

Transglobal Leadership as a Framework for Environmental Policy Diplomacy in Addressing Transboundary Forest Fire Impacts: Evidence from Malaysia and Indonesia

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Abstract

Transboundary forest fires remain one of Southeast Asia's most persistent ecological and diplomatic challenges. Despite the mechanisms in place under the ASEAN Agreement on Transboundary Haze Pollution (AATHP), regional responses remain largely voluntary and norm-driven with limited enforcement capacity. The study proposes transglobal leadership as a strategic framework to strengthen cross-border environmental policy diplomacy. The research uses a qualitative descriptive approach complemented by bibliometric mapping of scientific publications for the period 2015–2025. Empirical data was collected through the analysis of policy documents, official reports of the governments of Indonesia and Malaysia, ASEAN publications, as well as various academic studies relevant to the governance of forest fires and cross-border haze. This research identifies the evolving intellectual landscape of transglobal leadership and its application to environmental governance. The findings show that effective cross-border haze management requires five core leadership values, namely strategic global vision, adaptive resilience, ethical responsibility, collaborative diplomacy, and knowledge-based innovation operationalized through adaptive, integrative, and collaborative mechanisms. Empirical evidence from Malaysia-Indonesia cooperation shows partial progress in institutionalized coordination and shared environmental norms, but also highlights the need for more binding accountability and the strengthening of polycentric governance. The study concludes that integrating transglobal leadership values into ASEAN's environmental diplomacy has the potential to transform regional haze management from reactive coordination to proactive, collaborative, and knowledge-based ecological governance.

1. Introduction

Forest fires and transboundary haze pollution have become complex environmental issues in the Southeast Asian region (Hamim et al., 2023). Forest fire events represent a regional problem because they affect not only ecological and social domains but also diplomatic relations among Southeast Asian countries. This occurs because forest fires almost always produce haze that can cross national territorial boundaries. This phenomenon was clearly illustrated in data from the ASEAN Specialised Meteorological Centre (ASMC) dated July 29, 2025 which showed the distribution pattern of haze with dense hotspots in West Kalimantan, Central Kalimantan, and Riau, as well as dominant southwesterly and westerly winds pushing the haze toward Sarawak, Brunei Darussalam, and southern Peninsular Malaysia (Fig. 1). These meteorological conditions indicate an increased potential for transboundary haze which affects air quality and visibility in Malaysian urban areas such as Kuching, Johor Bahru, and Kuala Lumpur.

