

CLIMATE CHANGE ECONOMICS: MITIGATION POLICIES AND ADAPTATION STRATEGIES**EKONOMI PERUBAHAN IKLIM: KEBIJAKAN MITIGASI DAN STRATEGI ADAPTASI****Loso Judijanto**

IPOSS Jakarta

losojudijantobumn@gmail.com

Corresponding Author*ABSTRACT**

Climate change is a significant global challenge, affecting economic stability and food security in various countries. This research aims to evaluate the effectiveness of mitigation and adaptation policies in increasing economic resilience, especially in countries that are vulnerable to the impacts of climate change. This study focuses on analyzing mitigation and adaptation policies implemented in various countries, as well as their impact on economic resilience and social sustainability. This research uses a Systematic Literature Review (SLR) approach with the PRISMA protocol to identify, assess, and synthesize relevant literature. Data were collected from peer-reviewed articles in the Scopus, Web of Science, and ScienceDirect databases, with meta-synthesis and comparative analysis to identify patterns and policy effectiveness. The findings show that a combination of mitigation policies, such as carbon taxes and emissions trading, and adaptation strategies, such as green infrastructure and economic diversification, significantly improves economic resilience. Countries with strong political support and investment in green technology show better results. This research provides important insights for policymakers to design more effective strategies in dealing with climate change, by emphasizing the need to integrate mitigation and adaptation policies to achieve sustainable economic resilience.

Keywords: climate change, mitigation policy, adaptation policy, economic resilience, systematic literature.

ABSTRAK

Perubahan iklim merupakan tantangan global yang signifikan, mempengaruhi stabilitas ekonomi dan ketahanan pangan di berbagai negara. Penelitian ini bertujuan untuk mengevaluasi efektivitas kebijakan mitigasi dan adaptasi dalam meningkatkan ketahanan ekonomi, terutama di negara-negara yang rentan terhadap dampak perubahan iklim. Studi ini berfokus pada analisis kebijakan mitigasi dan adaptasi yang diterapkan di berbagai negara, serta dampaknya terhadap ketahanan ekonomi dan keberlanjutan sosial. Penelitian ini menggunakan pendekatan Systematic Literature Review (SLR) dengan protokol PRISMA untuk mengidentifikasi, menilai, dan mensintesis literatur yang relevan. Data dikumpulkan dari artikel peer-reviewed dalam database Scopus, Web of Science, dan ScienceDirect, dengan analisis meta-sintesis dan perbandingan untuk mengidentifikasi pola dan efektivitas kebijakan. Temuan menunjukkan bahwa kombinasi kebijakan mitigasi, seperti pajak karbon dan perdagangan emisi, serta strategi adaptasi, seperti infrastruktur hijau dan diversifikasi ekonomi, secara signifikan meningkatkan ketahanan ekonomi. Negara-negara dengan dukungan politik yang kuat dan investasi dalam teknologi hijau menunjukkan hasil yang lebih baik. Penelitian ini memberikan wawasan penting bagi pembuat kebijakan untuk merancang strategi yang lebih efektif dalam menghadapi perubahan iklim, dengan menekankan perlunya integrasi kebijakan mitigasi dan adaptasi untuk mencapai ketahanan ekonomi yang berkelanjutan.

Kata Kunci: perubahan iklim, kebijakan mitigasi, kebijakan adaptasi, ketahanan ekonomi, sistematis literatur.

1. INTRODUCTION

Climate change poses significant challenges that impact the global and national economy across multiple sectors, particularly in agriculture, food security, and social welfare. The increase in average temperatures, altered precipitation patterns, rising sea levels, and

heightened incidences of extreme weather events—such as storms and droughts—directly influence agricultural productivity and economic stability. For instance, food security is heavily implicated as a result of climate variations, which exacerbate existing vulnerabilities within food systems, especially in developing regions reliant on rain-fed agriculture (Khee, 2014; Newton et al., 2011).

To address the adverse effects of climate change, countries have largely deployed two primary strategies: mitigation and adaptation. Mitigation efforts revolve around the reduction of greenhouse gas emissions through the adoption of renewable energy sources and the enhancement of energy efficiency (Ekechukwu & Simpa, 2024; Monteiro et al., 2022). Renewable energy integration can promote climate resilience by diversifying energy sources and minimizing dependence on fossil fuels (Ekechukwu & Simpa, 2024). On the other hand, adaptation strategies focus on enhancing community resilience to the impacts of climate change. These approaches include improving infrastructural resilience, diversifying economic activities, and implementing disaster risk reduction measures (Allarané et al., 2023). For example, urban areas that prioritize green infrastructure and spatial design significantly bolster their resilience against climate threats (Su et al., 2022; Bouramdane, 2024).

Despite the widespread implementation of these strategies, their long-term effectiveness in fostering economic resilience remains under debate among scholars (Favas et al., 2024). Some research indicates that while mitigation can slow the pace of climate change, adaptation efforts must be specifically tailored to the socio-economic and environmental contexts of communities to achieve sustainable resilience. Community-Based Approaches (CBAs) and Knowledge, Attitudes, and Practices (KAP) methodologies are highlighted as promising frameworks, illustrating the importance of local engagement in adaptation strategies (Nur et al., 2024; Acharibasam & Datta, 2023). Additionally, the interdependence of various systems—water, energy, and food—underscores the necessity for integrated approaches to build resilience (Daher et al., 2021). In summary, addressing climate change through effective policies requires a dual focus on mitigation and adaptation. Enhanced awareness of local contexts and continuous evaluation of these strategies is crucial in overcoming challenges to economic resilience brought on by climate variability (Shaw & Maythorne, 2012; Durán-Sandoval et al., 2023; He et al., 2024). The successful implementation of these strategies not only stabilizes economies but also strengthens overall social welfare—an imperative as climate change continues to evolve.

Climate change not only impacts the environment, but also has significant economic consequences. Rising global temperatures and increasingly frequent natural disasters can hamper economic growth, cause market instability, and increase financial risks for various industrial sectors. Countries that rely heavily on natural resources, such as agriculture and fisheries, are more vulnerable to climate change because the productivity of these sectors is strongly influenced by environmental factors. In addition, the impact of climate change on financial stability is a major concern for governments and international institutions. Uncertainty related to extreme weather and changes in environmental policies can cause volatility in financial markets, disrupt investment and increase the fiscal burden on governments. Therefore, this research is urgently needed to identify the most effective policies in mitigating economic risks caused by climate change and optimizing evidence-based adaptation strategies.

