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SYSTEMATIC LITERATURE REVIEW OF CLIMATE ACTION INITIATIVES AMONG THE PUBLIC IN SOUTHEAST ASIA

Siti Melinda Haris^{1*}, Farah Adilla Ab Rahman², Nasyrah Ahmad³, Nurliyana Mohd Shazali⁴, Siti Hajjar Mohd Amin⁵

¹Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA, Malaysia

✉ melinda596@uitm.edu.my

ORCID <https://orcid.org/0000-0002-0483-9933>

²Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA, Malaysia

✉ farah855@uitm.edu.my

ORCID <https://orcid.org/0000-0001-7737-6346>

³Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA, Malaysia

✉ nasyrah185@uitm.edu.my

ORCID <https://orcid.org/0009-0008-6592-522X>

⁴Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA, Malaysia

✉ yanashazali@uitm.edu.my

ORCID <https://orcid.org/0009-0002-7926-289X>

⁵Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA, Malaysia

✉ hajjar@uitm.edu.my

ORCID <https://orcid.org/0000-0002-4744-6742>

*Corresponding Author

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Abstract:

Addressing climate change requires public action that is active and impactful. Public engagement in combating climate change occurs at multiple levels of impact, especially in reducing greenhouse gas emissions. These efforts include personal lifestyle changes, such as reducing energy consumption and using public transportation, as well as community initiatives like local clean-up activities and promoting sustainable practices, which can ultimately lead to broader systemic changes. They can be categorised into low-impact, moderate-impact and high-impact climate actions. Given the significant impact of daily activities on climate change, the public can greatly influence mitigation efforts. At present, studies on public climate action initiatives in Southeast Asian countries are limited. This study, therefore, employs a systematic review of 17 published articles from Scopus- and Web of Science-indexed journals, using ROSES

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technique, to explore the climate actions taken by the Southeast Asian public, categorised into three main categories. The findings indicate that the public in Southeast Asia participates in all categories of climate actions. They significantly practice moderate-impact actions but have minimal involvement in high-impact actions. They could play a significant role in reducing greenhouse gas emissions, as they can bring effective climate change mitigation at both the individual and community levels. Lastly, this review will recommend future avenues of research for scholars.

Keyword:

Climate Actions; Climate Change; Climate Mitigation; ROSES; Southeast Asia; Systematic Literature Review; Public



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Introduction

Climate change is one of the most pressing and fundamental issues facing the world today, with significant impacts on both ecosystems and human well-being. It is an environmental issue that requires urgent attention from all countries. As defined by the Intergovernmental Panel on Climate Change (IPCC) (2012), climate change refers to long-term alterations in climatic conditions, which can be observed through changes in the average and/or variability of these conditions over decades. These changes are primarily driven by human activities, such as deforestation and burning fossil fuels, as well as by natural processes. The effects are adverse, including severe weather events, rising sea levels, and disruptions in food and water supplies, ultimately threatening not only biodiversity but also the health, safety, and livelihoods of global populations.

Addressing climate change globally is an urgent need, especially in Southeast Asia, as the region is one of the major contributors to greenhouse gas (GHG) emissions. With a population estimated at nearly 680 million in 2022, Southeast Asian countries are experiencing rapid economic growth and development (United Nations, Department of Economic and Social Affairs, Population Division, 2022). According to the ASEAN Centre for Energy (ACE), GHG emissions from the energy sector in the region are projected to increase significantly between 2017 and 2040, with a projected increase of between 34% and 147% by 2040 (ACE, 2017). Although various mitigation measures have been and are being actively implemented by governments at the national and regional levels, as outlined in their Nationally Determined Contributions (NDC) reports, the role of individuals and communities in climate change mitigation efforts remains underexplored. In fact, individuals and communities have great potential to contribute to mitigation efforts through implementing climate action at their

respective levels. Therefore, it is important to understand how they take climate action at the individual and community levels in their efforts to mitigate climate change.

Based on a 2023 Statista global survey involving 23,507 respondents from Southeast Asia on perceptions of the severity of climate change, almost half of them (50.3%) perceived it as an immediate and serious threat to the well-being of the people. On the other hand, 40.5% believed it is a pivotal issue that necessitates ongoing attention. These findings display that there is growing public support for sustainable behaviour, emission-reduction actions, and environmental preservation initiatives in the region due to increasing climate change awareness.

As public awareness increases, proactive climate action at all levels of society also needs to be enhanced. The vulnerability of Southeast Asian countries to the irreversible impacts of climate change has heightened the need for active climate action by individuals, households, and communities. However, there is increasing concern that the public in Southeast Asia has not translated their knowledge and awareness into explicit action to mitigate climate change. Mitigation strategies should not only be initiated by the government and businesses, but also by individuals, households, and communities. The public has the power to make a positive impact on reducing greenhouse gas emissions. This can be achieved by adopting energy-efficient electrical appliances, utilising public transport, and advocating for effective government climate action.

Understanding the climate mitigation actions taken by individuals and the public in Southeast Asia becomes paramount, as the region is home to more than 671 million people as of 2022 (ASEAN Secretariat, 2023). Southeast Asia's high population makes it more sensitive to the effects of climate change. According to The State of Southeast Asia: 2024 Survey Report among Southeast Asians (Seah et al., 2024), climate change ranked second among Southeast Asians' most pressing concerns. Therefore, climate mitigation actions among individuals, communities and the public are becoming increasingly crucial.

