. Consequently, the instrument provided a dependable basis for examining community responses to climate change and ensured that the empirical findings accurately reflected the experiences and perceptions of coastal households in the selected study areas.

Demographic Profile of Respondents

Table 2. Demographic Profile of Respondents (N = 420)

Category	Frequency	Percentage (%)
Male	250	59.5
Female	170	40.5
Age 18–30	110	26.2
Age 31–45	180	42.8
Age 46–60	95	22.6
Age >60	35	8.4
Fishermen	220	52.4
Farmers	90	21.4
Traders	65	15.5
Others	45	10.7

Source: Primary survey data processed by the authors, 2025

Table 2 summarizes the demographic characteristics of the respondents. Male participants accounted for 59.5% of the sample, while females represented 40.5%, indicating that men remain the dominant workforce in coastal livelihood activities. The largest age group was 31–45 years (42.8%), followed by respondents aged 18–30

years (26.2%), suggesting that most participants were within the economically productive age range.

Regarding occupation, more than half of the respondents (52.4%) were fishermen, followed by farmers (21.4%), traders (15.5%), and other occupations (10.7%). This distribution confirms that household livelihoods in the study area are highly dependent on climate-sensitive economic sectors. Consequently, environmental changes have the potential to directly affect income generation, employment stability, and household welfare in the surveyed communities.

Perceived Impacts of Climate Change

Table 3. Perceived Impacts of Climate Change

Impact Type	High (%)	Moderate (%)	Low (%)
Decline in fish catch	68.0	22.0	10.0
Crop yield reduction	55.0	30.0	15.0
Coastal flooding/erosion	72.0	18.0	10.0
Saltwater intrusion	61.0	25.0	14.0
Health risks	48.0	32.0	20.0

Source: Primary survey data processed by the authors, 2025

Table 3 presents respondents' perceptions regarding the impacts of climate change on their livelihoods and living conditions. Coastal flooding and erosion were identified as the most severe environmental problems, with 72.0% of respondents reporting a high level of impact. This was followed by declining fish catches (68.0%) and saltwater intrusion (61.0%), indicating that marine and coastal ecosystems have experienced considerable environmental pressure. Agricultural activities were also affected, as 55.0% of respondents perceived a substantial reduction in crop yields due to changing environmental conditions. Meanwhile, 48.0% reported that climate change had increased health-related risks, although this indicator received a comparatively lower rating than the others.

Adaptive Practices Adopted by Communities

Table 4. Adaptive Practices Adopted by Communities

Adaptive Practice	High (%)	Moderate (%)	Low (%)
Mangrove planting	70.0	20.0	10.0
Raising house foundations	55.0	25.0	20.0
Diversifying livelihoods	45.0	35.0	20.0
Adjusting fishing seasons	62.0	28.0	10.0
Using drought-resistant crops	50.0	30.0	20.0

Source: Primary survey data processed by the authors, 2025

Table 4 presents the adaptive practices implemented by coastal communities to cope with climate change. Among the identified strategies, mangrove planting showed the highest level of adoption, with 70.0% of respondents indicating extensive implementation. This finding suggests that mangrove conservation has become a widely recognized community-based approach for reducing coastal erosion and protecting shoreline ecosystems.

Adjusting fishing seasons was the second most frequently adopted practice, reported by 62.0% of respondents. This indicates that fishing households have modified their harvesting schedules in response to changing weather conditions and marine resource availability. In addition, 55.0% of respondents reported elevating house foundations to reduce the impacts of recurrent tidal flooding, while 50.0% adopted drought-resistant crops to maintain agricultural productivity. Livelihood

diversification received the lowest high-adoption percentage (45.0%), suggesting that although some households have sought alternative income sources, many remain dependent on traditional coastal occupations.

Institutional and Government Support

Table 5. Institutional and Government Support

Type of Support	Frequency (%)
Mangrove rehabilitation programs	65.0
Disaster preparedness training	58.0
Financial aid/subsidy	40.0
Access to climate information	45.0
Infrastructure development	52.0

Source: Primary survey data processed by the authors, 2025

Table 5 respondents' perceptions of institutional and government support for climate change adaptation. Mangrove rehabilitation programs were the most frequently recognized form of assistance, with 65.0% of respondents acknowledging their availability. Disaster preparedness training was also relatively common, being reported by 58.0% of respondents, indicating ongoing efforts to improve community preparedness for climate-related hazards.