Although much research has been conducted on climate change, most studies focus more on environmental or technological aspects, such as the development of renewable energy and the reduction of carbon emissions. However, there are limitations in research that systematically evaluates the effectiveness of mitigation and adaptation policies from an economic perspective. Most existing research does not explicitly link mitigation and adaptation policies to a country's economic resilience. Several studies have evaluated the impact of environmental policies on certain sectors, but there are still few studies that use a holistic

approach in analyzing the effectiveness of climate change policies in maintaining overall economic stability. Therefore, this research aims to fill the gap in the literature by providing a more comprehensive analysis of the impact of mitigation and adaptation policies on economic resilience.

This research contributes in several main aspects. First, by using a systematic approach, this research will evaluate the effectiveness of mitigation and adaptation policies from an economic perspective, not just from environmental or technological aspects. This analysis will provide a deeper understanding of how these policies contribute to economic stability, sustainable growth and financial resilience of a country. Second, this research will provide insight for policy makers in designing economic strategies that are more resilient to climate change. By understanding the effectiveness of various policies that have been implemented in various countries, this research can offer evidence-based recommendations that can be adopted to improve the efficiency and effectiveness of mitigation and adaptation strategies.

To support the analysis in this study, several theoretical frameworks are used as a basis. The Environmental Kuznets Curve (EKC) is an important concept in ecological economics, providing insights into the complex relationship between economic growth and environmental degradation. The EKC hypothesis suggests that environmental degradation initially rises during the early stages of economic development, but after reaching a certain income threshold, the trend reverses and degradation declines as societies invest in cleaner technologies and implement environmental policies (Chow, 2015; Bongers, 2020; Stern, 2004). This shift is often attributed to the increasing demand for a healthier environment from more affluent populations, who prioritize environmental quality alongside economic growth (McCollough et al., 2016). Understanding the implications of the EKC is essential for evaluating the effectiveness of environmental policies. Countries that have reached higher income levels typically demonstrate more robust environmental protection measures, which can serve as scalable models for developing nations (Alstine & Neumayer, 2008; Mitić et al., 2019). Implementing environmental management strategies during higher stages of development not only bolsters economic resilience but also plays a crucial role in ensuring long-term sustainability in the face of climate change (Shahbaz & Sinha, 2019).

Cost-Benefit Analysis (CBA) complements EKC research by assessing the trade-offs involved in various environmental policies. CBA evaluates the costs associated with implementing these policies against their potential benefits, helping to determine the economic efficiency of different mitigation strategies (Alstine & Neumayer, 2008; Bongers, 2020). This evaluative method underscores the importance of investing in environmental initiatives by highlighting their value relative to costs, ultimately optimizing economic resilience amid environmental challenges (Stern, 2004; Mazur et al., 2015). Dynamic Stochastic General Equilibrium (DSGE) models are valuable tools for simulating economic scenarios influenced by varying climate policies. These models incorporate uncertainty and provide a comprehensive view of how climate initiatives can impact macroeconomic factors such as production, consumption, and employment (Verbeke & Clercq, 2006; Moosa & Burns, 2022). By analyzing the interconnected nature of economic growth and environmental policies, DSGE models help policymakers anticipate potential economic outcomes based on the successful implementation of adaptive strategies (Mazur et al., 2015; Hlongwane & Daw, 2022). These insights collectively underscore the necessity for coordinated policy-making that harmonizes economic and environmental goals, ensuring that growth occurs without compromising environmental sustainability.

This research aims to assess the effectiveness of mitigation and adaptation policies in increasing a country's economic resilience using an evidence-based approach. In the context of increasingly urgent climate change, policies implemented by a country must be able to not only reduce negative environmental impacts, but also ensure economic stability in the long term. Therefore, this research will evaluate various policies that have been implemented in various

countries and measure the extent to which these policies contribute to increasing economic resilience. Apart from that, this research also aims to identify factors that influence the success of mitigation and adaptation policies in the global and national economic context. Factors such as economic stability, political support, technological readiness, and investment in green energy and sustainable infrastructure are important aspects that need to be considered in designing effective policies. By understanding the main determinants that influence the success of these policies, this research can provide deeper insights for policy makers and other stakeholders. Furthermore, this research will provide research-based recommendations regarding the most efficient policy strategies in reducing economic risks due to climate change. These recommendations will be based on empirical findings and comparative analysis of policies from various countries, so that they can serve as a guide for the government in integrating mitigation and adaptation into national economic strategies. Thus, it is hoped that the results of this research can contribute to the development of more effective policies in facing the challenges of climate change and ensuring economic sustainability in the future. Thus, this research not only contributes to the academic literature, but also has practical implications in making more sustainable economic policies in the era of climate change.

2. METHODS

2.1 Research Design

This research uses a Systematic Literature Review (SLR) approach as the main method for evaluating the effectiveness of climate change mitigation and adaptation policies in increasing a country's economic resilience. SLR was chosen because it is able to systematically identify, assess and synthesize published research results, resulting in a more comprehensive understanding of the topic under study. In implementing the SLR, this study adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol to ensure transparency and accuracy in the literature selection process. PRISMA is used as a guide in identifying, filtering, and determining literature that meets predetermined inclusion and exclusion criteria.

2.2 Data Collection

Data collection in this research was carried out by accessing peer-reviewed journal articles from leading academic databases, namely Scopus, Web of Science, dan ScienceDirect. This source selection aims to ensure that only high-quality research is used in the analysis. The specified time range is from years 2008 to 2024, taking into account the latest developments in climate change mitigation and adaptation policies and their relevance to economic resilience.

A literature search was carried out using main keywords, which were arranged based on a combination of the core concepts of this research, namely:

- "climate change economics"
- "mitigation policies"
- "adaptation strategies"
- "economic resilience"

This search was carried out using Boolean operators such as AND and OR to ensure broad coverage but remained relevant to the research being conducted.

2.3 Inclusion and Exclusion Criteria

To ensure that only relevant research is analyzed, several inclusion and exclusion criteria are set as follows:

Inclusion Criteria:

1. Studies that discuss climate change mitigation and adaptation policies and their impact on the economic resilience of a country or region.

2. Articles published in reputable scientific journals and have gone through a peer-review process.
3. Research that uses empirical methodology or economic models that can measure the effectiveness of mitigation and adaptation policies.
4. The study was written in English to ensure accessibility and comparability of data.

Exclusion Criteria:

1. Studies that only focus on the environmental aspects of climate change without considering its impact on the economy.
2. Articles in the form of opinions, editorials, or reports that are not based on empirical analysis.
3. Research that does not provide sufficient data for comparative analysis or meta-synthesis.
4. Studies that only discuss mitigation or adaptation separately without considering their relationship to economic resilience.