Many Southeast Asian governments do not describe how individuals or households can reduce greenhouse gas emissions in their NDCs. Most NDCs focus on key sectors that are major contributors to high CO₂ emissions, such as energy and industry. The public has a crucial role to play in this endeavour. Nevertheless, the extent to which they have been implemented is still uncertain. To date, there is a noticeable lack of systematic literature reviews on public climate action in Southeast Asian countries.

To gain insight into the public's efforts to mitigate climate change in Southeast Asian nations, a fundamental question was posed: "What are the initiatives taken by the public in Southeast Asian countries to mitigate climate change?" This article examines the measures individuals in Southeast Asian nations have implemented to address climate change, focusing on identifying significant patterns across these countries. The primary objective is to systematically analyse existing literature to provide insights into the key actions taken by the public in Southeast Asian countries in response to climate change.

Literature Review

As a well-documented global phenomenon, climate change represents one of the most intricate and challenging human issues (Anderl, 2023). Since the mid-20th century, human activities

have been identified as the primary drivers of climate change (United Nations, 2009). The projected consequences of climate change are profound and far-reaching, affecting global health, food security, water resources, and economic development. Addressing this multifaceted and multidimensional impact requires effective climate action that engages diverse stakeholders.

Climate action can be defined as the collective measures taken to address or to minimise the effects of climate change. These measures include climate mitigation and adaptation. Climate mitigation aims to reduce greenhouse gas emissions, while climate adaptation focuses on preparing for and responding to current and expected future climatic change. As stated by Leal Filho et al. (2021), climate action encompasses strategic efforts to reduce greenhouse gas emissions while enhancing resilience and the ability to adapt to climate change. This effort is in line with Sustainable Development Goal (SDG) 13, which calls for urgent collective efforts from individuals, governments, businesses, communities, social movements, nations and global organisations to take climate action to combat climate change.

There is a growing body of research that recognises the importance of community climate action in driving systemic change as well as effective policy formulation to reduce global carbon emissions. Community participation in the implementation of climate initiatives is critical to achieve the goal of net-zero carbon emissions, as it can increase community support and encourage participation in various climate-related projects. Active public participation can also strengthen the implementation of climate policy to be more effective. At the individual level, increased awareness and encouragement to participate in climate action can significantly reduce the daily carbon footprint (Ebner et al., 2025). At the community level, cooperation among community members not only accelerates the transition to a sustainable lifestyle but also encourages the government and the business sector to adopt environmentally friendly policies and practices (Ballard & Brastosin, 2024).

The literature underscores that a comprehensive strategy that acknowledges the various roles people play in society is crucial for effective climate action. While structural interventions by businesses, governments and local authorities are necessary to guarantee that sustainable actions are available, public support for mitigation initiatives remains critical (Hampton & Whitmarsh, 2023). In a similar vein, Lu & Schuldt (2016) suggest that people contribute to climate solutions not only as customers but also as professionals, citizens, family members, and community members whose decisions collectively influence societal outcomes.

Psychological processes play a vital role in shaping community responses and fostering a culture of action against climate change. Empirical studies also show that individual's behaviours and engagement in climate action are largely driven by their understanding of climate change. People are more conscious of certain environmental risks and feel more morally and personally obligated to act when they have a greater understanding of the reality and severity of climate change. In turn, these psychological processes make people more likely to engage in a variety of direct and indirect climate-related activities, thereby strengthening the larger social momentum required to address climate issues (Albright & Crow, 2019).

Individual climate action refers to the personal decisions and lifestyle changes people adopt to reduce their greenhouse gas emissions and inspire broader environmental progress. Actions taken by individuals and communities can vary significantly, leading to different levels of impact on greenhouse gas emissions (GHG) (Bergquist, Mildenerberger, & Stokes, 2020; Wynes

& Nicholas, 2017; Olson et al., 2024). Wynes and Nicholas (2017) classify individual climate actions into four main categories: high-impact, moderate-impact, low-impact, and civic actions, based on their potential to reduce GHG emissions and individual carbon footprints.

The first category is high-impact actions, which include all strategies or activities that have the greatest impact on reducing greenhouse gas emissions. However, implementing these actions requires significant lifestyle changes in society. Actions that have the potential to significantly reduce carbon emissions include not owning a private car, instead, they use public transport, walking or cycling to commute to a destination; adopting a plant-based diet; limiting family size; and minimising air travel. High-impact climate actions focus on large-scale structural changes and systemic transformations, rather than small adjustments to individual habits.

The second category is moderate-impact actions, in which it contributes significantly to environmental protection, but have a smaller impact at the individual level than high-impact actions. Examples of these actions include recycling, reducing waste, conserving resources, reducing resource use, replacing light bulbs with energy-efficient bulbs, washing clothes in cold water, hanging clothes to dry, driving hybrid vehicles, installing solar panels, minimising food waste, and reducing meat consumption. Moderate-impact climate actions are more practical and easy-to-implement strategies to strengthen community resilience and effectively reduce greenhouse gas emissions without requiring sweeping lifestyle changes as compared to high-impact actions.