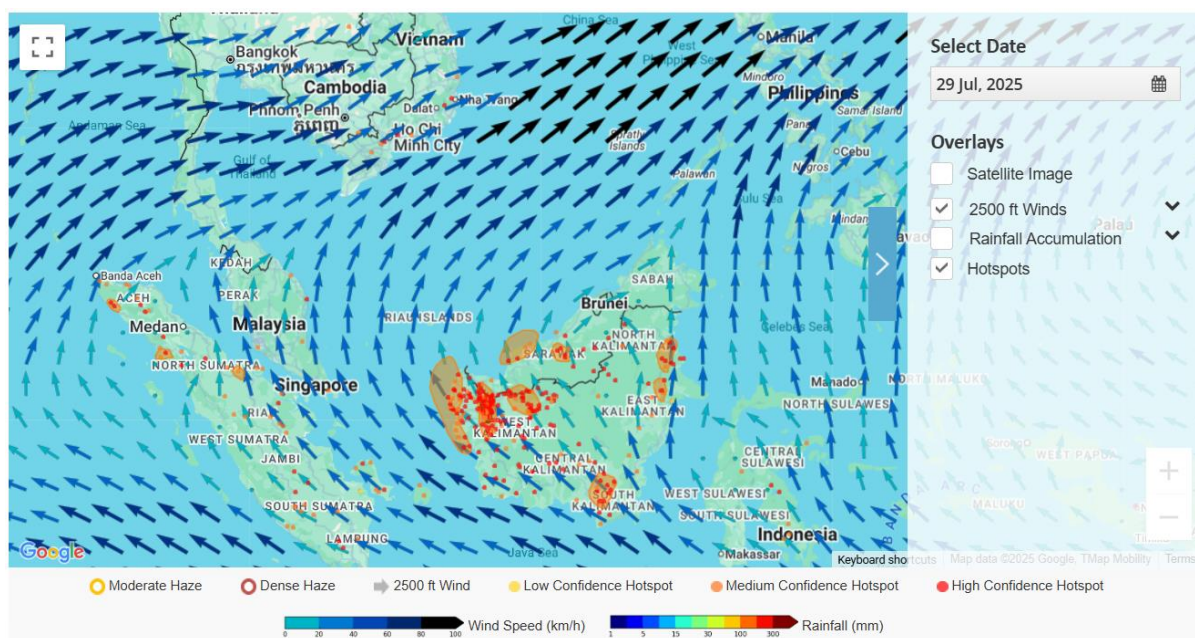


Fig. 1 Pattern of haze distribution and hotspots source: Asean Specialised Meteorological Centre (2025)

The wind pattern and hotspot density in late July 2025 indicate that haze is not a relatively new phenomenon. The haze results from recurring land burning in peatland and plantation areas in Malaysia and Indonesia, directly impacting neighboring countries. Although mitigation and management efforts have been enhanced, forest fires remain largely uncontrolled and appear to be increasing in intensity and recurring periodically due to various factors such as climatic conditions, improper peatland management, traditional slash-and-burn practices, and poor water management (Chew et al., 2021).

Southeast Asia has experienced major haze crises in 2015 and 2019 which led to air quality index levels reaching hazardous levels (Chew et al., 2022). Transboundary haze events were identified between September 4–21, 2019 in Central and West Kalimantan where haze spread to Malaysia, particularly Sarawak; and between September 10–23, 2019 in Riau, Jambi, and South Sumatera where haze reached Singapore and Peninsular Malaysia.

The transboundary haze phenomenon is closely correlated with the increased tree cover loss due to fires in the Southeast Asian region. Based on Global Forest Watch data for the ASEAN region (2001–2024), Indonesia recorded tree cover loss due to fire of approximately 2.97 million hectares, while Malaysia lost about 173,000 hectares. These figures are the highest in ASEAN followed by Myanmar (49,500 ha) and Cambodia (28,300 ha). Most tree cover loss in Indonesia occurred in peatlands and plantation areas in Kalimantan and Sumatera whereas in Malaysia it was concentrated in Sabah and Sarawak. When including all sources of loss (both fire and non-fire related), Indonesia has lost about 29 million hectares of forested area, while Malaysia has lost about 9.34 million hectares. Several studies affirm that most fires occur within the concession areas of oil palm and industrial plantation companies that have financial ties to entities in Malaysia and Singapore (Indrasari, 2023; Luerdi, 2021).



Fig. 2 Extent of tree cover loss source: *Global Forest Watch (2024)*

Despite the vast burned areas and significant damage caused, many of the affected lands belong to companies affiliated with Singapore and Malaysia (Indrasari, 2023). Their involvement extends beyond land management into complex and opaque cross-border business networks, making direct legal enforcement difficult. Ironically, ASEAN countries most affected by fires and haze pollution have exerted minimal pressure on companies based within their own jurisdictions. Some companies received only minor administrative sanctions such as replanting obligations, without license revocations or actual legal proceedings. Yet, most fires occur repeatedly on the same lands indicating negligence or even deliberate acts that should be subject to legal action.

The weak enforcement of laws against land-burning companies demonstrates a lack of commitment and cross-border coordination in addressing forest and land fires. Although there is an agreement on haze pollution management through the *ASEAN Agreement on Transboundary Haze Pollution (AATHP)*, the mechanism is voluntary (non-binding) and does not impose strict sanctions (Choir, 2018). As a result, companies whose lands burn repeatedly continue operating as usual. Singapore has enacted the *Transboundary Haze Pollution Act (THPA)* but its implementation remains ineffective due to limited concession data transparency and poor inter-country coordination (Faradiba, 2024).