Infrastructure development, including improvements to coastal protection and public facilities, was identified by 52.0% of respondents. In contrast, only 45.0% reported having adequate access to climate information, while financial assistance or subsidies received the lowest level of recognition (40.0%). These findings suggest that although environmental restoration and preparedness initiatives have been implemented, financial support and information dissemination remain relatively limited. In general, the results indicate that institutional involvement has contributed to strengthening local adaptation efforts, particularly through ecosystem restoration and capacity-building activities. Nevertheless, the comparatively lower percentages for financial support and climate information highlight areas where government intervention could be enhanced to improve community adaptive capacity and promote more sustainable climate resilience.

Key Challenges in Climate Change Adaptation

Table 6. Key Challenges in Climate Change Adaptation

Challenge	Percentage (%)
Limited financial resources	62.0
Lack of technical knowledge	50.0
Poor coordination with government/NGOs	42.0
Social inequality in adaptation	37.0
Short-term focus of adaptation programs	46.0

Source: Primary survey data processed by the authors, 2025

Table 6 presents the major challenges encountered by coastal communities in implementing climate change adaptation strategies. The most significant obstacle was limited financial resources, reported by 62.0% of respondents. This finding indicates that insufficient financial capacity restricts households from investing in adaptive measures such as improving housing conditions, adopting new technologies, or diversifying livelihood activities. The second most frequently identified challenge was the lack of technical knowledge (50.0%), suggesting that many respondents have limited access to information and skills needed to implement effective climate adaptation practices. In addition, 46.0% of respondents perceived

that many adaptation programs were short-term in nature, reducing their long-term effectiveness and sustainability.

Institutional issues also emerged as important constraints. Poor coordination between communities and government or non-governmental organizations was reported by 42.0% of respondents, while 37.0% perceived that social inequality affected access to adaptation resources and opportunities. Overall, these findings indicate that climate adaptation is constrained not only by environmental conditions but also by economic, institutional, and social factors that influence communities' ability to respond effectively to climate-related risks.

Community Perceptions of Resilience

Table 7. Community Perceptions of Resilience

Perception Indicator	Strong (%)	Moderate (%)	Weak (%)
Community solidarity	66.0	24.0	10.0
Confidence in adaptation	58.0	28.0	14.0
Trust in government	42.0	35.0	23.0
Hope for younger generation	71.0	20.0	9.0

Source: Primary survey data processed by the authors, 2025

Table 7 summarizes respondents' perceptions of community resilience in coping with climate change. Hope for the younger generation received the highest positive response, with 71.0% of respondents expressing strong confidence that future generations will be better prepared to address climate-related challenges. This was followed by community solidarity (66.0%), indicating that social cohesion remains an important source of collective resilience in coastal villages. Furthermore, 58.0% of respondents reported strong confidence in their community's ability to adapt to changing environmental conditions. However, trust in government was comparatively lower, with only 42.0% expressing a strong level of confidence, while 23.0% reported weak trust. This suggests that although communities demonstrate considerable internal resilience, perceptions of institutional effectiveness remain relatively moderate.

Table 8. Overall Descriptive Statistics of Research Variables

Variable	Mean	SD	Interpretation
Perceived Climate Change Impacts	4.18	0.63	High
Adaptive Practices	3.91	0.67	High
Institutional and Government Support	3.54	0.71	Moderate
Adaptation Challenges	3.78	0.69	High
Community Resilience	4.06	0.61	High

Table 8 summarizes the overall descriptive statistics for the five research dimensions. Perceived climate change impacts obtained the highest mean score ($M = 4.18$, $SD = 0.63$), indicating that respondents generally experienced substantial environmental changes affecting their livelihoods. Community resilience also demonstrated a relatively high mean ($M = 4.06$, $SD = 0.61$), reflecting strong social cohesion and confidence in collective adaptation. Adaptive practices showed a high level of implementation ($M = 3.91$, $SD = 0.67$), whereas institutional and government support recorded the lowest mean ($M = 3.54$, $SD = 0.71$), suggesting that respondents perceived existing support mechanisms as only moderately adequate. Adaptation challenges remained relatively high ($M = 3.78$, $SD = 0.69$), indicating that financial, technical, and institutional constraints continue to hinder effective adaptation efforts.