The next category is low-impact actions. While these actions may not have a huge impact individually, they still contribute to a more comprehensive and high-impact strategy in combating climate change. Examples of low-impact actions include cutting back on lawn mowing, purchasing carbon credits as a carbon offset, minimising waste generation, conserving water, reducing unnecessary travel, and planting trees. Low-impact climate actions involve easy-to-implement lifestyle changes and collective community efforts aimed at reducing carbon footprints and increasing community resilience. These goals can be achieved without requiring significant lifestyle changes.

The final category is civic action. This action is crucial in driving systemic change through active community involvement in decision-making and public policy development. Examples of civic action include joining organisations or groups that advocate for environmental issues, raising awareness about climate change, voting for potential leaders who support climate action-oriented policies, and communicating with government officials to express support for or opposition to sustainable policies and practices. Civic-based climate action is a community-driven effort and democratic practice that aims to influence environmental policy, promote sustainable practices and lifestyles, and accelerate the transition to carbon neutrality.

In conclusion, efforts to address climate change necessitate a coordinated and comprehensive approach that involves all levels of society, especially individuals and communities. Each climate action, although falling into different categories, still contributes to reducing carbon emissions, either directly or indirectly. What is more important is a deep understanding of the complexity of the climate change issue in order to shape environmentally friendly behaviours that, in turn, encourage the implementation of high-impact climate actions. Therefore, efforts to increase climate literacy and encourage active civic engagement are important elements in achieving global sustainability goals and addressing the challenges of climate change more effectively.

Methodology

This section discusses the methods and procedures used to obtain articles related to public climate action in Southeast Asian countries. The systematic literature review combines empirical evidence from previous studies to provide a structured and comprehensive overview of public climate action, both at individual and collective levels, in Southeast Asia. In addition, the systematic literature review also aims to identify knowledge gaps and outline future research directions.

This systematic literature review uses the Reporting Standards for Systematic Evidence Synthesis (ROSES) as a guide in implementing the systematic review protocol. ROSES is a reporting standard developed specifically for systematic reviews in the field of environmental conservation and management (Haddaway et al., 2018). This standard aims to help researchers report information accurately, transparently, and at an appropriate level of detail. Based on the protocol, the author begins the systematic literature review by formulating appropriate research questions. Next, the author describes the systematic search process that includes three main subprocesses, namely identification, screening based on inclusion and exclusion criteria, and determination of eligibility. Then, the author explains the method of evaluating the selected articles to assess their overall quality. Finally, the author describes the data extraction and analysis process used in this review.

Constructing Research Questions

The research question for this study was developed using the PICo criteria, a commonly used method for formulating qualitative research inquiries. PICo serves as a valuable framework for authors to craft relevant research questions for their reviews. The PICo criteria consist of three key components: Population or Problem, Interest, and Context. In this review, the authors focused on three main criteria: the public (Population), climate change mitigation actions (Interest), and Southeast Asian countries (Context). Consequently, the primary research question formulated is: "What are the initiatives taken by the public in Southeast Asian countries to mitigate climate change?"

Systematic Search Process

The systematic searching strategies involve three main processes: identification, screening, and eligibility.

Searching

The identification process includes searching for synonyms and related terms for the study's three main keywords: public, mitigation actions, and climate change. The aim is to expand the database options for locating additional related articles to be reviewed. The selection of keywords is based on the research question, following the guidelines suggested by Okoli (2015). By refining the main keywords, the authors successfully constructed a comprehensive search string for the two primary databases, Scopus and Web of Science (Table 1). Martin-Martin et al. (2018) and Gusenbauer and Haddaway (2020) claim that these two databases are suitable for conducting a systematic literature review. They offer advanced search functions, index articles from over 5000 publishers, ensure quality control, and focus on multidisciplinary

studies, including those related to environmental management. After conducting searches in Scopus and Web of Science, a total of 148 articles were yielded (Figure 1).

Table 1: Search Strings Used In The Database

Database	Keywords
Scopus	TITLE-ABS-KEY (("Climat* chang*" OR "global warming*") AND ("Climate action*" OR "mitigation actions*" OR "mitigation strategy*") AND ("public" OR "community*" OR "citizen*" OR "resident*" OR "local" OR "household*" OR "home*") AND ("Malaysia" OR "Singapore" OR "Thailand" OR "Indonesia" OR "Philippines" OR "Laos" OR "Myanmar" OR "Cambodia" OR "Brunei" OR "Vietnam" OR "Timor Leste"))
Web of Science	TS= (("Climat* chang*" OR "global warming*") AND ("Climate action*" OR "mitigation actions*" OR "mitigation strategy*") AND ("public" OR "community*" OR "citizen*" OR "resident*" OR "local" OR "household*" OR "home*") AND ("Malaysia" OR "Singapore" OR "Thailand" OR "Indonesia" OR "Philippines" OR "Laos" OR "Myanmar" OR "Cambodia" OR "Brunei" OR "Vietnam" OR "Timor Leste"))

Source: Authors

Screening

The 200 articles were screened by establishing selection criteria and using the database's sorting function. Kitchenham and Charters (2007) state that these selection criteria should be based on the research question. Due to the impracticality of reviewing every previously published article, Okoli (2015) recommended that researchers establish a time frame to conduct their reviews. The search process conducted in the selected database reveals a notable surge in research on the public's efforts to address climate change since 2010. The search was limited to March 2024 since the search process commenced in that month and is still ongoing. The inclusion criteria were established to encompass the time frame from 2010 to March 2024. To ensure a thorough review, the authors focused exclusively on peer-reviewed journal articles that contained empirical data.

