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Socio-Ecological Resilience and the Role of Organizations in Addressing the Complexity of Climate Change in Malaysia

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ABSTRACT

Purpose: *This study examines how governmental, non-governmental, and community-based organizations in Malaysia contribute to socio-ecological resilience amid climate change. It focuses on identifying organizational strategies, collaborative practices, and key challenges influencing adaptation effectiveness.*

Subjects and Methods: *A qualitative design was used with 20 purposively selected participants across climate-related organizations. Data were collected through semi-structured interviews, document analysis, and observations, then analyzed thematically to capture organizational awareness, collaboration, socio-ecological strategies, and implementation challenges.*

Results: *Organizations with strong awareness and strategic commitment were better able to integrate climate concerns into policies and programs. Multi-stakeholder collaboration proved essential for developing sustainable, context-appropriate strategies, while ecosystem-based adaptation and community-based risk reduction showed clear socio-ecological benefits. Challenges included resource limitations, governance fragmentation, and technical barriers, but adaptive learning and participatory approaches helped organizations navigate these constraints.*

Conclusions: *Organizations significantly enhance socio-ecological resilience by aligning strategic commitment, collaboration, and adaptive socio-ecological practices. Effective resilience emerges when ecological and social aspects are integrated, communities are engaged, and flexible management responds to evolving climate risks, offering useful insights for strengthening adaptive capacity in Malaysia.*

INTRODUCTION

Climate change represents one of the most pressing global challenges of the twenty-first century, with profound impacts on ecological systems, human societies, and economic structures. Malaysia, as a Southeast Asian nation with extensive tropical forests, coastal regions, and diverse ecological zones, is particularly vulnerable to climate-induced hazards such as floods, droughts, and rising sea levels. These environmental changes not only threaten natural ecosystems but also disrupt social systems, including livelihoods, public health, and infrastructure, underscoring the necessity for resilience-oriented approaches (Lv & Sarker, 2024).

Socio-ecological resilience, which emphasizes the capacity of human and ecological systems to absorb disturbances while maintaining functionality, has emerged as a critical framework for understanding adaptive capacity in the face of complex climate threats (May, 2022). Organizations, including government agencies, non-governmental organizations (NGOs), community-based organizations (CBOs), and private sector actors, play a central role in

promoting socio-ecological resilience (Sharifi, 2023). These organizations serve as catalysts for change by implementing adaptation strategies, mobilizing resources, and facilitating community engagement (Muhammad et al., 2023).

In Malaysia, governmental initiatives such as the National Policy on Climate Change and regional disaster management frameworks have sought to integrate resilience-building into national planning, emphasizing proactive rather than reactive measures (Madnor et al., 2024; Zreik, 2024). Simultaneously, NGOs and CBOs complement governmental efforts by delivering localized programs that address specific vulnerabilities and leverage traditional ecological knowledge. The role of organizations extends beyond implementing projects; they are pivotal in shaping adaptive governance structures that coordinate multi-stakeholder responses to climate impacts (Gannon et al., 2021).

Multi-level collaboration between national, regional, and local actors enhances the effectiveness of climate interventions by aligning objectives, sharing knowledge, and pooling resources (Fisher et al., 2022). For instance, community-driven initiatives that integrate local knowledge with scientific research have demonstrated enhanced adaptive capacity and improved ecological outcomes in flood-prone and coastal areas of Malaysia (Gioia, 2024). Such approaches underscore the importance of organizations not only as implementers of programs but also as facilitators of inclusive governance processes that empower communities to actively participate in resilience-building.

Despite these efforts, multiple challenges constrain organizational effectiveness in promoting socio-ecological resilience. Fragmented governance, limited financial and technical resources, and institutional inertia often impede coordinated action (Kim et al., 2021). Moreover, the complexity of climate change characterized by uncertainty, nonlinearity, and interconnected socio-ecological impacts requires flexible and adaptive strategies that many organizations struggle to operationalize. Addressing these challenges demands a comprehensive understanding of how organizations perceive climate risks, design adaptive strategies, and interact with communities and ecosystems to foster resilience.