Integrating Community-Based Adaptation and Institutional Support for Coastal Climate Resilience

The findings demonstrate that climate change represents a multidimensional challenge affecting both the ecological integrity and socioeconomic sustainability of coastal communities in Java. Coastal flooding, shoreline erosion, declining fish catches, and saltwater intrusion were identified by respondents as the most prominent climate-related impacts, indicating that these environmental changes are perceived as major threats to livelihoods that remain highly dependent on fisheries and coastal agriculture. These findings are consistent with recent studies reporting that coastal communities throughout Southeast Asia are increasingly exposed to compound climate hazards that reduce ecosystem productivity and household income (Dong et al., 2024; Feist et al., 2023; Yadav et al., 2024). The descriptive evidence further suggests that respondents experienced multiple climate-related pressures simultaneously rather than as isolated events. This pattern highlights the importance of designing adaptation strategies that address a broad range of environmental challenges instead of focusing on individual hazards alone.

Despite these increasing environmental pressures, the findings indicate that coastal communities have adopted various adaptation practices, particularly mangrove planting, adjustments to fishing seasons, raising house foundations, and the use of drought-resistant crops. These observations support previous studies emphasizing that ecosystem-based adaptation remains one of the most effective community-driven strategies for strengthening coastal resilience while maintaining ecological functions (Rölfer et al., 2022; Yadav et al., 2024; Farny & Dentoni, 2025). Mangrove restoration contributes not only to reducing coastal erosion but also to supporting fisheries productivity and biodiversity conservation, thereby providing long-term environmental and economic benefits.

Nevertheless, livelihood diversification showed the lowest level of adoption among respondents, suggesting that many households continue to depend primarily on traditional coastal occupations. This finding differs from several studies conducted in other Asian coastal regions where livelihood diversification has become a more common adaptation strategy following increasing climate uncertainty. Such differences may reflect the continued cultural attachment of Javanese coastal communities to fisheries together with the limited availability of alternative employment opportunities (Zamzami et al., 2025; Syatori et al., 2023; Febriani et al., 2024).

The descriptive findings also indicate that institutional and government support was perceived as moderately available. Respondents more frequently recognized mangrove rehabilitation programs and disaster preparedness training than financial assistance or climate information services. Similar observations have been reported by Sdunzik et al. (2025) and Pakidi and Tambaip (2025), who argued that many adaptation initiatives continue to emphasize environmental rehabilitation while providing relatively limited long-term economic empowerment and knowledge transfer. Likewise, financial constraints, inadequate technical knowledge, fragmented institutional coordination, and social inequality were identified as important barriers to effective climate adaptation.

These findings correspond with recent international studies demonstrating that adaptive capacity is closely associated with socioeconomic resources and governance quality in addition to environmental exposure (IPCC, 2023; Setiawan et al., 2025; Suntoro et al., 2025). The comparatively lower perception of financial support and access to climate information observed in this study suggests that existing adaptation policies place greater emphasis on program implementation than on continuous community assistance (Tofu et al., 2022; Ngigi et al., 2022; Castelo et al.,

2023). Therefore, strengthening financial assistance, technical support, institutional coordination, and climate information services should become complementary priorities for improving long-term community adaptation (Susskind & Kim, 2022; Dushkova & Ivlieva, 2024).

Another notable finding concerns the relatively high levels of community solidarity and optimism regarding future generations, indicating that social capital remains an important element of resilience among coastal communities. These observations support resilience theory, which emphasizes the importance of collective action, local knowledge, and mutual trust in strengthening community responses to environmental uncertainty (Farny & Dentoni, 2025; Yadav et al., 2024; Rölfer et al., 2022). Nevertheless, respondents reported lower levels of trust in government institutions than in community solidarity, suggesting that institutional confidence has not developed as strongly as community-based adaptation initiatives. This pattern indicates that strengthening climate resilience requires not only active community participation but also stronger collaboration between governments, local communities, universities, and other stakeholders in planning, implementing, and evaluating adaptation programs.