Additionally, the authors limited their inclusion to English articles to avoid potential misinterpretation. For the study, the authors only selected articles published in Southeast Asian countries. During the review process, the authors excluded 38 articles that did not meet our inclusion criteria and removed 33 duplicate articles. A total of 77 articles were selected for the third stage of eligibility.

The authors reviewed the retrieved articles during the eligibility process to validate their alignment with the selection criteria by examining their titles and abstracts. A total of 58 articles were excluded for various reasons. These included focusing on climate change adaptation, climate change impacts, national-level climate policies and strategies, disaster risk management strategies, and the challenges of climate actions, rather than relying on empirical data or reviews. As a result, only 19 articles were selected.

Critical Appraisal

To minimise bias in the data extraction process, the authors outline the review protocol, which includes identification, screening, and eligibility assessment. Data extraction was performed independently by all research team members to reduce errors and bias, as suggested by Charrois (2015). Petticrew and Roberts (2006) identified three quality categories: high, moderate, and low. The authors thoroughly analysed the methodologies of the articles to determine their quality ranking. All authors must mutually agree that the quality meets a moderate level for inclusion in the review. All disagreements were thoroughly discussed and resolved before deciding whether to include or exclude articles. Following the critical appraisal process, 17 articles were identified as high-quality, while 7 received a moderate ranking. Therefore, all the remaining articles met the inclusion criteria for the review.

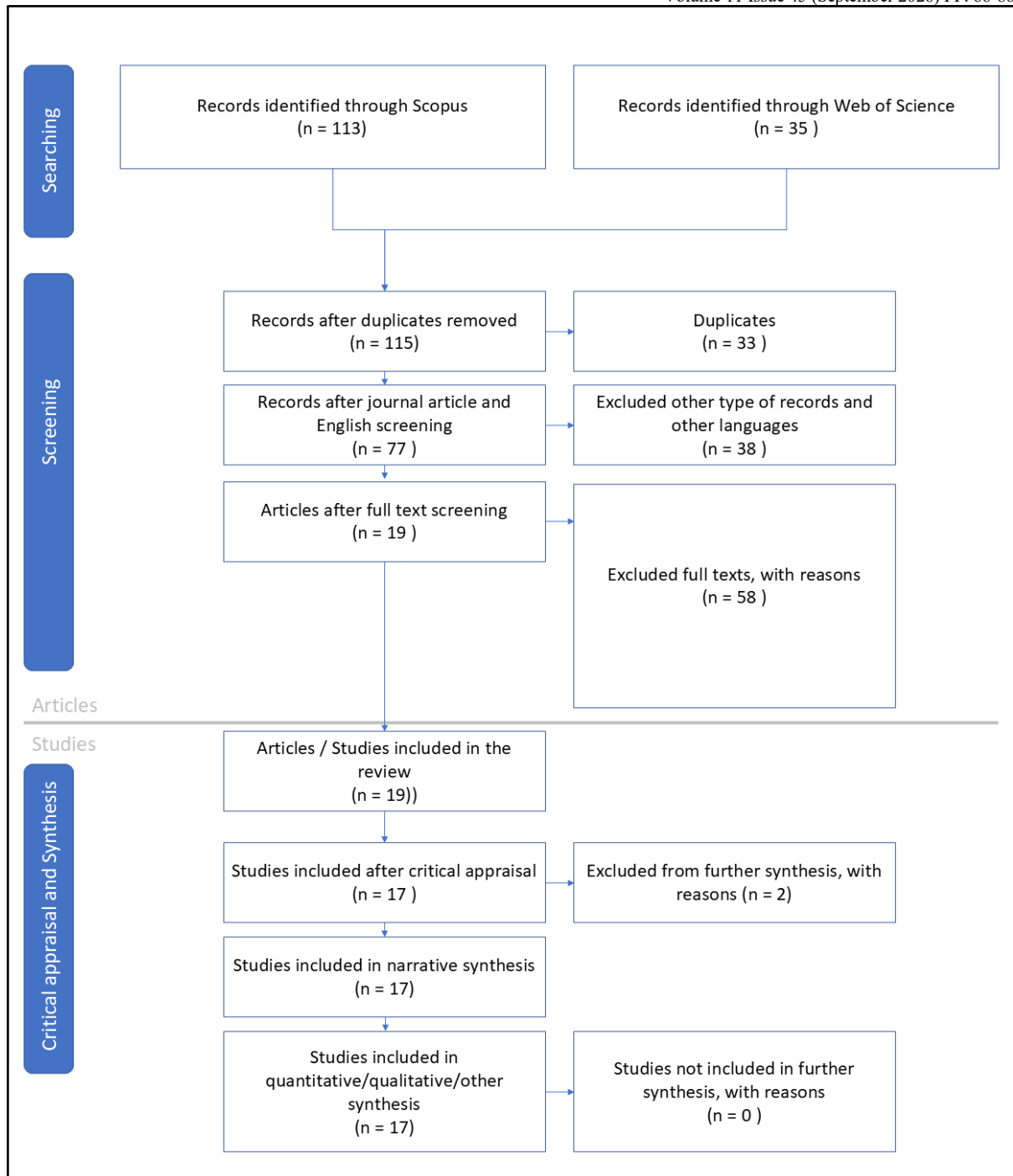


Figure 1: Reporting Standards for Systematic Evidence Syntheses (ROSES)