In Malaysia, socio-ecological resilience is particularly relevant due to the country's high dependency on natural resources, vulnerability of coastal communities, and exposure to extreme weather events (Solorio, 2021; Vangana, 2025). Organizations operating in this context must balance ecological sustainability with social equity, ensuring that adaptation measures protect vulnerable populations while maintaining ecosystem services (Madnor et al., 2024). By examining the roles and strategies of organizations, it becomes possible to identify successful practices, gaps in implementation, and opportunities for enhancing integrated responses to climate change.

METHODOLOGY

This chapter presents a detailed description of the methodology used in this qualitative study. It explains the research design, participants, data collection methods, data analysis procedures, and strategies to ensure the credibility and trustworthiness of the findings. The methodology is designed to capture in-depth insights into how organizations contribute to socio-ecological resilience in Malaysia, and how they navigate the complexity of climate change.

Research Design

This study employed a qualitative research design, focusing on an exploratory and descriptive approach. The qualitative paradigm was chosen because it allows an in-depth understanding of complex phenomena, particularly the perceptions, experiences, and strategies of organizations in enhancing socio-ecological resilience. By prioritizing the lived experiences and interpretations of organizational stakeholders, this study sought to uncover the nuances of organizational roles, collaborative efforts, and adaptive strategies that are not easily measurable using quantitative methods. The design emphasized flexibility and responsiveness to the dynamics of the study context, enabling the researcher to capture rich, context-specific data.

Participants

The participants in this study were selected using purposive sampling, a technique commonly employed in qualitative research to identify individuals or groups who can provide in-depth information on the research topic. Participants included representatives from governmental agencies, non-governmental organizations (NGOs), community-based organizations (CBOs), and private sector entities involved in climate change adaptation and resilience-building in Malaysia. Selection criteria were based on participants' expertise, involvement in relevant projects, and their knowledge of socio-ecological systems. In total, 20 participants were engaged in the study, ensuring a diverse range of perspectives across organizational types and sectors.

Data Collection

Data collection was conducted through multiple qualitative methods to ensure comprehensive coverage and triangulation. Semi-structured interviews formed the primary data source, allowing participants to share their experiences, insights, and perceptions in a flexible yet guided manner. Interviews were conducted face-to-face or via virtual platforms, depending on participants' availability and logistical constraints, with each session lasting between 45 and 90 minutes. In addition to interviews, document analysis was employed to review organizational reports, policy documents, project plans, and relevant publications that provided supplementary evidence on resilience strategies and organizational roles. Observations of organizational activities, where feasible, were also conducted to capture contextual nuances and practical implementations of resilience initiatives. All interviews and observations were recorded, transcribed, and anonymized to maintain ethical standards and ensure participant confidentiality.

Data Analysis

Thematic analysis was employed to analyze the qualitative data, following a systematic process of coding, categorization, and theme development. The analysis began with familiarization, where the researcher repeatedly read transcripts and documents to immerse in the data. Open coding was then applied to identify meaningful units of information, followed by axial coding to link related codes and organize them into broader categories. Finally, selective coding was conducted to extract overarching themes that captured the roles of organizations, strategies implemented, and challenges encountered in promoting socio-ecological resilience. This iterative process allowed the researcher to refine themes continuously and ensure that interpretations accurately reflected participants' perspectives. NVivo software was used to manage and organize data efficiently, supporting the transparency and rigor of the analysis.

RESULTS AND DISCUSSION

The findings of this study illuminate the multifaceted roles that organizations play in fostering socio-ecological resilience in Malaysia, revealing how strategic awareness, committed action, and collaborative practices intersect to address the complex challenges of climate change. By examining the perspectives of governmental agencies, non-governmental organizations, and community-based organizations, this study highlights the mechanisms through which institutions integrate ecological and social considerations into adaptive strategies. The subsequent results section presents the key themes that emerged from the analysis, including organizational awareness and commitment, collaborative approaches and multi-stakeholder engagement, socio-ecological strategies, and the challenges and barriers encountered in implementing resilience initiatives. These findings provide empirical insights into how organizations operationalize resilience principles in practice, offering a foundation for understanding the effectiveness and limitations of current climate adaptation efforts within the Malaysian context.