2.4 Analysis Approach

Once relevant literature was identified, this research applied two main approaches to data analysis:

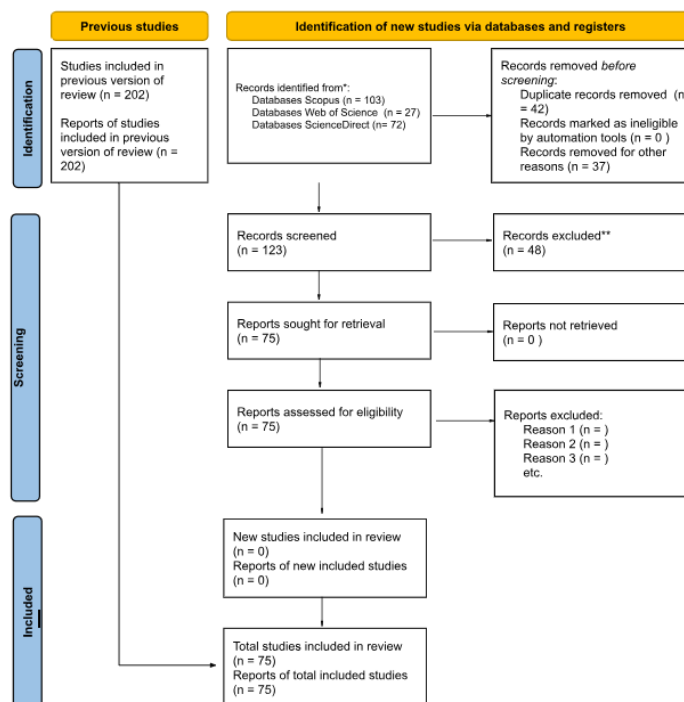
1. Meta-synthesis:

This method is used to identify thematic patterns in the literature that has been collected. The analysis process was carried out by categorizing the results of previous research into main themes, such as the effectiveness of mitigation policies, the impact of adaptation on economic resilience, and economic factors that influence climate change policies. This approach allows the grouping of relevant findings to facilitate comparative analysis between studies. With this method, a synthesis of various studies will produce a more comprehensive understanding of the link between mitigation and adaptation policies and economic resilience. This not only helps in identifying the most effective policy trends, but also provides insight into the factors that contribute to successful policy implementation in various economic and geographic contexts.

2. Comparative Analysis:

This technique is used to compare the effectiveness of mitigation and adaptation policies in various countries or regions that have different economic and social conditions. This analysis aims to identify the success factors and main challenges in implementing policies in various economic contexts, so as to provide a more comprehensive picture of the effectiveness of the strategies implemented. Comparisons are made by evaluating various economic indicators, such as Gross Domestic Product (GDP) growth, financial stability, and the level of investment in green infrastructure. With this approach, research can reveal the extent to which mitigation and adaptation policies contribute to a country's economic resilience and provide evidence-based recommendations for optimizing policy strategies in the future.

This analytical approach allows research to provide evidence-based insights that can be used by policymakers in designing more effective mitigation and adaptation strategies to increase economic resilience to the impacts of climate change.

Table 1. Prisma Diagram

Source: Data Processed, 2025

This PRISMA diagram illustrates the systematic stages of identifying, screening, and including studies in a literature review. This process consists of three main stages: identification, screening, and inclusion.

At the level of identification, there are two main sources of studies used in this review. First, there were 202 studies that were included in previous versions of this review. Second, a search for new studies was carried out through databases such as Scopus (103 studies), Web of Science (27 studies), and ScienceDirect (72 studies). From the results of this search, a total of 123 records were obtained after eliminating 42 duplicate studies and 37 studies that did not meet the criteria for various reasons.

The next level is filtering, where of the 123 records obtained, 48 studies were excluded because they did not meet the established criteria. After this filtering process, 75 reports remained which were then requested for further analysis. All these reports were successfully obtained without any problems. Next, the 75 reports were assessed for suitability for inclusion in the systematic review. However, after going through the evaluation stage, all these reports were excluded based on various reasons, such as non-compliance with the inclusion criteria or relevance to the topic studied.

At the level inclusion, the final results show that no new studies were successfully included in this literature review. Therefore, the total number of studies used in the final review remained 75, originating from the studies in the previous version.

3. RESULTS

3.1 Main Findings

This research identifies that mitigation and adaptation policies to climate change have a crucial role in increasing a country's economic resilience. Based on a systematic review of relevant literature, it was found that mitigation policies tend to focus on reducing carbon emissions and switching to renewable energy, while adaptation policies focus more on

increasing infrastructure resilience and protecting economic sectors from the impacts of climate change.

3.1.1. Mitigation

Carbon taxes serve as a crucial policy instrument designed to internalize the negative externalities associated with carbon emissions. The implementation of carbon taxes in developed countries, notably in Sweden and Canada, has been documented to result in reductions of greenhouse gases without detrimental impacts on economic growth. Aghion et al. (2012) provide insights into how carbon taxes can reshape practices within industries like automotive manufacturing, decreasing emissions while fostering innovation. Moreover, studies indicate that clear pricing mechanisms for carbon emissions can incentivize technological advancements and operational efficiency, further supporting economic growth amidst stringent environmental policies (Aghion et al., 2012).

Emissions trading systems, exemplified by the European Union's Emissions Trading System (EU ETS), have also demonstrated effective results in managing emissions. This system enables businesses to trade permits, fostering a market-driven approach that identifies the most cost-effective paths for emission reductions. According to Skjærseth (Skjærseth, 2010), the revisions to the EU ETS have enhanced its legitimacy and enforced stricter protocols, leading to observable declines in greenhouse gas emissions while maintaining a competitive market environment. This dual benefit of reducing emissions and supporting economic activity underscores the effectiveness of emissions trading as a climate policy mechanism.

Additionally, renewable energy subsidies have emerged as instrumental in facilitating the clean energy transition, driving significant investments in technologies such as solar and wind power. Research indicates that government incentives not only increase capital inflow into renewable sectors but also contribute to job creation (Dahlke et al., 2021; Popp, 2010). For instance, Liu and Li (Liu & Li (2023)) acknowledge that the introduction of Renewable Portfolio Standards has significantly propelled the growth of renewable energy generation, demonstrating that well-implemented subsidies can outperform more traditional financial incentives. Consequently, the proper structuring of renewable energy incentives leads to enhanced renewable capacity and subsequent job creation, affirming the necessity of government support in clean energy transitions (Liu & Li, 2023).

In summary, the strategic combination of carbon taxes, emissions trading, and renewable energy subsidies forms a robust policy framework capable of driving significant reductions in greenhouse emissions while maintaining and even enhancing economic vitality. The interplay between these mechanisms highlights both their individual effectiveness and their complementary roles in achieving sustainable environmental objectives.

3.1.2 Adaptation

In the context of building disaster-resistant infrastructure, including technologies like dams and improved drainage systems, the role of green infrastructure is vital to enhancing economic resilience against climate change. Investing in resilient infrastructure not only provides immediate protection against extreme weather events but also supports long-term economic stability by mitigating risks associated with climate variability. Evidence suggests that nations with robust infrastructure systems are generally better equipped to withstand the economic shocks caused by such environmental changes, thus facilitating recovery and ongoing economic growth in the aftermath of disasters (Pieces, 2019).