Source: Adapted from Haddaway, N. R., Macura, B., Whaley, P., & Pullin, A. S. (2017). ROSES flow diagram for systematic reviews (Version 1.0). doi: 10.6084/m9.figshare.5897389

Result

Background of the Studies

Among the 17 selected articles, 16 were single-case studies of a specific Southeast Asian country, while 1 was a multiple-case study examining several Southeast Asian countries. A

significant number of studies, seven in total, were conducted in Indonesia, highlighting a varied range of findings and approaches to climate action (Martin et al., 2024; Atmadja et al., 2023; Mangunjaya, 2023; Sudarmanto et al., 2023; Mulyasari et al., 2021; Sunarjo et al., 2021; Surahman et al., 2019). In addition to Indonesia, four studies were conducted in Vietnam (Tariq et al., 2017; Bayrak & Marafa, 2017; Lohrey et al., 2021; Seewald et al., 2023). Next, Thailand was represented by two studies (Phupadtong et al., 2023; Seewald et al., 2023), and Malaysia contributed with two studies (Phua et al., 2014; Ramli et al., 2019). In a broader analysis, only one study was found for the Philippines (Bigsang et al., 2016), Cambodia (Marajh & He, 2022) and Singapore (Milovanoff et al., 2021). Interestingly, no studies were found on Laos, Brunei, or Timor-Leste. Overall, a noticeable lack of research persists, particularly regarding public and community climate actions in this region, compared to studies conducted in other areas.

Furthermore, the publication dates of the articles ranged from 2014 to 2024, reflecting a relatively recent but varied interest in the topic. Since 2014, the number of studies on public climate actions in the region has fluctuated, as indicated in Figure 2.

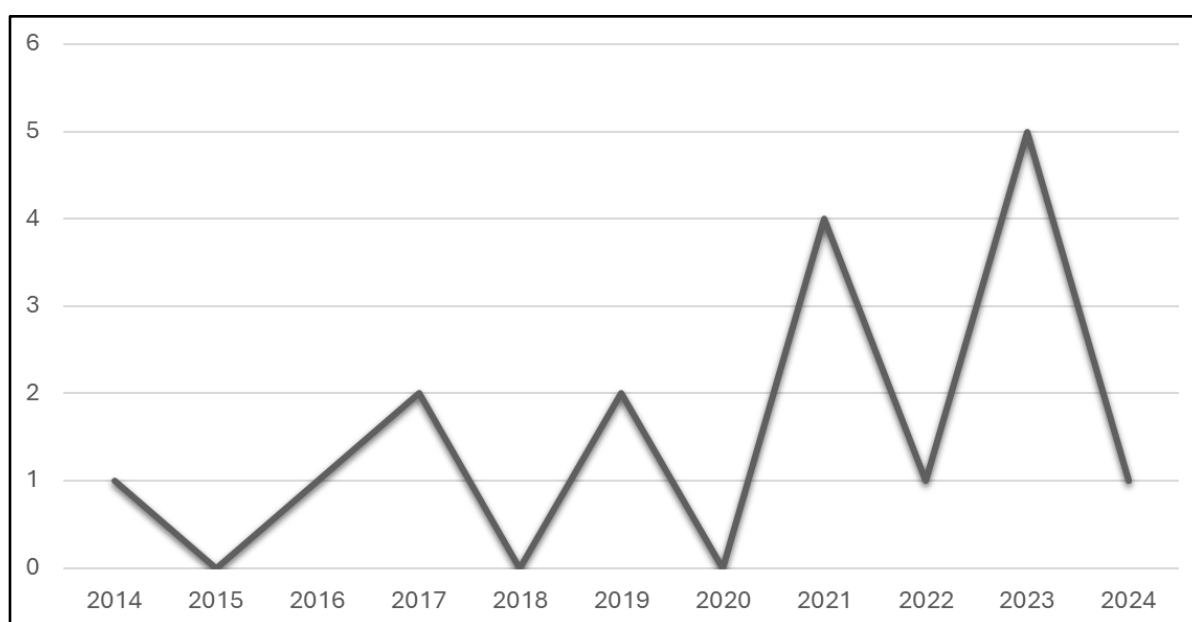


Figure 2: Year of Publication

Source: Authors

Main Themes

Seventeen articles in the included study were analysed by categorising empirical research findings into themes related to public climate actions. The results are summarised in Table 2. Notably, a clear trend emerges, demonstrating the integration of various climate mitigation actions and highlighting the diverse strategies the public employs to address climate change.