The descriptive findings provide an integrated overview of perceived climate impacts, adaptation practices, institutional support, adaptation constraints, and community resilience within a single analytical framework across several coastal villages in Java. Unlike many previous studies that have examined these dimensions separately, this study presents empirical descriptive evidence that collectively characterizes community responses to climate change in vulnerable coastal settings. Although the present study does not statistically examine causal relationships among these variables, the integrated assessment contributes to a broader understanding of the multiple environmental, socioeconomic, institutional, and social conditions experienced by coastal communities. At the policy level, the findings suggest that governments should prioritize long-term adaptation financing, strengthen climate information systems, expand technical extension services, and promote participatory governance involving local communities, universities, and non-governmental organizations.

Such integrated efforts are expected to reinforce existing community capacities while supporting the development of more inclusive and sustainable adaptation strategies. Nevertheless, this study is limited by its cross-sectional design and reliance on descriptive statistical analysis, which provide only a snapshot of community perceptions and do not permit causal interpretation. Future studies are therefore encouraged to employ longitudinal designs, mixed-method approaches, and multivariate statistical analyses to further examine the relationships among institutional support, socioeconomic capacity, social capital, and long-term community resilience in coastal areas of Indonesia.

CONCLUSION

The findings of this study show that local adaptation strategies have been incorporated into community-based resilience mechanisms, with the communities in the coastal areas of Java actively reacting to climate change. The results reveal that the climate-related hazards, such as coastal flooding, shoreline erosion, declining fish catches and saltwater intrusion, remain a threat to coastal livelihoods. Communities have responded by adapting their practices, including mangrove restoration, shifting fishing seasons, raising the foundations of houses and growing drought-tolerant crops. However, adaptive capacity is still limited due to financial constraints, limited technical knowledge, institutional fragmentation and limited access to climate information.

This research would be an addition to the climate adaptation literature by offering an integrated analytical framework that incorporates all four streams of adaptation environmental pressures, adaptive practices, institutional support, and adaptation constraints as well as community resilience. In practice, the results highlight the need to increase participatory governance, increase funding over the long-term, strengthen climate information systems, and capacity building at the local level. This study has its limitations due to the descriptive statistical analysis used, and the cross-sectional design of the study which limits the study to a descriptive interpretation of the findings. Moving forward, more studies with longitudinal, mixed methods, and multivariate designs are needed that explore the dynamic relationships between institutional capacity, socioeconomic factors, and community resilience in more expansive coastal areas.

REFERENCES

- Ahmed, I., Ayeb-Karlsson, S., van Der Geest, K., Huq, S., & Jordan, J. C. (2019). Climate change, environmental stress and loss of livelihoods can push people towards illegal activities: a case study from coastal Bangladesh. *Climate and Development*, 11(10), 907-917. <https://doi.org/10.1080/17565529.2019.1586638>
- Anjanappa, J., Samant, S., & Thakur, B. (2024). bridging the gap: addressing the unequal allocation of climate adaptation finance in global South. *Available at SSRN* 4985851. <https://doi.org/10.2139/ssrn.4985851>
- Castelo, S., Amado, M., & Ferreira, F. (2023). Challenges and opportunities in the use of nature-based solutions for urban adaptation. *Sustainability*, 15(9), 7243. <https://doi.org/10.3390/su15097243>
- Choudhury, M., Wu, H., & Shahidullah, A. K. M. (2024). Improving the feedback loop between community-and policy-level learning: Building resilience of coastal communities in Bangladesh. *Sustainable Development*, 32(2), 1508-1524. <https://doi.org/10.1002/sd.2686>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Dong, W. S., Ismailluddin, A., Yun, L. S., Ariffin, E. H., Saengsupavanich, C., Maulud, K. N. A., ... & Yunus, K. (2024). The impact of climate change on coastal erosion in Southeast Asia and the compelling need to establish robust adaptation strategies. *Heliyon*, 10(4). <https://doi.org/10.1016/j.heliyon.2024.e25609>
- Dushkova, D., & Ivlieva, O. (2024). Empowering communities to act for a change: A review of the community empowerment programs towards sustainability and resilience. *Sustainability*, 16(19), 8700. <https://doi.org/10.3390/su16198700>
- Farny, S., & Dentoni, D. (2025). Social identity and place based dynamics in community resilience building for natural disasters: An integrative framework. *Ecology and Society*, 30(2). <https://doi.org/10.5751/ES-15998-300212>
- Farny, S., & Dentoni, D. (2025). Social identity and place-based dynamics in community resilience building for natural disasters: an integrative framework. *Ecology and Society*, 30(2). <https://doi.org/10.5751/ES-15998-300212>
- Febriani, M. E., Tanzil, T. S., Natalie, A. C., Angelina, N. V., Laurensia, J. V., Gabriela, G., & Radjamin, I. P. (2024). Social Construction and