Organizational Awareness and Commitment

Organizational awareness and commitment play a crucial role in shaping how institutions respond to climate change and contribute to socio-ecological resilience. In Malaysia, many organizations have developed a heightened awareness of climate-related risks, understanding that both social and ecological systems are interconnected and vulnerable to environmental changes. This awareness is often reflected in internal policies, strategic plans, and dedicated programs aimed at enhancing adaptive capacity. Government agencies, for example, have increasingly integrated climate considerations into their planning and operations, demonstrating

recognition of the long-term implications of climate variability on communities and ecosystems. One government official emphasized,

> *"Our agency has been actively revising our disaster management plans to incorporate climate projections, so we can be better prepared for floods and other extreme events."*

This statement illustrates how institutional awareness translates into concrete policy adjustments, reflecting an understanding of both environmental and social vulnerabilities. Beyond governmental institutions, non-governmental organizations (NGOs) and community-based organizations (CBOs) have also demonstrated a strong commitment to climate resilience initiatives. These organizations often operate at the grassroots level, where they are closely connected to local communities and understand their specific needs and vulnerabilities. Their commitment is evident not only in program implementation but also in advocacy, awareness campaigns, and capacity-building initiatives. An NGO representative stated,

> *"We organize workshops with communities every year to educate them about climate risks and how they can participate in restoring local ecosystems. It is not just about planting trees; it's about empowering people to protect their environment."*

This quote highlights that organizational commitment extends beyond procedural compliance to fostering community engagement and environmental stewardship. Commitment to resilience also manifests in resource allocation, including financial investment, human resources, and time dedicated to climate-related programs. Organizations with high levels of commitment often prioritize resilience-building even when resources are constrained, demonstrating that strategic intent and organizational culture are as important as financial capacity. For instance, a CBO coordinator mentioned,

> *"Even with limited funding, we allocate a portion of our budget to mangrove rehabilitation because we know it directly protects coastal communities from storm surges."*

This statement underscores that awareness, when coupled with strategic commitment, results in tangible actions that enhance socio-ecological resilience. Moreover, organizational awareness and commitment are reinforced through continuous monitoring, evaluation, and learning. Organizations that actively track the outcomes of their interventions are better equipped to refine strategies, respond to emerging challenges, and sustain resilience efforts over time. Interview data revealed that some organizations maintain dedicated teams to assess environmental impacts and community feedback. One NGO officer explained, "We regularly review the effectiveness of our adaptation projects and adjust our approaches based on what we learn from the communities we work with." This reflects a proactive stance, where organizational commitment is not static but evolves through adaptive learning processes.

However, challenges persist despite high levels of awareness and commitment. Some organizations struggle with bureaucratic constraints, limited inter-agency coordination, or insufficient technical expertise, which can hinder the translation of awareness into effective action. Nevertheless, the study findings suggest that organizations with strong internal commitment and clear climate-focused policies are better positioned to implement innovative and adaptive strategies, bridging the gap between awareness and actionable resilience measures.

Collaborative Approaches and Multi-Stakeholder Engagement

Collaborative approaches and multi-stakeholder engagement are essential components in addressing the complexity of climate change, particularly in enhancing socio-ecological resilience. Climate change impacts are inherently multifaceted, affecting ecosystems, communities, and economic systems simultaneously, which makes unilateral actions by a single organization insufficient. In Malaysia, effective adaptation and resilience-building require coordinated efforts among governmental agencies, non-governmental organizations (NGOs), community-based organizations (CBOs), and the private sector. Through collaboration, organizations can pool expertise, share resources, and integrate diverse perspectives to design and implement more comprehensive resilience strategies. One governmental official highlighted this approach, stating,

> *"We cannot work in isolation. Partnering with local NGOs and community groups allows us to combine scientific knowledge with local practices to create better flood management programs."*

Multi-stakeholder engagement also fosters inclusive decision-making, ensuring that the voices of communities most affected by climate change are considered in planning and implementation. Community participation is particularly important because it enhances local ownership of adaptation initiatives and ensures that strategies are contextually appropriate and culturally sensitive. An NGO representative described this process, stating,