Table 2: Search Strings Used in The Database

No.	Author(s)	Year	Climate Mitigation Actions			
			HIA	MIA	LIA	CA
1	Martin, E., Ulya, N. A., Yunardy, S., Agustina, K., Meidalima, D., & Chuzaimah, C.	2024			/	
2	Atmadja, S. S., Boissière, M., Ekowati, D., & Resosudarmo, I. A. P.	2023				/
3	Phupadtong, A., Chavalparit, O., Suwanteep, K., & Murayama, T.	2023		/		
4	Mangunjaya, F. M.	2023		/	/	/
5	Sudarmanto, B., Suranto, S., Suntoro, S., & Sutrisno, J.	2023		/		/
6	Marajh, L., & He, Y.	2022		/		/
7	Milovanoff, A., Minet, L., Cheah, L., Posen, I. D., MacLean, H. L., & Balasubramanian, R.	2021	/	/		/
8	Mulyasari, F., Harahap, A. K., Rio, A. O., Sule, R., & Kadir, W. G. A.	2021				/
9	Sunarjo, W. A., Manalu, V. G., & Adawiyah, W. R.	2021		/		
10	Tariq, A., Vu, Q. D., Jensen, L. S., de Tourdonnet, S., Sander, B. O., Wassmann, R., & de Neergaard, A.	2017		/		
11	Bayrak, M. M., & Marafa, L. M.	2017	/	/	/	/
12	Ramli, A. F., Muis, Z. A., Ho, W. S., Idris, A. M., & Mohtar, A.	2019		/		
13	Bigsang, R. T., et al.	2016			/	
14	Phua, M., Wong, W., Goh, M., Kamlun, K. U., Kodoh, J., & Teo, S.	2014		/		/
15	Seewald, E., Baerthel, S., & Nguyen, T. T.	2023		/		
16	Lohrey, S., Chua, M., Gros, C., Faucet, J., & Lee, J.K.	2021		/	/	/
17	Surahman, A., Shivakoti, G. P., & Soni, P	2019		/	/	/
Frequency			2	13	6	10

HIA high-impact actions, MIA middle-impact actions, LIA low-impact actions, CA civic actions

High-Impact Actions

High-impact actions highlight the significant and direct effects on reducing greenhouse gas (GHG) emissions. According to the findings, only two articles discussed high-impact actions taken by the public. The Singaporean government has implemented policies since 1975 to limit personal car ownership (Milovanoff et al., 2021). With substantial investment in public transportation, the public has demonstrated a willingness to live without cars, mainly due to restrictions on the use and ownership of personal vehicles. In Vietnamese communities, community-based forest management is recognised as a high-impact action within the REDD+ framework (Bayrak & Marafa, 2017). This approach empowers indigenous and forest-dependent communities in Vietnam's Central Highlands to actively manage their forests.

Moderate-Impact Actions

On the contrary, moderate-impact actions are effective climate solutions that offer more accessible and practical options. While these actions can significantly reduce greenhouse gas (GHG) emissions, their impact may not be as profound as that of high-impact actions because they focus on everyday activities. For example, urban stakeholders in Thailand's Nakhon Ratchasima Municipality, including local communities, have implemented recycling and waste utilisation programs to address urbanisation and waste management challenges. Additionally, many Thais opt for energy-efficient household appliances, purchase zero-emission vehicles (ZEVs), and use public transportation to reduce carbon emissions (Phupadtong et al., 2023). Similarly, Singaporeans engage in moderate-impact actions by relying on public transportation, installing efficient air conditioners, and installing solar panels on their rooftops (Milovanoff et al., 2021).

Although the demand for electric vehicles (EVs) remains relatively low in Malaysia, urban communities have begun purchasing EVs as part of their efforts to reduce carbon emissions through climate action (Ramli et al., 2019). In Indonesia, the public engages in various eco-friendly practices, including recycling waste (Mangunjaya, 2023), using efficient home cooling systems, reusing items (Sudarmanto et al., 2023), buying energy-efficient appliances, and reducing consumption and food waste (Surahman et al., 2019; Sunarjo et al., 2021). Similarly, the shift toward low-emission transport and heat adaptation among workers in Hanoi demonstrates increased individual resilience and awareness (Lohrey et al., 2021).

In line with initiatives by urban communities in Malaysia and Indonesia to reduce carbon emissions, Vietnam's agricultural sector is actively adopting advanced farming techniques to address greenhouse gas emissions. This is evident in Vietnam's paddy fields, which significantly contribute to agricultural methane (CH₄) emissions. The rice farmers mitigate these emissions by adopting improved field water management practices, such as Alternate Wetting and Drying (AWD) and Efficient Field Water Management (EWM) (Tariq et al., 2017). These methods have been demonstrated to reduce methane emissions while also enhancing rice yields.

Low-Impact Actions

In South Sumatra, Indonesia, local communities are actively involved in restoring mangrove forests (Martin et al., 2024). Similar action is taken in Maasim, Sarangani Province, Philippines (Bigsang, R. T., et al., 2016). In Central Kalimantan, Indonesia, farmers and communities have

collaborated to adopt sustainable management practices for degraded peatlands, aiming to reduce greenhouse gas emissions (Surahman et al., 2019). Across various countries, including Malaysia, Indonesia, Cambodia, and Vietnam, communities have also taken the initiative to plant trees as a way to combat climate change (Martin et al., 2024; Mangunjaya, 2023; Marajh & He, 2022; Nambiar, 2021; Bayrak & Marafa, 2017; Phua, 2014). In particular, rural communities in Sarawak, Malaysia, have increased their efforts in reforestation by planting more trees (Phua et al., 2014).