Communication Pattern of Fishermen Community in South Java Sea Coast. *Journal of Economics, Business, and Government Challenges*, 7(2), 21-32. <https://doi.org/10.33005/ebgc.v7i02.1465>

- Feist, S. E., Hoque, M. A., & Ahmed, K. M. (2023). Coastal salinity and water management practices in the Bengal Delta: A critical analysis to inform salinisation risk management strategies in Asian Deltas. *Earth Systems and Environment*, 7(1), 171-187. <https://doi.org/10.1007/s41748-022-00335-9>
- Feist, S. E., Hoque, M. A., & Ahmed, K. M. (2023). Coastal salinity and water management practices in the Bengal Delta: A critical analysis to inform salinisation risk management strategies in Asian deltas. *Earth Systems and Environment*, 7(1), 171-187. <https://doi.org/10.1007/s41748-022-00335-9>
- Gul, S., Shafiq, U., Mir, S. A., Iqbal, G., & Lone, H. Q. (2024). Enhancing global food security through sustainable fisheries and aquaculture: A comprehensive review. *Asian Journal of Agricultural Extension, Economics & Sociology*, 42(10), 60-70. <https://doi.org/10.9734/ajaees/2024/v42i102563>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.
- Intergovernmental Panel on Climate Change. (2023). *Climate change 2023: Synthesis report*. IPCC. <https://www.ipcc.ch/report/ar6/syr/>
- Islam, M. T., Hossain, M. M., Ha-Mim, N. M., Hossain, M. Z., & Sikder, S. K. (2025). Climate change impacts on shoreline migration and community livelihood resilience: evidence from coastal Bangladesh. *Frontiers in Sustainability*, 5, 1525483. <https://doi.org/10.3389/frsus.2024.1525483>
- Mishra, R., Gupta, J., & Verma, A. (2025). Anthropogenic climate change and the escalating vulnerability of coastal communities. In *Geometrical Enhancements Based on Data-Driven Design Decisions* (pp. 171-184). CRC Press. <https://doi.org/10.1201/9781003621102-11>
- Ngigi, M. W., & Muange, E. N. (2022). Access to climate information services and climate-smart agriculture in Kenya: a gender-based analysis. *Climatic Change*, 174(3), 21. <https://doi.org/10.1007/s10584-022-03445-5>
- Niu, Y., Abdullayev, V., Alyar, A. V., & Kamran, A. T. (2023). Resilience and adaptation to climate change: community-based strategies in coastal regions. *Estidamaa*, 2023, 36-43. <https://doi.org/10.70470/ESTIDAMAA/2023/005>
- Onyenekwe, C. S., Okpara, U., Opata, P. I., Egyir, I. S., & Sarpong, D. B. (2022). The triple challenge: Food security and vulnerabilities of fishing and farming households in situations characterized by increasing conflict, climate shock, and environmental degradation. *Land*, 11(11), 1-20. <https://doi.org/10.3390/land11111982>
- Pacillo, G., Nguyen, N., Paustyan, E., Cavatassi, R., Astralaga, M., & Läderach, P. (2024). What drives the success and failure of climate change adaptation projects? A qualitative comparative analysis. *Mitigation and Adaptation Strategies for Global Change*, 29(8), 89. <https://doi.org/10.1007/s11027-024-10186-6>
- Pakidi, C. S., & Tambaip, B. (2025). Ketahanan Air dan Kearifan Lokal: Studi Kasus Pengelolaan Sumber Daya Air Berbasis Komunitas Adat di Merauke. *Jejak digital: Jurnal Ilmiah Multidisiplin*, 1(3), 660-676. <https://doi.org/10.63822/q8m27758>