In the realm of climate insurance policy, numerous countries have adopted weather index-based insurance schemes designed to shield agricultural sectors from the financial impacts of extreme weather conditions. These innovative insurance instruments operate based on predefined weather parameters instead of actual losses, thereby offering quicker payouts to policyholders and promoting financial stability among farmers. This approach has proven

beneficial in developing nations, where traditional insurance may not be feasible due to high infrastructure costs. Empirical studies have indicated that these index-based insurance products significantly improve income stability for farmers, enabling them to better cope with income volatility due to adverse weather events (Nogales & Olivera, 2019; Miranda & Farrin, 2012).

Economic diversification emerges as an essential strategy for enhancing resilience against climate change, particularly for countries heavily reliant on vulnerable sectors like agriculture and tourism. By expanding into sectors such as manufacturing and information technology, these nations can create a more balanced economic structure that diminishes dependency on climate-sensitive industries. Research indicates that diversified economies are generally more resilient to climate impacts, as they have alternative income sources that can buffer against the potential losses experienced in primary sectors (Hisali et al., 2011; Müller et al., 2011). Furthermore, collaborations between sectors may foster innovation and develop sustainable practices that contribute to overall economic resilience in the face of climate challenges (Bhandary et al., 2021).

In conclusion, integrating robust infrastructure development, innovative climate insurance policies, and economic diversification strategies can significantly enhance a country's resilience to climate change. These interconnected measures not only provide immediate relief in response to climate-related disasters but also promote long-term sustainability and stability in both economic and ecological systems.

3.2 Comparison of Policy Effectiveness

To understand the effectiveness of various mitigation and adaptation policies, comparisons are made between theme implementation in developed and developing countries. Developed countries such as Germany, the United States, and Japan demonstrate a robust financial capacity to implement extensive climate mitigation policies. These nations are capable of deploying significant investments in renewable energy and instituting carbon pricing mechanisms, contributing to long-term economic stability. Specifically, financial support for renewable initiatives and carbon pricing incentivizes businesses and consumers to transition toward greener alternatives, enhancing environmental outcomes and fostering economic resilience. The capacity of these countries to lead global efforts and investments in climate solutions is underscored by research on their financial capabilities and climate policy commitments (Rossi, 2024; Campagnolo & Davide, 2017; Golub et al., 2012).

Conversely, developing countries often face a financial landscape that necessitates a greater emphasis on adaptation rather than direct mitigation policies. This is largely due to limited resources which hinder direct emission reductions. Southeast Asian nations, for instance, emphasize investment in green infrastructure and social protection policies to enhance economic resilience against climate change impacts. Such approaches play a crucial role in building adaptive capacity, addressing immediate vulnerabilities, and promoting sustainable development. Research indicates that ecosystem-based adaptation strategies can yield considerable co-benefits while complementing development goals (Geneletti & Zardo, 2016; Ford et al., 2013). Thus, the focus on adaptation, paired with strategic financing for sustainable infrastructure, represents a pragmatic response to the unique challenges faced by developing nations (Hussein et al., 2013; Ford et al., 2013).

Overall, the situation requires a nuanced understanding of climate policies across different national contexts. While developed countries utilize their financial strength to lead extensive mitigation efforts, developing nations prioritize adaptation strategies that align with their socio-economic realities. This dual approach not only addresses the global climate challenge but also fosters local development and resilience, illustrating the differing priorities dictated by economic capacity (Campagnolo & Davide, 2017; Sebos et al., 2023).

3.3 Determining Factors for Policy Success

The successful implementation of climate change mitigation and adaptation policies is contingent upon several interrelated external factors. A comprehensive examination of the literature suggests that economic stability, political support, and investment in green technology are critical determinants of the effectiveness of these policies.

First, economic stability plays a pivotal role in the allocation of resources necessary for implementing robust climate policies. Research indicates that economically strong countries are better positioned to invest in mitigation strategies and long-term adaptation measures, as they can allocate substantial budgets for implementation and maintenance (Contreras & Platania, 2019). In contrast, nations with fragile economies often struggle to enact comprehensive climate measures due to competing fiscal demands and limited funding sources (Contreras & Platania, 2019; Kalafatis, 2017). Furthermore, the interplay between economic conditions and climate initiatives demonstrates that effective climate policies can indeed stimulate economic growth, highlighting a bidirectional relationship that further emphasizes the importance of economic stability (Digitemie & Ekemezie, 2024; Bhandary et al., 2021).

Political support is another fundamental external factor influencing the success of climate policies. Effective mitigation and adaptation strategies require sustained commitment from political leaders and the private sector, making political stability essential for long-term success (Kalafatis, 2020; Yi & Feiock, 2015; Skea et al., 2021). The literature underscores that consistent regulatory frameworks bolster confidence among investors and stakeholders, thereby facilitating the implementation of climate initiatives. Conversely, political instability can result in abrupt policy shifts that undermine ongoing efforts (Skea et al., 2021; Jung et al., 2022). Moreover, the socio-political context can foster or hinder public support for climate action, which is crucial in shaping policy outcomes (Drews & Bergh, 2015; Rana, 2023).

Investment in green technology further complements the effectiveness of climate policies. As countries ramp up their commitments to low-carbon technologies, research highlights that substantial investments in green technology R&D can lead to lower economic impacts from climate change (Zhu et al., 2019; Matsuo & Schmidt, 2017). Firms that innovate in renewable energy and low-carbon solutions not only contribute to mitigating climate change but also enhance their market competitiveness (Matsuo & Schmidt, 2017). A strategic alignment of hybrid policies that integrate green technology deployment with existing fossil fuel subsidies can optimize outcomes, demonstrating the multifaceted nature of investments in climate solutions (Matsuo & Schmidt, 2017; Heine et al., 2019).

In conclusion, the interconnectedness of economic stability, political support, and investment in green technology is evident in the literature concerning the success of climate change mitigation and adaptation policies. As nations continue to navigate the complexities of climate action, understanding and addressing these external factors will be paramount in advancing effective strategies for sustainable environmental stewardship.

By considering these factors, this research highlights the importance of an evidence-based approach in designing more effective policies to increase economic resilience to climate change.

4. DISCUSSION

4.1 Interpretation of Findings

Climate change mitigation policies are crucial for enhancing long-term economic resilience. Key strategies such as carbon taxes, emissions trading, and renewable energy subsidies can significantly reduce greenhouse gas emissions over time while fostering a transition to a low-carbon economy. These policies require substantial investments in infrastructure and the development of green technologies. Research highlights that effective implementation of these strategies necessitates considerable resource allocations, particularly in the initial phases, to build the required frameworks and technologies (Ağan & Balcılar, 2023;

Tran et al., 2024). For example, significant funding for research and development (R&D) in green technologies and environmental taxation is vital for achieving sustainable economic growth alongside climate change objectives, reiterating the interconnectedness of economic and environmental performance (Ağan & Balçılar, 2023; Tran et al., 2024).