This situation also illustrates that forest fire and haze problems persist due to weak policy diplomacy and the absence of a cross-border leadership framework. Failures in transnational environmental governance are often characterized by fragmented actors and weak law enforcement. Moreover, the outputs of cooperative programs in environmental governance often focus more on technical reporting and accountability than on institutional development and long-term strategy (Kramarz & Park, 2016). This aligns with Kanie & Biermann (2017) critique of bilateral cooperation models that have yet to address systemic sustainability governance challenges.

Therefore, Varkkey (2022) argues that the haze problem in Southeast Asia must be viewed as a transboundary governance challenge, involving resource linkages that cross national borders and engage multiple levels of government. Singapore's experience as a country without major peat fires but suffering acute haze impacts demonstrates how transboundary publics can play a role in fostering *emergent governance* of transboundary haze. In this context, the concept of *transglobal leadership* becomes relevant to understanding how negotiation, commitment, and shared responsibility among ASEAN countries can be built through more collaborative environmental policy diplomacy.

Although the issue of forest fires and transboundary haze has been widely studied in the perspective of environmental governance, ASEAN regional diplomacy, and the effectiveness of the ASEAN Agreement on Transboundary Haze Pollution (AATHP), most research still focuses on institutional aspects, state compliance, and regulatory instruments in forest fire control (Varkkey, 2022; Faradiba, 2024). Studies that place leadership as a strategic variable in building cross-border collaboration are still relatively limited, especially in explaining how state actors can develop diplomacy mechanisms that are able to go beyond national interests and encourage shared responsibility for regional environmental management. Thus, there is a research gap related to understanding the role of leadership models in strengthening transnational environmental governance and overcoming the limitations of the regulatory approach that has been applied.

Transglobal leadership emphasizes the ability to think and act beyond national and cultural boundaries by prioritizing collaboration, empathy, global responsibility, and sustainability ethics (Sedarmayanti et al., 2020). A

transglobal leader possesses cross-cultural intelligence, the ability to bridge diverse actors, and the courage to make decisions within dual jurisdictions and multinational interests (Sharkey et al., 2012; Subakti & Arquisola, 2022). In the context of transboundary forest fires, this approach can strengthen adaptive and collaborative policy diplomacy for instance, through real-time satellite data exchange, joint hotspot monitoring, cross-border peatland restoration, and concession ownership transparency. Diplomacy can thus serve not only as a tool for resolving temporary conflicts but also for building a sustainable environmental policy foundation.

Therefore, it is crucial to analyze how the *transglobal leadership* model can serve as a strategic alternative for formulating effective bilateral policies between Indonesia and Malaysia, particularly in addressing the impacts of forest fires.

In this context, the concept of transglobal leadership offers a new perspective that has not been widely used in the study of environmental diplomacy in Southeast Asia. In contrast to conventional governance approaches that focus on institutional compliance, transglobal leadership emphasizes the capacity of actors to build a shared vision, manage competing interests, and create collaboration across countries, sectors, and cultures in the face of global challenges. This approach allows for a more comprehensive analysis of how Indonesia and Malaysia can strengthen environmental diplomacy through policy coordination, information exchange, concession ownership transparency, and mutual accountability mechanisms in the fight against forest fires and cross-border haze.

This study is significant for assessing how far the political diplomacy of both countries can transform in facing ecological challenges through a more holistic and future-oriented leadership approach. Accordingly, this article aims to examine how the *transglobal leadership* model can serve as a framework for environmental policy diplomacy between Malaysia and Indonesia in addressing the recurring impacts of transboundary forest fires.

Based on this background, this study is directed to answer the following questions: (1) why has the existing cooperation mechanism not been able to effectively address forest fires and cross-border haze pollution between Indonesia and Malaysia?; and (2) how can the transglobal leadership model serve as a more effective framework for environmental policy diplomacy in strengthening Indonesia-Malaysia bilateral collaboration in addressing transboundary forest fires? To answer this question, this study integrates bibliometric analysis and qualitative analysis. Bibliometric analysis is used to map publication developments, research trends, collaboration networks, as well as key themes that are developing in the study of forest fires, cross-border haze, environmental diplomacy, and transglobal leadership. The bibliometric findings then became the basis for qualitative analysis to identify research gaps, interpret the dynamics of cross-border environmental governance, and evaluate the relevance of the concept of transglobal leadership as a framework for policy diplomacy between Indonesia and Malaysia. Thus, the bibliometric results not only serve as a mapping of the literature, but also serve as an empirical basis in the development of argumentation and qualitative interpretation of this research.