Civic Actions

Civic action aimed at addressing climate change in Southeast Asia has been found to be significantly influenced by local socio-cultural systems and the need to ensure economic sustainability to support community livelihoods. For example, in Indonesia, women play a critical role in forest-based climate initiatives by actively engaging in REDD+ (Reducing Emissions from Deforestation and Forest Degradation) programs and Posyandu (Integrated Community Health Posts) activities. These initiatives not only raise community awareness about climate change, but also strengthen women's empowerment (Atmadja et al., 2023). The women's active involvement in civic action supporting climate change mitigation efforts is believed to be influenced by the socio-economic background of the local community.

In addition to women, the Muslim community in Indonesia also plays an important role in efforts to address climate change through the integration of Islamic teachings with local customs and practices. For example, in 2014, the Indonesian Ulema Council issued a fatwa on the environment aimed at protecting biodiversity, followed by a fatwa prohibiting forest burning in 2016. These initiatives have contributed to reducing deforestation and forest burning, especially in villages with a Muslim majority population. In addition, communities through grassroots initiatives have implemented forest endowment schemes in Aceh and Bogor to conserve forest areas and land. The eco-pesantren movement promotes sustainable practices in boarding schools through the implementation of organic farming, reforestation and recycling practices. In addition, communities in regions such as West Sumatra, North Sumatra, Jambi and Riau have revived traditional management systems to protect rivers and preserve biodiversity. In terms of finance, citizens are also investing in Islamic bonds to support renewable energy projects and climate action. This approach shows that religious values and beliefs can influence citizens' financial decisions as well as encourage their participation in climate action.

Sudarmanto et al. (2023) emphasise the importance of civic action in Indonesia, particularly in the Garang Watershed of Central Java. These community-based initiatives are vital to climate mitigation efforts, encompassing activities such as tree planting and preservation to lower temperatures and prevent soil erosion. Local institutions, including community leaders, religious figures, and organisations, have actively engaged the community in environmental protection campaigns and greening initiatives.

Another study by Surahman et al. (2019) highlights sustainable peatland management practices in Central Kalimantan, where communities employ methods such as canal blocking, establishing firefighting teams, and adopting low-carbon agricultural practices to curb forest fires and carbon emissions. Additionally, Mulyasari et al. (2021) documented community involvement in Blora, Central Java, in a Carbon Capture, Utilisation, and Storage (CCUS)

project, including awareness programs and efforts to educate local teachers on carbon capture technology.

In Vietnam and Malaysia, rural communities are similarly engaging in sustainable forest management through the REDD+ program, which has not only strengthened local economies but also markedly reduced illegal logging (Phua et al., 2014; Bayrak & Marafa, 2017; Nambiar, 2021). Similarly, in the Philippines, the community in Maasim has taken proactive steps to replant mangroves and monitor carbon stock levels, thereby safeguarding their coastal areas. Meanwhile, in Cambodia, communities are combating climate change through reforestation, forest conservation, and raising awareness about local temperature fluctuations by utilising education and scientific data. These collective efforts across Southeast Asia reflect a strong dedication to environmental sustainability and community resilience.

Discussion

As the challenges posed by climate change continue to escalate, it is increasingly vital to comprehend how the public engages with climate action. Using thematic analysis, this systematic literature review examines public actions in Southeast Asia to mitigate climate change. The thematic analysis developed four main themes, which are discussed further in this section. Overall, the main findings highlight a range of public climate actions that can be categorised by impact level, from low-impact to high-impact, as well as civic actions. The extent of public participation in these actions varies across multiple contextual factors, including local policy frameworks, cultural values, economic conditions, and levels of environmental awareness.

The selected studies in this systematic literature review (SLR) confirm that public climate action in Southeast Asia is multifaceted, categorised into high-, medium-, and low-impact activities, as well as civic actions. The first theme addresses the high-impact climate actions that are least frequently practised by the public. High-impact climate actions, such as car-free living in Singapore and carbon sequestration through forests in Vietnam, are not common. These actions are important because they can significantly reduce GHG emissions. However, the notable gap between its potential and practical implementation must be addressed.

Based on the study, these examples demonstrate that individuals can engage in meaningful climate action. However, they require robust institutional and policy support to catalyse the achievement of ambitious carbon reduction goals. The case of Singapore illustrates how effective enforcement of transportation policies and investment in a robust public transport system can lead to significant changes in collective behaviour at the societal level. The findings of this study support the claims made by Bulkeley and Betsill (2005), who argue that effective urban climate governance requires a strategic combination of behavioural change, regulatory frameworks, and infrastructure development to achieve a comprehensive impact. Likewise, as demonstrated by the REDD+ program in Vietnam, empowering indigenous and forest-dependent communities can lead to substantial mitigation outcomes. It also fosters a sense of ownership that can increase their engagement at the community level in some other climate action initiatives. Overall, these examples demonstrate that achieving ambitious carbon-reduction targets requires individual action alongside effective policy mechanisms, robust capacity-building initiatives, and inclusive governance frameworks.