Adaptation policies, on the other hand, focus on immediate economic stability and resilience in the face of climate-induced risks. Strategies such as green infrastructure, climate insurance, and economic diversification help countries mitigate the impacts of climate disasters. Adaptation measures can provide rapid benefits and reduce the economic risks associated with climate events like floods and droughts (Agyepong & Nhamo, 2016). However, the efficacy of these adaptation efforts tends to diminish if they are not aligned with simultaneous mitigation strategies, leading to an overall weaker response to long-term climate change challenges (Surianshah et al., 2024).

The integration of both mitigation and adaptation policies is essential for creating a more resilient economic framework in the face of climate change. Studies suggest that a dual approach not only stabilizes immediate economic conditions but also builds a sustainable foundation for future resilience (Afzal et al., 2024; Antal & Bergh, 2014; Shah et al., 2023). This strategy is particularly critical in developing economies, where resource allocation for both mitigation and adaptation could significantly enhance overall economic viability (You et al., 2022).

In summary, while mitigation policies lay the groundwork for long-term ecological sustainability and economic robustness through significant investments in technology and infrastructure, adaptation strategies provide the necessary cushion for immediate economic stability. A synergistic approach that combines both sets of policies will maximize economic resilience against the multifaceted threats posed by climate change.

4.2 Comparison with Previous Studies

The findings of this study substantiate the Environmental Kuznets Curve (EKC) theory, which posits that wealthier nations are generally more capable of implementing climate change mitigation strategies due to their higher Gross Domestic Product (GDP) levels, granting them greater fiscal resources to finance energy transitions. This theory suggests that as economies develop, they are better positioned to address environmental degradation and invest in sustainability initiatives. Grossman and Krueger (1995) articulated this relationship, indicating that affluence enables nations to allocate more resources towards environmental protection and technological advancements necessary for climate action (Koskimaa et al., 2021; Butt et al., 2024).

The current study offers a novel perspective by emphasizing that a synergistic approach combining mitigation and adaptation strategies yields greater efficacy than employing these strategies in isolation. Prior research frequently treated mitigation and adaptation as distinct entities, thus overlooking the potential synergies that could enhance economic resilience and the capacity to deal with climate change impacts. The Intergovernmental Panel on Climate Change (IPCC) has highlighted the necessity of integrating these strategies, indicating that coordinated efforts can provide more comprehensive solutions to climate challenges and improve overall resilience (Palermo & Yeray, 2020; Parkkinen & Vikström, 2024; Pilato et al., 2018). The importance of an effective policy context for the realization of these strategies has also been established, suggesting that variations in political, social, and economic frameworks significantly influence the success of climate policies across different nations (Aamodt & Stensdal, 2017; Byravan, 2014).

Further supporting this integrated approach, research has shown that policy advocacy coalitions demonstrate varied stances on climate policy across different political contexts, highlighting the need for tailored strategies that account for local governance structures and

resource availability. Studies suggest that adaptation measures tend to receive less focus compared to mitigation strategies, despite their critical role in a balanced climate response (Singh et al., 2023; Ampaire et al., 2024; Lãm et al., 2024). This underscores the importance of acknowledging local contexts and the unique challenges faced by countries at varying levels of development, as these factors considerably shape the feasibility and effectiveness of climate policies (Adelle & Russel, 2013; Rietig, 2013).

4.3 Academic and Practical Implications

From an academic perspective, this research contributes by filling the gap in the literature regarding the effectiveness of mitigation and adaptation policies in an economic context. Using a Systematic Literature Review (SLR) approach and the PRISMA method, this research provides a comprehensive synthesis of how climate change policies affect economic resilience in various countries. This can be a reference for future researchers who want to explore the relationship between environmental and economic policies.

Practically, the findings of this research can serve as a guide for policy makers in designing more effective evidence-based strategies. The government can use the results of this research to allocate resources more optimally between mitigation and adaptation policies. In addition, this research emphasizes that successful policies require strong political support, investment in green technology, and a clear regulatory framework in order to run sustainably.

4.4 Research Limitations

Although this research provides important insights into the effectiveness of mitigation and adaptation policies, there are several limitations that need to be noted. First, this research does not consider microeconomic data in depth. Further analysis is needed to understand how climate change policies affect specific industrial sectors, particularly small and medium enterprises (SMEs), which are often more vulnerable to the impacts of climate change.

Second, limited access to several specific policy studies in developing countries is a challenge in this analysis. Many policies implemented in developing countries have not been well documented in the scientific literature, so this research may not fully reflect the complexity of policy implementation in various economic contexts.

4.5 Recommendations for Future Research

To overcome existing limitations, it is recommended that further research conduct a more in-depth analysis using richer quantitative data regarding the economic impacts of mitigation and adaptation policies. Empirical approaches such as econometric analysis can provide more detailed insights into policy effectiveness based on actual data.

Additionally, specific case studies in different countries can be conducted to compare the effectiveness of policies in different contexts. This research can examine how social, political and economic factors influence policy implementation, as well as identify success factors that can be replicated in other countries. Thus, future research can provide more contextual and applicable recommendations for policy makers at the national and global level.

5. CONCLUSION

5.1 Summary of Findings

This research has examined the effectiveness of mitigation and adaptation policies in dealing with climate change and their impact on economic resilience. Based on the analysis carried out, it was found that mitigation policies, such as carbon taxes, emissions trading, and renewable energy subsidies, have a significant long-term impact on reducing emissions and the transition to a low-carbon economy. However, implementing this policy requires large initial investment and consistent policy support to run effectively.

On the other hand, adaptation policies, such as green infrastructure development, climate insurance policies, and economic diversification, show faster results in increasing economic resilience to climate change risks. However, adaptation policies are often less than optimal if they are not integrated with mitigation policies. These findings underscore the importance of a holistic approach in facing the challenge of climate change by balancing mitigation and adaptation strategies.

Furthermore, the effectiveness of this policy is strongly influenced by various external factors, including economic stability, strong political support, and investment in green technology. Countries with stable economic policies and a commitment to environmental investment tend to be more successful in implementing effective and sustainable climate change policies.

5.2 Contribution to Economics This research makes an important contribution to the field of environmental economics by offering new insights into the interactions between climate change policy and economic resilience. By adopting an approach *Systematic Literature Review (SLR)* Based on the PRISMA method, this research succeeded in identifying the most effective policy patterns in the global economic context. The main contribution of this research lies in developing understanding regarding the optimal combination of mitigation and adaptation policies. In the context of economic theory, this research also supports the idea *Environmental Kuznets Curve (EKC)* which states that countries with higher economic levels tend to be more able to adopt ambitious mitigation policies. Additionally, this research provides a conceptual basis for evidence-based decision making (*evidence-based policymaking*) in designing more effective and sustainable green economic policies.