2. Method

This research employs a qualitative-descriptive approach to deeply understand the social, political, and institutional dynamics shaping environmental diplomacy practices between Malaysia and Indonesia in response to recurring forest and peatland fires. The qualitative approach is chosen for its capacity to explore interpretive meanings, institutional behaviors, and inter-actor interactions that cannot be adequately captured through quantitative methods (Creswell & Creswell, 2017). The study aims to analyze how the transglobal leadership model can function as a strategic framework for cross-border environmental governance and climate diplomacy in Southeast Asia. As a complement to the qualitative analysis, this study also utilizes bibliometric analysis to map the development of the literature, research trends, scientific collaboration networks, and the interconnectedness of key concepts related to cross-border forest fires, environmental diplomacy, and transglobal leadership. Bibliometric analysis serves as a preliminary analytical stage for establishing the study's novelty and theoretical contribution. Therefore, bibliometric results are not used as the final goal of the research but rather as a basis for identifying dominant themes, research gaps, and the direction of development of academic discourse which are then further interpreted through qualitative analysis. Thus, the bibliometric findings serve as a conceptual mapping framework that strengthens the process of analyzing and interpreting qualitative data, resulting in a more comprehensive understanding of the challenges and opportunities for strengthening environmental cooperation between Indonesia and Malaysia.

2.1 Research Design

This study adopts a descriptive analytical design, combining conceptual observation with document analysis to describe, interpret, and critically evaluate the phenomenon of transboundary haze diplomacy. Through this approach, the study connects the case of bilateral cooperation between Malaysia and Indonesia with the conceptual dimensions of transglobal leadership. The analysis is directed toward identifying patterns of collaboration, ethical responsibility, and policy adaptation in regional environmental diplomacy.

2.2 Data Collection Techniques

Data was collected through literature review, encompassing a wide range of scientific and policy sources. The data sources include reputable peer-reviewed journals, policy reports, government documents, conference proceedings, and credible digital archives. Literature selection was conducted through purposive sampling, considering thematic relevance, publication quality, and scholarly contribution to the discourse on environmental diplomacy and global leadership. To strengthen analytical rigor and the validity of findings, the study also integrates a bibliometric analysis as a complementary method to map the intellectual landscape of the research topic. The steps include:

- Extracting bibliographic data using the *Publish or Perish (PoP)* software with the keyword “transglobal leadership.”
- Citation analysis to identify publication trends, key authors, influential journals, and scholarly citation networks.
- Data visualization using *VOSviewer* to build maps of keyword co-occurrence, author collaboration, and thematic clusters in the related literature.

The integration of qualitative and bibliometric approaches follows a mixed analytical logic based on interpretive and scientific mapping, ensuring methodological rigor and transparency throughout the analytical process.

2.3 Data Analysis Procedure

The data analysis process was conducted iteratively through three interrelated stages, allowing the researcher to build a deeper and more comprehensive understanding of Malaysia-Indonesia environmental diplomacy within the framework of transglobal leadership.