The second theme focuses on moderate-impact actions that represent the most frequently reported across the reviewed studies from the region. It encompasses household energy efficiency, recycling, public transport use, and waste reduction, which are most accessible and practised by the urban middle class. People are generally more willing to participate in climate-friendly activities when these options are affordable, convenient, and beneficial. As indicated in a previous study, people are more likely to engage in pro-environmental behaviours when structural barriers are reduced, and personal advantages are clearly presented (Steg, 2008). Economic and infrastructure challenges may impede the implementation of climate actions, such as adopting electric vehicles (EVs), requiring government intervention to facilitate the transition to green energy. It implies that moderate-impact actions are essential for integrating climate responsibility. Nonetheless, their scalability and overall effectiveness heavily depend on institutional support and the preparedness of existing structures.

The third theme examines the low-impact actions among the public in Southeast Asia. Despite their relatively minimal direct impact on carbon reduction, low-impact initiatives such as tree planting and mangrove restoration play a vital role in fostering environmental awareness and promoting community engagement. Tidball and Krasny (2010) noted that these nature-based activities often serve as educational and symbolic tools that promote long-term stewardship and foster pro-environmental values, particularly within communities. These activities are frequently undertaken as voluntary community efforts, highlighting the cultural influences that shape the ecological values of specific groups, especially in rural areas and among Indigenous populations. Although these actions may not, in isolation, lead to significant reductions in emissions, they are pivotal in cultivating ecological awareness and facilitating grassroots environmental governance.

Ultimately, a key takeaway from this review is the increasing significance of civic engagement. It is crucial to discuss the interplay between climate actions and social factors, where climate engagement is linked to social organisation, religious values, and gender roles (Avis, 2021; Ives & Baker, 2024; Marega et al., 2019). For instance, climate awareness campaigns in Indonesia are integrated into women-led community health initiatives, demonstrating the connection between environmental and social development agendas. Additionally, Islamic teachings serve as a normative framework that promotes sustainable ethics, encouraging practices such as organic farming and community composting. These findings highlight the distinct socio-cultural contexts that influence climate awareness and action in Southeast Asia (Letchumanan, 2010; Suthirat & Takashi, 2014).

Alongside the socio-cultural contexts emphasised, the active engagement of local communities uncovers the fundamental motivations that propel impactful climate action. The engagement of forest-dependent communities and smallholder farmers, particularly within the frameworks of REDD+ and sustainable land management initiatives (Bayrak & Marafa, 2017), underscores the dual role of civic participation in preserving ecological integrity and enhancing livelihood resilience. However, participation is frequently associated with tangible benefits and increased confidence in institutions (Nguyen et al., 2022; Sim et al., 2022). It suggests that ongoing engagement necessitates an understanding of, and adherence to, principles of fairness, inclusivity, and long-term incentives.

Conclusion

The public, through the implementation of climate action at individual and collective levels, is able to contribute to the achievement of global goals to reduce the impacts of climate change (Dietz et al., 2009; Creutzig et al., 2022). They are also recognised as one of the key actors in efforts to address climate change (Devine-Wright et al., 2022). This systematic literature review aims to identify and analyse climate actions that have been implemented by individuals and communities in Southeast Asian countries in efforts to address climate change. The results of the review show that climate action among communities in Southeast Asia is increasingly evident across various impact categories. This development reflects the increasing public awareness of climate change issues and more active involvement in the implementation of mitigation measures. However, the findings of the study also show that high-impact actions are still less implemented compared to medium-impact and low-impact actions. This situation indicates the need for more comprehensive studies to identify factors, barriers and challenges that limit the involvement of individuals and communities in the implementation of high-impact climate action.

Although the existing body of research is still limited, research findings suggest that difficulties in accessing low-carbon infrastructure are among the factors that constrain community engagement in climate action. Therefore, this study highlights the importance of effective policy formulation and enforcement to encourage collective community engagement in climate change efforts. In addition, several studies have shown that community-level climate action initiatives can significantly increase community engagement in climate change mitigation efforts. However, further research is still needed to confirm these findings, especially given the ever-changing and evolving landscape of government commitments in Southeast Asia.

In addition, the study also found that a large proportion of the community is engaged in moderate-impact climate action, apart from participating in various civic activities aimed at raising public awareness about climate change. In contrast, the limited implementation of high-impact climate action indicates the need for more in-depth research to identify the barriers faced by communities in Southeast Asia, particularly in under-researched countries, such as Laos, Myanmar and Timor-Leste.

It is also noteworthy that the study suggests that achieving the ambitious carbon-reduction targets requires a dual approach that combines individual commitment with inclusive governance frameworks, comprehensive policy mechanisms, and capacity-building initiatives. This implies that future research should delve deeper into these dynamics, especially within the varied socio-economic and cultural landscapes of Southeast Asia.

As a final point, the study reveals that there are few research studies on public climate actions in Southeast Asia. The scarcity of research may be due to the limited selection of databases for the present systematic literature review. Furthermore, the current fluctuating publication trends indicate a moderate level of interest among authors in examining climate actions within the public sphere in this region. Therefore, future systematic literature reviews on climate actions should utilise a wider range of databases. Addressing these gaps would help uncover critical insights into other aspects, such as the factors and challenges of public engagement in climate action in Southeast Asia, ultimately contributing to more effective climate strategies.

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