> *"Before we start any reforestation project, we meet with village leaders and residents to understand their needs and traditional knowledge. This way, the project aligns with both environmental goals and community priorities."*

This quotation illustrates how engaging multiple stakeholders from policymakers to local communities enables organizations to develop resilience initiatives that are both effective and sustainable. Collaboration extends beyond sharing knowledge and resources; it also includes joint problem-solving, conflict resolution, and co-management of socio-ecological systems. For instance, several organizations in Malaysia have established partnerships to implement mangrove restoration and riverbank stabilization projects, where each partner contributes specific expertise, such as ecological assessment, community training, or monitoring activities. A CBO coordinator explained,

> *"We work closely with government agencies, universities, and other NGOs to restore wetlands. Each organization brings something different, and together we can achieve results that none of us could accomplish alone."*

This statement emphasizes the importance of synergy in addressing complex environmental challenges, demonstrating that collective action is often more impactful than isolated efforts. Moreover, multi-stakeholder engagement helps organizations overcome challenges associated with bureaucratic limitations, resource constraints, and policy fragmentation. Collaborative networks enable knowledge exchange and capacity building, ensuring that lessons learned in one area can be applied in others, and promoting adaptive management practices. An NGO officer highlighted this benefit, saying,

> *"Through our network with other NGOs and local authorities, we can learn from successful adaptation projects elsewhere and adapt them to our local context. Collaboration accelerates learning and reduces trial-and-error costs."*

This reflects how multi-stakeholder approaches not only enhance operational efficiency but also strengthen resilience by fostering continuous learning and innovation. Despite the advantages, multi-stakeholder engagement also faces challenges, such as differing priorities, communication gaps, and power asymmetries among partners. Nonetheless, the study findings indicate that organizations committed to collaboration often develop mechanisms to address these issues, such as regular stakeholder meetings, joint planning sessions, and participatory monitoring frameworks. These efforts reinforce the notion that building socio-ecological resilience requires sustained engagement and cooperation across multiple levels and sectors.

Socio-Ecological Strategies

Socio-ecological strategies represent the practical approaches organizations adopt to strengthen both ecological sustainability and community resilience in the face of climate change. In Malaysia, organizations have increasingly recognized that addressing environmental challenges requires integrated strategies that consider social systems and ecosystems as interconnected. This perspective ensures that adaptation efforts not only protect natural resources but also safeguard the well-being of local communities. A government official emphasized this dual focus, stating,

> *"Our projects are designed to protect forests and rivers, but we also consider how local communities depend on these ecosystems for their livelihoods. Resilience must be social and ecological together."*

This illustrates that successful interventions require a balance between ecological conservation and human development needs. One of the primary socio-ecological strategies employed by organizations in Malaysia is ecosystem-based adaptation (EbA). This approach leverages natural ecosystems to reduce vulnerability and enhance adaptive capacity, such as through mangrove restoration, wetland rehabilitation, and reforestation initiatives. These projects not only mitigate the impacts of floods and coastal erosion but also support biodiversity and provide sustainable resources for communities. An NGO representative described their involvement in such efforts, stating, "We have been planting mangroves along the coast with local communities.

The trees act as a buffer during storms and also provide fish habitats, which support livelihoods." This quote highlights the practical outcomes of ecosystem-based strategies, demonstrating how ecological interventions simultaneously address environmental and social resilience. In addition to ecosystem restoration, organizations implement strategies that promote community-based disaster risk reduction (CBDRR). These initiatives aim to enhance local preparedness and adaptive capacity through education, training, and participatory planning. Community members are equipped with knowledge and tools to respond effectively to climate hazards, ensuring that resilience is built from the ground up. A community project coordinator explained,

> *"We conduct regular workshops and drills to train residents on flood response and emergency evacuation. When the community is prepared, it reduces both loss of life and damage to resources."*

This example underscores the importance of embedding social resilience within ecological projects, creating a holistic approach to climate adaptation. Furthermore, organizations increasingly emphasize sustainable resource management as part of their socio-ecological strategies. By promoting practices such as sustainable agriculture, water conservation, and forest management, organizations ensure that environmental resources remain available for future generations while supporting local economic stability. One NGO officer noted, "We work with farmers to adopt sustainable farming practices that protect soil and water. It is not just about immediate yields, but long-term sustainability and resilience for their communities." This statement reflects the principle that socio-ecological strategies must be forward-looking, addressing both current vulnerabilities and future risks.