- **Conceptual Coding and Thematic Categorization:** a systematic process of organizing qualitative data according to key analytical themes derived from theoretical review. All literature, policy documents, and bibliometric mapping results were classified into thematic categories such as transglobal leadership values, environmental diplomacy mechanisms and cross-border policy outcomes. Open coding was applied followed by reduction into core categories representing conceptual relationships among variables. This step served as the foundation for linking empirical findings with theoretical constructs.
- **Interpretive Analysis** focused on interpreting the meaning and relationships among concepts. This stage examined the connection between Malaysia-Indonesia environmental cooperation practices and transglobal leadership principles such as adaptive resilience, ethical responsibility, and collaborative diplomacy. The analysis followed a hermeneutic approach, reinterpreting the socio-political and diplomatic contexts underlying both countries’ environmental policies. This approach revealed how leadership values are translated into decisions, collaborations and cross-national commitments.
- **Bibliometric Synthesis** aimed to reinforce conceptual analysis through data-driven scientific mapping. Visualization results from *VOSviewer* were analyzed to identify research clusters and underexplored gaps in the existing scholarship. This stage ensured that qualitative interpretations were grounded in the broader epistemological structure of scientific knowledge. Consequently, bibliometric synthesis enriched the qualitative analysis with a wider intellectual context.

3. Literature Review

Transboundary environmental governance has become increasingly complex due to the interdependence of ecological systems and political boundaries. In the context of Southeast Asia, particularly transboundary haze pollution, governance challenges extend beyond national jurisdiction and require coordinated leadership across multiple levels of authority. This complexity exposes the limitations of fragmented governance architectures that rely primarily on institutional arrangements rather than leadership capacity. Existing scholarship on global environmental governance emphasizes the increasing interdependence of states in addressing ecological risks (Biermann, 2014; Pierre & Peters, 2020). In this context, the concept of transglobal leadership emerges as a new paradigm that integrates global vision, adaptive resilience, ethical responsibility, multilevel collaboration, and knowledge-based innovation (Sedarmayanti et al., 2020; Sharkey et al., 2012). This chapter reviews the main theories that form the conceptual foundation for developing an Environmental Policy Diplomacy Framework as a framework that connects leadership values, policy mechanisms, and cross-border diplomatic outcomes.

Although various leadership approaches have been widely applied in environmental governance studies, including transformational leadership, collaborative leadership, adaptive leadership, and global leadership, each presents certain limitations when addressing complex transboundary environmental issues. Transformational leadership emphasizes a leader’s ability to inspire organizational change and influence followers’ behavior;

however, it pays limited attention to multilevel governance dynamics and interstate relations. Collaborative leadership focuses on building consensus and partnerships among diverse stakeholders, yet it often does not explicitly incorporate the dimensions of global ethics and transboundary ecological responsibility. Meanwhile, adaptive leadership highlights the capacity to respond to uncertainty and change, but it does not fully explain how leadership can effectively connect local, national, and global interests within a coherent policy framework.

In this context, transglobal leadership offers a more comprehensive theoretical contribution by integrating global vision, adaptive resilience, ethical responsibility, collaborative diplomacy, and knowledge-based innovation into a unified conceptual framework. Unlike previous leadership models that tend to emphasize specific dimensions in isolation, transglobal leadership conceptualizes leadership as the capacity to connect multiple levels of governance, cross-sectoral actors, and interests that extend across jurisdictions in addressing shared global challenges. Consequently, this concept provides added theoretical value to environmental diplomacy studies by explaining how leadership processes can simultaneously facilitate policy coordination, cross-border cooperation, and environmental justice. Therefore, transglobal leadership functions not only as a normative approach but also as an analytical framework that bridges the relationship between leadership capacity, governance mechanisms, and diplomatic outcomes in the management of transnational environmental issues.

Table 1 *Comparison of leadership frameworks in Global Environmental Governance;*
Source: Analysis Results, 2026