- Parr, T. W., Sier, A. R., Battarbee, R. W., Mackay, A., & Burgess, J. (2003). Detecting environmental change: science and society—perspectives on long-term research and monitoring in the 21st century. *Science of the total environment*, 310(1-3), 1-8. [https://doi.org/10.1016/S0048-9697\(03\)00257-2](https://doi.org/10.1016/S0048-9697(03)00257-2)
- Rölfer, L., Celliers, L., & Abson, D. (2022). Resilience and coastal governance: Knowledge and navigation between stability and transformation. *Ecology and Society*, 27(2). <https://doi.org/10.5751/ES-13244-270240>
- Saha, M. K., Biswas, A. A. A., & Faisal, M. (2024). Livelihood vulnerability of coastal communities in context of the climate change: A index-based assessment. *World Development Sustainability*, 4, 100152. <https://doi.org/10.1016/j.wds.2024.100152>
- Saidu, M. (2025). Contributions of fisheries and aquaculture to food security in Africa. In *Food Security, Nutrition and sustainability through aquaculture technologies* (pp. 493-502). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-75830-0_28
- Sdunzik, J., Bampoh, D. K., & Burgess, W. D. (2025). An Innovative Approach to Effective, Impact-Driven Partnering: An Educational Aid Case Study. *Journal of International Development*, 37(8), 1571-1584. <https://doi.org/10.1002/jid.70027>
- Setiawan, H. H., Susantyo, B., Irmayani, N. R., Habibullah, H., Ganti, M., Abdullah, A., ... & Halifu, R. (2025). Integrated Resilience for Adapting to Climate Change in North Coastal Communities on Java Island, Indonesia. In *Climate Change: Conflict and Resilience in the Age of Anthropocene* (pp. 175-201). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-85359-3_8
- Smith, T. F., Daffara, P., O'Toole, K., Matthews, J., Thomsen, D. C., Inayatullah, S., ... & Graymore, M. (2011). A method for building community resilience to climate change in emerging coastal cities. *Futures*, 43(7), 673-679. <https://doi.org/10.1016/j.futures.2011.05.008>
- Sultana, R., Irfanullah, H. M., Selim, S. A., & Alam, M. S. (2023). Social-ecological vulnerability to climate change and risk governance in coastal fishing communities of Bangladesh. *Frontiers in Marine Science*, 10, 1174659. <https://doi.org/10.3389/fmars.2023.1174659>
- Suntoro, A., Marbun, A. A. Y., & Sayekti, C. W. (2025). Climate Change Challenge: Coastal Community Adaptation Towards Achieving Sustainable Community Resilience in Central Java, Indonesia. In *Climate Change: Conflict and Resilience in the Age of Anthropocene* (pp. 235-255). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-85359-3_10
- Susskind, L., & Kim, A. (2022). Building local capacity to adapt to climate change. *Climate Policy*, 22(5), 593-606. <https://doi.org/10.1080/14693062.2021.1874860>
- Syam, S. (2025). Coastal Communities' Experiences in Facing Climate Change: A Study on Socio-Ecological Resilience in the Northern Coast of Java. *Journal of Multidisciplinary Research and Innovation*, 1(3), 102-111.
- Syatori, A., Ramdhani, S., & Khikmawati, N. (2023). Structural and Cultural Aspects of Fisherman Family Education Problems in Waruduwur Cirebon. *Masyarakat: Jurnal Sosiologi*, 28(1), Menurut-Program.

- Tofu, D. A., Woldeamanuel, T., & Haile, F. (2022). Smallholder farmers' vulnerability and adaptation to climate change induced shocks: The case of Northern Ethiopia highlands. *Journal of Agriculture and Food Research*, 8, 100312. <https://doi.org/10.1016/j.jafr.2022.100312>
- Vinayachandran, P. N., Seng, D. C., & Schmid, F. A. (2022). Climate change and coastal systems. In *Blue economy: an ocean science perspective* (pp. 341-377). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-19-5065-0_12
- Zamzami, L., Hasmira, M. H., Harahap, J., & Aliman, M. (2025). Empowering of coastal community ecotourism: The role of cultural entrepreneurship among fishermen in west Sumatra Indonesia. *Geojournal of Tourism and Geosites*, 58(1), 396-404. <https://doi.org/10.30892/gtg.58136-1421>