Monitoring and adaptive management are also key components of these strategies. Organizations regularly assess the outcomes of their interventions and adjust practices based on observed ecological changes and community feedback. This iterative approach ensures that strategies remain relevant and effective under evolving climate conditions. A government representative stated, "We constantly evaluate our coastal restoration projects and make adjustments based on erosion patterns and community needs. Flexibility is critical because climate impacts are unpredictable." This highlights the dynamic nature of socio-ecological strategies, which require continuous learning and adaptation to remain effective.

Discussion

This study provides a nuanced understanding of how organizations in Malaysia are navigating the complexities of climate change through socio-ecological resilience strategies. By examining organizational awareness, commitment, collaborative approaches, and the implementation of ecosystem-based and community-driven initiatives, the research underscores the critical role of management practices in fostering adaptive capacities. The findings not only contribute to the academic discourse on climate adaptation but also offer practical insights for policymakers and organizational leaders aiming to enhance resilience in the face of escalating environmental challenges.

The study reveals a significant shift in organizational awareness regarding climate change, with many institutions recognizing the interconnectedness of ecological systems and human communities. This awareness is pivotal, as it drives the integration of climate considerations into organizational policies and practices. However, awareness alone is insufficient; it must be coupled with a strong commitment to action. The research highlights that organizations demonstrating a high level of commitment are more likely to allocate resources towards climate adaptation initiatives, engage in long-term planning, and foster a culture of resilience. This aligns with

findings from previous studies, which emphasize the importance of organizational commitment in translating awareness into effective action (Wang, 2022; Lee & Kim, 2023; Xueyun et al., 2023).

The complexity of climate change necessitates collaborative efforts across various sectors and stakeholders. The study underscores the effectiveness of multi-stakeholder engagement in developing comprehensive adaptation strategies. By involving government agencies, NGOs, community organizations, and the private sector, organizations can leverage diverse expertise and resources, leading to more robust and contextually appropriate solutions. This collaborative approach is consistent with the literature, which highlights the benefits of inclusive decision-making processes in enhancing adaptive capacity. Moreover, the research indicates that such engagement fosters a sense of shared responsibility and ownership, which is crucial for the sustainability of resilience initiatives (Uzorka et al., 2024; Khatter et al., 2024; Baker et al., 2021).

The implementation of strategies is a central theme in the study, illustrating how organizations utilize natural systems to mitigate climate impacts. Initiatives such as mangrove restoration, reforestation, and wetland conservation not only enhance biodiversity but also provide essential services like flood protection and carbon sequestration. The study's findings corroborate previous research that advocates for as a cost-effective and sustainable approach to climate adaptation. However, the research also identifies challenges in scaling up initiatives, including limited technical capacity, insufficient funding, and policy barriers. Addressing these challenges requires concerted efforts to build institutional capacity, secure financing, and create enabling policy environments.

The study highlights the importance of community involvement in disaster risk reduction, emphasizing that local knowledge and participation are vital for effective climate adaptation (Vasileiou et al., 2022; Panda et al., 2023). By empowering communities to take an active role in identifying risks, planning interventions, and implementing solutions, organizations can enhance the relevance and effectiveness of their strategies. This approach aligns with the principles of CBDRR, which advocates for community-led initiatives in disaster management. The research also points to the need for capacity-building programs that equip communities with the skills and knowledge necessary to manage climate-related risks independently (Hermans et al., 2022).