5.3 Policy Implications The findings of this research have important implications for policy makers in designing more adaptive and sustainable economic strategies. Governments in various countries need to consider integrating mitigation and adaptation policies as part of national economic strategies to increase resilience to climate change risks.

Some strategic steps that can be taken include:

- Investment in renewable energy: The development of clean energy technologies, such as solar and wind power, can reduce dependence on fossil fuels and increase national energy security.
- Improved green infrastructure: Sustainable city development with environmentally friendly transportation systems and good water management will increase economic resilience to climate change.
- Carbon tax regulation and emissions trading: Implementing an effective carbon tax and developing a transparent emissions trading system can encourage the transition to a low-carbon economy without hampering economic growth.
- Incentives for green technology innovation: The government can provide subsidies or tax incentives for companies that invest in environmentally friendly technology, thereby speeding up the process of adopting innovation in the industrial sector.

5.4 Recommendations for Further Research

Although this research has provided broad insight into the effectiveness of mitigation and adaptation policies, there are several limitations that can form the basis for further research. One aspect that needs to be expanded is the use of quantitative economic models to project the impact of mitigation and adaptation policies in the long term. This model can help identify more accurate economic scenarios based on macroeconomic variables such as GDP growth, inflation rate and green investment.

In addition, more in-depth empirical studies in various countries are needed to understand the specific dynamics of climate change policy implementation. Data-based case

studies from various countries, both developed and developing countries, can provide a more comprehensive understanding of the factors that influence the success of a policy. Thus, future research can provide more precise recommendations in designing policies that are not only environmentally effective, but also optimal in the global economic context.

By considering these aspects, it is hoped that this research can become a basis for developing more effective and sustainable green economic policies, as well as encourage more academic studies that focus on the integration of mitigation and adaptation strategies in facing the challenges of climate change in the future.

6. REFERENCES

- Aamodt, S. and Stensdal, I. (2017). Seizing policy windows: policy influence of climate advocacy coalitions in brazil, china, and india, 2000–2015. *Global Environmental Change*, 46, 114-125. <https://doi.org/10.1016/j.gloenvcha.2017.08.006>
- Acharibasam, J. and Datta, R. (2023). Enhancing community resilience to climate change disasters: learning experience within and from sub-saharan black immigrant communities in western canada. *Sustainable Development*, 32(2), 1401-1411. <https://doi.org/10.1002/sd.2677>
- Adelle, C. and Russel, D. (2013). Climate policy integration: a case of déjà vu?. *Environmental Policy and Governance*, 23(1), 1-12. <https://doi.org/10.1002/eet.1601>
- Afzal, A., Abaidi, J., Firdousi, S., & Noor, R. (2024). Climate change and the european banking sector: the effect of green technology adaptation and human capital. *Review of Accounting and Finance*, 23(3), 394-418. <https://doi.org/10.1108/raf-10-2023-0341>
- Ağan, B. and Balçılar, M. (2023). Unraveling the green growth matrix: exploring the impact of green technology, climate change adaptation, and macroeconomic factors on sustainable development. *Sustainability*, 15(11), 8530. <https://doi.org/10.3390/su15118530>
- Aghion, P., Dechezleprêtre, A., Hémous, D., Martin, R., & Reenen, J. (2012). Carbon taxes, path dependency and directed technical change: evidence from the auto industry. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2184830>
- Agyepong, A. and Nhamo, G. (2016). Green procurement in south africa: perspectives on legislative provisions in metropolitan municipalities. *Environment Development and Sustainability*, 19(6), 2457-2474. <https://doi.org/10.1007/s10668-016-9865-9>
- Allarané, N., Azagoun, V., Atchadé, A., Hetcheli, F., & Atela, J. (2023). Urban vulnerability and adaptation strategies against recurrent climate risks in central africa: evidence from n'djaména city (chad). *Urban Science*, 7(3), 97. <https://doi.org/10.3390/urbansci7030097>
- Alstine, J. and Neumayer, E. (2008). The environmental kuznets curve.. <https://doi.org/10.4337/9781848446045.00011>
- Ampaire, E., Mwongera, C., Marois, I., & Kinuya, I. (2024). Climate change integration and budgeting in national and subnational policies in tanzania and uganda.. <https://doi.org/10.21203/rs.3.rs-4684680/v1>
- Antal, M. and Bergh, J. (2014). Green growth and climate change: conceptual and empirical considerations. *Climate Policy*, 16(2), 165-177. <https://doi.org/10.1080/14693062.2014.992003>
- Bhandary, R., Gallagher, K., & Fang, Z. (2021). Climate finance policy in practice: a review of the evidence. *Climate Policy*, 21(4), 529-545. <https://doi.org/10.1080/14693062.2020.1871313>
- Bongers, A. (2020). The environmental kuznets curve and the energy mix: a structural estimation. *Energies*, 13(10), 2641. <https://doi.org/10.3390/en13102641>

- Bouramdane, A. (2024). Shaping resilient buildings and cities: climate change impacts, metrics, and strategies for mitigation and adaptation. *Infor. Syst. Smart. City*, 3(1). <https://doi.org/10.59400/issc.v3i1.190>
- Butt, A., Zia, A., Ali, R., & Zaheer, A. (2024). Comparative analysis of climate change policies: pakistan vs. global approaches. *Journal of Climate Policy*, 3(1), 45-61. <https://doi.org/10.47941/jcp.2016>
- Byravan, S. (2014). Climate policy and the poor: some perspectives. *Environmental Justice*, 7(5), 142-145. <https://doi.org/10.1089/env.2014.0011>
- Campagnolo, L. and Davide, M. (2017). Can the paris deal boost sdgs achievement? an assessment of climate mitigation co-benefits or side-effects on poverty and inequality. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3038713>
- Chow, G. (2015). Environmental kuznets curve., 159-167. https://doi.org/10.1142/9789814390408_0010
- Contreras, G. and Platania, F. (2019). Economic and policy uncertainty in climate change mitigation: the london smart city case scenario. *Technological Forecasting and Social Change*, 142, 384-393. <https://doi.org/10.1016/j.techfore.2018.07.018>
- Daher, B., Hamie, S., Pappas, K., Karim, M., & Thomas, T. (2021). Toward resilient water-energy-food systems under shocks: understanding the impact of migration, pandemics, and natural disasters. *Sustainability*, 13(16), 9402. <https://doi.org/10.3390/su13169402>
- Dahlke, S., Sterling, J., & Meehan, C. (2021). Policy and market drivers for advancing clean energy., 451-485. <https://doi.org/10.1016/b978-0-12-821221-9.00012-8>
- Digitemie, W. and Ekemezie, I. (2024). Assessing the role of carbon pricing in global climate change mitigation strategies. *Magna Scientia Advanced Research and Reviews*, 10(2), 022-031. <https://doi.org/10.30574/msarr.2024.10.2.0040>
- Drews, S. and Bergh, J. (2015). What explains public support for climate policies? a review of empirical and experimental studies. *Climate Policy*, 16(7), 855-876. <https://doi.org/10.1080/14693062.2015.1058240>
- Du, M., Liu, Q., MacDonald, G., Liu, Y., Lin, J., Cui, Q., ... & Liu, Y. (2022). Examining the sensitivity of global co2 emissions to trade restrictions over multiple years. *Environmental Science & Technology Letters*, 9(4), 293-298. <https://doi.org/10.1021/acs.estlett.2c00127>
- Durán-Sandoval, D., Uleri, F., Romero, G., & López, A. (2023). Food, climate change, and the challenge of innovation. *Encyclopedia*, 3(3), 839-852. <https://doi.org/10.3390/encyclopedia3030060>
- Ekechukwu, D. and Simpa, P. (2024). A comprehensive review of renewable energy integration for climate resilience. *Engineering Science & Technology Journal*, 5(6), 1884-1908. <https://doi.org/10.51594/estj.v5i6.1187>
- Favas, C., Cresta, C., Whelan, E., Smith, K., Manger, M., Chandrasenage, D., ... & Goudet, S. (2024). Exploring food system resilience to the global polycrisis in six asian countries. *Frontiers in Nutrition*, 11. <https://doi.org/10.3389/fnut.2024.1347186>
- Ford, J., Berrang-Ford, L., Lesnikowski, A., Barrera, M., & Heymann, J. (2013). How to track adaptation to climate change: a typology of approaches for national-level application. *Ecology and Society*, 18(3). <https://doi.org/10.5751/es-05732-180340>
- Geneletti, D. and Zardo, L. (2016). Ecosystem-based adaptation in cities: an analysis of european urban climate adaptation plans. *Land Use Policy*, 50, 38-47. <https://doi.org/10.1016/j.landusepol.2015.09.003>
- Golub, A., Henderson, B., Hertel, T., Gerber, P., Rose, S., & Sohngen, B. (2012). Global climate policy impacts on livestock, land use, livelihoods, and food security. *Proceedings of the National Academy of Sciences*, 110(52), 20894-20899. <https://doi.org/10.1073/pnas.1108772109>

- He, X., Yan, J., Yang, L., Wang, J., Zhou, H., & Lin, X. (2024). Linking smallholders' livelihood resilience with their adaptation strategies to climate impacts: insights from the tibetan plateau. *Ecology and Society*, 29(2). <https://doi.org/10.5751/es-14639-290207>
- Heine, D., Semmler, W., Mazzucato, M., Braga, J., Flaherty, M., Gevorkyan, A., ... & Radpour, S. (2019). Financing low-carbon transitions through carbon pricing and green bonds. *Quarterly Issues on Economic Research*, 88(2), 29-49. <https://doi.org/10.3790/vjh.88.2.29>
- Hisali, E., Birungi, P., & Buyinza, F. (2011). Adaptation to climate change in uganda: evidence from micro level data. *Global Environmental Change*, 21(4), 1245-1261. <https://doi.org/10.1016/j.gloenvcha.2011.07.005>
- Hlongwane, N. and Daw, O. (2022). Testing environmental kuznets curve hold in south africa: an econometric approach. *International Journal of Energy Economics and Policy*, 12(3), 385-394. <https://doi.org/10.32479/ijeeep.12875>
- Hussein, Z., Hertel, T., & Golub, A. (2013). Climate change mitigation policies and poverty in developing countries. *Environmental Research Letters*, 8(3), 035009. <https://doi.org/10.1088/1748-9326/8/3/035009>
- Jung, S., Kim, H., Kang, Y., & Jeong, E. (2022). Analysis of korea's green technology policy and investment trends for the realization of carbon neutrality: focusing on ccus technology. *Processes*, 10(3), 501. <https://doi.org/10.3390/pr10030501>
- Kalafatis, S. (2017). Identifying the potential for climate compatible development efforts and the missing links. *Sustainability*, 9(9), 1642. <https://doi.org/10.3390/su9091642>
- Kalafatis, S. (2020). Socioeconomic reinvention and expanding engagement with climate change policy in american rust belt cities. *Atmosphere*, 11(12), 1327. <https://doi.org/10.3390/atmos11121327>
- Khee, P. (2014). The economic impact of climate change on food security in malaysia. *International Journal of Academic Research*, 6(3), 195-199. <https://doi.org/10.7813/2075-4124.2014/6-3/b.29>
- Koskimaa, V., Rapeli, L., & Hiedanpää, J. (2021). Governing through strategies: how does finland sustain a future-oriented environmental policy for the long term?. *Futures*, 125, 102667. <https://doi.org/10.1016/j.futures.2020.102667>
- Kousky, C. (2019). The role of natural disaster insurance in recovery and risk reduction. *Annual Review of Resource Economics*, 11(1), 399-418. <https://doi.org/10.1146/annurev-resource-100518-094028>
- Lâm, S., Novović, G., Skinner, K., & Nguyen-Viet, H. (2024). Greener through gender: what climate mainstreaming can learn from gender mainstreaming. *Wiley Interdisciplinary Reviews Climate Change*, 15(4). <https://doi.org/10.1002/wcc.887>
- Liu, C. and Li, Q. (2023). Air pollution, global warming and difficulties to replace fossil fuel with renewable energy. *Atmospheric and Climate Sciences*, 13(04), 526-538. <https://doi.org/10.4236/acs.2023.134030>
- Matsuo, T. and Schmidt, T. (2017). Hybridizing low-carbon technology deployment policy and fossil fuel subsidy reform: a climate finance perspective. *Environmental Research Letters*, 12(1), 014002. <https://doi.org/10.1088/1748-9326/aa5384>
- Mazur, A., Phutkaradze, Z., & Phutkaradze, J. (2015). Economic growth and environmental quality in the european union countries – is there evidence for the environmental kuznets curve?. *International Journal of Management and Economics*, 45(1), 108-126. <https://doi.org/10.1515/ijme-2015-0018>
- McCollough, J., He, M., & Bayramoğlu, A. (2016). Pollution havens and their relationship to the environmental kuznets curve: the case of the us tyre industry. *Economic Affairs*, 36(3), 258-272. <https://doi.org/10.1111/ecaf.12202>
- Miranda, M. and Farrin, K. (2012). Index insurance for developing countries. *Applied Economic Perspectives and Policy*, 34(3), 391-427. <https://doi.org/10.1093/aep/pps031>