The findings of this study have several implications for management practice in the context of climate change adaptation. First, organizations must move beyond awareness and develop a deep commitment to integrating climate considerations into their core operations and strategies. This involves setting clear objectives, allocating resources, and establishing accountability mechanisms to ensure the effective implementation of adaptation initiatives. Second, fostering a collaborative culture within and between organizations can enhance the development and execution of resilience strategies. This includes promoting open communication, trust-building, and joint problem-solving among stakeholders (Tamara et al., 2021; Agbodzakey, 2024; Ishola et al., 2024). Third, organizations should prioritize the adoption of EbA and CBDRR approaches, recognizing their dual benefits for ecological conservation and community well-being. This requires investment in capacity building, research, and policy advocacy to overcome existing barriers and facilitate the scaling up of these approaches. Finally, organizations must adopt an adaptive management framework that allows for continuous learning and adjustment of strategies in response to changing climate conditions and emerging challenges.

CONCLUSION

This study illuminates the critical role of organizations in fostering socio-ecological resilience amidst the complex challenges of climate change in Malaysia, demonstrating that effective adaptation requires more than awareness it demands strategic commitment, collaborative engagement, and the integration of ecosystem-based and community-driven approaches. The findings underscore that organizations capable of aligning internal policies, resource allocation, and stakeholder partnerships not only enhance ecological sustainability but also empower communities to actively participate in resilience-building, thereby creating adaptive systems that are both socially inclusive and environmentally robust. Moreover, the study highlights the necessity of adaptive management and continuous learning as central components of organizational practice, ensuring that strategies

remain responsive to evolving climatic and social conditions. By bridging management practices with resilience imperatives, this research provides actionable insights for policymakers, organizational leaders, and practitioners, emphasizing that the deliberate integration of socio-ecological considerations into organizational strategy is indispensable for achieving sustainable development and long-term climate resilience in Malaysia.

REFERENCES

Agbodzakey, J. (2024). Building Trust in Collaborative Governance. In *Collaborative Governance Primer: An Antidote to Solving Complex Public Problems* (pp. 71-79). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-57373-6_7

Baker, J. J., Kearney, T., Laud, G., & Holmlund, M. (2021). Engaging users in the sharing economy: individual and collective psychological ownership as antecedents to actor engagement. *Journal of service management*, *32*(4), 483-506. https://doi.org/10.1108/JOSM-08-2020-0300

Fisher, M. R., Bettinger, K. A., Lowry, K., Lessy, M. R., Salim, W., & Foley, D. (2022). From knowledge to action: multi-stakeholder planning for urban climate change adaptation and resilience in the Asia–Pacific. *Socio-Ecological Practice Research*, *4*(4), 339-353. https://doi.org/10.1007/s42532-022-00128-4

Gannon, K. E., Crick, F., Atela, J., & Conway, D. (2021). What role for multi-stakeholder partnerships in adaptation to climate change? Experiences from private sector adaptation in Kenya. *Climate Risk Management*, *32*, 100319. https://doi.org/10.1016/j.crm.2021.100319

Gioia, E. (2024). Reducing the Risks Posed by Climate Change Through Multi-scalar, Multi-stakeholder Governance. In *Climate Change Adaptation in the Adriatic Coastal Areas: From European Strategies to Local Actions* (pp. 1-8). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-97-6655-0_1

Hermans, T. D., Šakić Trogrlić, R., van den Homberg, M. J., Bailon, H., Sarku, R., & Mosurska, A. (2022). Exploring the integration of local and scientific knowledge in early warning systems for disaster risk reduction: a review. *Natural Hazards*, *114*(2), 1125-1152. https://doi.org/10.1016/j.ijdrr.2022.103255

Ishola, A. O., Odunaiya, O. G., & Soyombo, O. T. (2024). Stakeholder communication framework for successful implementation of community-based renewable energy projects. *Journal Name*. https://doi.org/10.53294/ijfstr.2024.7.2.0047

Khatter, A., Thalaachawr, K., & Blyth, M. (2024). Student engagement and fostering ownership of learning. *Journal of Applied Learning and Teaching*, *7*(1), 291-302. https://doi.org/10.37074/jalt.2024.7.1.38

Kim, S. Y., Swann, W. L., & Feiock, R. C. (2021). Collective learning and institutional collective action in fragmented governance. In *Knowledge for governance* (pp. 351-373). Cham: Springer International Publishing.

Lee, M., & Kim, B. (2023). Effect of employee experience on organizational commitment: Case of South Korea. *Behavioral Sciences*, *13*(7), 521. https://doi.org/10.3390/bs13070521

Lv, Y., & Sarker, M. N. I. (2024). Integrative approaches to urban resilience: Evaluating the efficacy of resilience strategies in mitigating climate change vulnerabilities. *Heliyon*, *10*(6).

Madnor, M. S., Harun, A. N., & Ros, F. C. (2024). Exploring Gaps and Strategies: A Pilot Interview for Enhancing Disaster Risk Governance in Malaysia through Integrated Climate Change Adaptation for Resilience in the Future. *PaperASIA*, *40*(3b), 81-95. https://doi.org/10.59953/paperasia.v40i3b.110

Madnor, M. S., Harun, A. N., & Ros, F. C. (2024). Integrating adaptation of climate change to strengthen Malaysia's disaster risk governance. *Environment and Social Psychology*, *9*(4), 1-18. https://doi.org/10.54517/esp.v9i4.2189

May, C. K. (2022). Complex adaptive governance systems: a framework to understand institutions, organizations, and people in socio-ecological systems. *Socio-ecological practice research*, *4*(1), 39-54. https://doi.org/10.1007/s42532-021-00101-7

Muhammad, A., Idris, M. B., Ishaq, A. A., & Abdullah, A. K. (2023). The butterfly effect and its implications for resilience in complex socio-ecological systems. *Journal of Environmental Science and Economics*, *2*(2), 38-49. https://doi.org/10.56556/jescae.v2i2.533

Panda, G. K., Chatterjee, U., & Panda, S. (2023). Indigenous knowledge and disaster risk reduction: insight toward perception, response, adaptation and sustainability. In *Indigenous Knowledge and Disaster Risk Reduction: Insight Towards Perception, Response, Adaptation and Sustainability* (pp. 3-18). Cham: Springer International Publishing.

Sharifi, A. (2023). Resilience of urban social-ecological-technological systems (SETS): A review. *Sustainable Cities and Society*, *99*, 104910. https://doi.org/10.1016/j.scs.2023.104910

Solorio, I. (2021). Leader on paper, laggard in practice: policy fragmentation and the multi-level paralysis in implementation of the Mexican Climate Act. *Climate Policy*, *21*(9), 1175-1189. https://doi.org/10.1080/14693062.2021.1894084

Tamara, A. R., Vigil, N. M., Liswanti, N., Arwida, S., Larson, A. M., & Barletti, J. P. (2021). Trust-building and leadership in multi-stakeholder forums: lessons from Indonesia. *International Forestry Review*, *23*(1), 43-58. https://doi.org/10.1505/146554821833466068

Uzorka, A., Akiyode, O., & Isa, S. M. (2024). Strategies for engaging students in sustainability initiatives and fostering a sense of ownership and responsibility towards sustainable development. *Discover Sustainability*, *5*(1), 320. https://doi.org/10.1007/s43621-024-00505-x

Vangana, S. V. S. (2025). Institutional Barriers and Enablers of Co-Production in Fragile Governance Contexts: Evidence from Zimbabwe. *African Journal on Impact Economic and Social studies (AJIESS)*, *3*(002).

Vasileiou, K., Barnett, J., & Fraser, D. S. (2022). Integrating local and scientific knowledge in disaster risk reduction: A systematic review of motivations, processes, and outcomes. *International Journal of Disaster Risk Reduction*, *81*, 103255.

Wang, R. (2022). Organizational commitment in the nonprofit sector and the underlying impact of stakeholders and organizational support. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, *33*(3), 538-549. Xueyun,

Xueyun, Z., Al Mamun, A., Masukujjaman, M., Rahman, M. K., Gao, J., & Yang, Q. (2023). Modelling the significance of organizational conditions on quiet quitting intention among Gen Z workforce in an emerging economy. *Scientific reports*, *13*(1), 15438. https://doi.org/10.1038/s41598-023-42591-3

Zreik, M. (2024). Governing complex disasters in Southeast Asia: A focus on COVID-19 management in Malaysia. *Southeast Asia: A Multidisciplinary Journal*, *24*(3), 171-184. https://doi.org/10.1108/SEAMJ-12-2023-0084