- Mitić, P., Kresoja, M., & Minović, J. (2019). A literature survey of the environmental kuznets curve. *Economic Analysis*, 52(1), 109-127. <https://doi.org/10.28934/ea.19.52.12.pp109-127>
- Monteiro, A., Ankrah, J., Madureira, H., & Pacheco, M. (2022). Climate risk mitigation and adaptation concerns in urban areas: a systematic review of the impact of ipcc assessment reports. *Climate*, 10(8), 115. <https://doi.org/10.3390/cli10080115>
- Moosa, I. and Burns, K. (2022). The energy kuznets curve: evidence from developed and developing economies. *The Energy Journal*, 43(6), 47-70. <https://doi.org/10.5547/01956574.43.6.imoo>
- Müller, C., Crämer, W., Hare, B., & Lotze-Campen, H. (2011). Climate change risks for african agriculture. *Proceedings of the National Academy of Sciences*, 108(11), 4313-4315. <https://doi.org/10.1073/pnas.1015078108>
- Newton, A., Johnson, S., & Gregory, P. (2011). Implications of climate change for diseases, crop yields and food security. *Euphytica*, 179(1), 3-18. <https://doi.org/10.1007/s10681-011-0359-4>
- Nogales, R. and Olivera, P. (2019). On the advantages and feasibility of weather index-based crop insurance schemes in bolivia. *Emerging Markets Finance and Trade*, 58(1), 195-213. <https://doi.org/10.1080/1540496x.2019.1677226>
- Nur, D., Nurwulandari, A., & Hasanudin, E. (2024). Enhancing climate resilience: a systematic review of community-based and knowledge-attitude-practice approaches to adaptation strategies. *Asian Journal of Economics Business and Accounting*, 24(9), 1-11. <https://doi.org/10.9734/ajeba/2024/v24i91473>
- Palermo, V. and Yeray, H. (2020). Group discussions on how to implement a participatory process in climate adaptation planning: a case study in malaysia. *Ecological Economics*, 177, 106791. <https://doi.org/10.1016/j.ecolecon.2020.106791>
- Parkkinen, M. and Vikström, S. (2024). Alternative policy narratives of the future of climate change: analyzing finland's energy and climate strategy and news reports. *Review of Policy Research*, 41(4), 635-653. <https://doi.org/10.1111/ropr.12602>
- Pilato, G., Sallu, S., & Gaworek-Michalczenia, M. (2018). Assessing the integration of climate change and development strategies at local levels: insights from muheza district, tanzania. *Sustainability*, 10(1), 174. <https://doi.org/10.3390/su10010174>
- Popp, D. (2010). Innovation and climate policy. *Annual Review of Resource Economics*, 2(1), 275-298. <https://doi.org/10.1146/annurev.resource.012809.103929>
- Rana, S. (2023). The effectiveness of current national policies on integrated forest management and climate change: systematic literature review (slr). *Pakistan Journal of Social Research*, 05(03), 15-19. <https://doi.org/10.52567/pjsr.v5i03.1323>
- Rietig, K. (2013). Sustainable climate policy integration in the european union. *Environmental Policy and Governance*, 23(5), 297-310. <https://doi.org/10.1002/eet.1616>
- Rossi, A. (2024). Evaluation of climate change mitigation policies in developed vs developing countries. *International Journal of Climatic Studies*, 3(2), 46-56. <https://doi.org/10.47604/ijcs.2690>
- Sebos, I., Progiou, A., & Kallinikos, L. (2023). Methodological framework for the quantification of ghg emission reductions from climate change mitigation actions. *Strategic Planning for Energy and the Environment*. <https://doi.org/10.13052/spee1048-4236.391411>
- Shah, S., Jirakiattikul, S., Techato, K., & Mudbhari, B. (2023). A systematic review on nexus between green finance and climate change: evidence from china and india. *International Journal of Energy Economics and Policy*, 13(4), 599-613. <https://doi.org/10.32479/ijeepp.14331>
- Shahbaz, M. and Sinha, A. (2019). Environmental kuznets curve for co2 emissions: a literature survey. *Journal of Economic Studies*, 46(1), 106-168. <https://doi.org/10.1108/jes-09-2017-0249>

- Shaw, K. and Maythorne, L. (2012). Managing for local resilience: towards a strategic approach. *Public Policy and Administration*, 28(1), 43-65. <https://doi.org/10.1177/0952076711432578>
- Singh, Y., Brahmacharimayum, B., Singh, A., & Devi, S. (2023). Assessment of vulnerability to climate variability in manipur, india. *jrtdd*. <https://doi.org/10.53555/jrtdd.v6i1.2669>
- Skea, J., Shukla, P., Khourdajie, A., & McCollum, D. (2021). Intergovernmental panel on climate change: transparency and integrated assessment modeling. *Wiley Interdisciplinary Reviews Climate Change*, 12(5). <https://doi.org/10.1002/wcc.727>
- Skjærseth, J. (2010). Eu emissions trading: legitimacy and stringency. *Environmental Policy and Governance*, 20(5), 295-308. <https://doi.org/10.1002/eet.541>
- Stern, D. (2004). The rise and fall of the environmental kuznets curve. *World Development*, 32(8), 1419-1439. <https://doi.org/10.1016/j.worlddev.2004.03.004>
- Su, Q., Chang, H., & Pai, S. (2022). A comparative study of the resilience of urban and rural areas under climate change. *International Journal of Environmental Research and Public Health*, 19(15), 8911. <https://doi.org/10.3390/ijerph19158911>
- Surianshah, S., Hassan, S., & Liwan, A. (2024). The effect of green technology policy on climate change awareness of youth in sabah, malaysia. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, 43(2), 42-51. <https://doi.org/10.37934/araset.43.2.4251>
- Tran, N., Nguyen, T., Tran, T., Diep, G., Nguyen, T., & Nguyen, T. (2024). Environmental outlook of asean-5 through the lens of green bonds, environmental technologies and financialization. *International Journal of Engineering Business Management*, 16. <https://doi.org/10.1177/18479790241238129>
- Verbeke, T. and Clercq, M. (2006). The income–environment relationship: evidence from a binary response model. *Ecological Economics*, 59(4), 419-428. <https://doi.org/10.1016/j.ecolecon.2005.11.011>
- Yi, H. and Feiock, R. (2015). Climate action plan adoptions in the us states. *International Journal of Climate Change Strategies and Management*, 7(3), 375-393. <https://doi.org/10.1108/ijccsm-02-2014-0019>
- Zhu, J., Fan, Y., Deng, X., & Xue, L. (2019). Low-carbon innovation induced by emissions trading in china. *Nature Communications*, 10(1). <https://doi.org/10.1038/s41467-019-12213-6>