Analytical Dimension	Transformational Leadership	Adaptive Leadership	Collaborative Leadership	Global Leadership	Transglobal Leadership
Primary Focus	Inspiring organizational change and transforming followers' attitudes and behaviors through vision and motivation	Enhancing the capacity to respond to uncertainty, complexity, and emerging challenges	Building collaboration, consensus, and partnerships among diverse stakeholders	Managing organizations and addressing issues within complex international environments	Connecting local, national, regional, and global interests within cross-border governance systems
Unit of Analysis	Individuals and organizations	Organizations and social systems	Networks of stakeholders and institutions	Multinational organizations and global environments	Multilevel governance systems involving states, markets, civil society, and international institutions
Leadership Orientation	Organizational transformation and follower development	Adaptation to changing conditions and complex challenges	Coordination, dialogue, and relationship-building among actors	Global vision and cross-cultural competence	Integration of global vision, adaptive resilience, ethical responsibility, collaborative diplomacy, and knowledge-based innovation
Approach to Complexity	Changes organizational culture and mindset to achieve desired outcomes	Facilitates learning and adaptation in response to uncertainty	Manages interdependence through collaborative processes	Addresses global interconnectedness and cultural diversity	Simultaneously manages cross-sectoral and cross-national interdependencies
Role of Ethics and Responsibility	Implicitly embedded in	Focuses primarily on addressing	Emphasizes trust, legitimacy,	Promotes global awareness and	Explicitly prioritizes environmental

Analytical Dimension	Transformational Leadership	Adaptive Leadership	Collaborative Leadership	Global Leadership	Transglobal Leadership
	leaders' values and behaviors	adaptive challenges	and stakeholder engagement	cultural sensitivity	justice, transparency, accountability, and shared responsibility
Relevance to Environmental Governance	Encourages organizational commitment to sustainability initiatives	Strengthens resilience and adaptation to environmental change	Facilitates stakeholder participation in environmental decision-making	Supports international cooperation on environmental issues	Integrates environmental diplomacy, multilevel governance, and cross-border ecological management
Strengths	Creates a compelling vision and motivates collective action	Provides flexibility in addressing uncertainty and complexity	Enhances participation, trust, and collective problem-solving	Develops international perspectives and cross-cultural capabilities	Offers a holistic framework linking leadership, governance, diplomacy, and sustainability
Limitations	Limited attention to multilevel governance and transboundary policy coordination	Insufficient emphasis on diplomacy and international governance mechanisms	Often focuses on process rather than normative global responsibilities	Primarily oriented toward organizational and managerial contexts	Remains an emerging concept requiring further empirical validation
Contribution to Environmental Diplomacy	Indirect contribution through transformational change	Supports crisis response and adaptive governance	Facilitates negotiation, dialogue, and stakeholder engagement	Promotes international cooperation and intercultural understanding	Explains how leadership capacities translate into cross-border policy coordination, environmental justice, and diplomatic outcomes

Within leadership studies, several dominant frameworks have been applied to environmental governance. While transformational, adaptive, collaborative, and global leadership frameworks each provide valuable insights into leadership processes, they tend to emphasize specific dimensions of leadership in isolation. Transformational leadership focuses on motivating organizational change and shaping followers' behavior (Bass & Riggio, 2006). Although useful for internal institutional reform, this framework is limited in explaining coordination between sovereign states, where authority is decentralized and politically contested. As a result, its applicability to transboundary environmental diplomacy remains constrained. Adaptive leadership emphasizes the capacity to navigate uncertainty and complex challenges (Heifetz et al., 2009). However, this framework primarily addresses crisis responsiveness at organizational or community levels. It offers limited explanatory power regarding sustained intergovernmental cooperation or the institutionalization of cross-border environmental commitments. Collaborative leadership highlights stakeholder engagement and consensus-building (Ansell & Gash, 2008); (Emerson et al., 2012) While this approach is highly relevant to environmental issues involving multiple stakeholders, it often assumes relatively balanced power relations. In transboundary haze governance, asymmetries in capacity and political influence challenge the effectiveness of purely collaborative models.

Global leadership concentrates on cross-cultural competencies and international perspectives (Mendenhall et al., 2013) Nevertheless, this framework remains largely embedded in organizational and managerial contexts

rather than inter-state environmental diplomacy. It therefore insufficiently addresses normative issues such as environmental justice across national borders. A comparative synthesis of these frameworks indicates that each leadership model captures only a partial dimension of transboundary environmental governance. This fragmentation creates a theoretical gap in understanding how leadership operates in complex environmental diplomacy settings. Existing frameworks do not adequately explain how leadership can simultaneously manage ecological interdependence and institutional asymmetry across states involved in shared environmental crises.

In response to this limitation, the concept of transglobal leadership has emerged as a more integrative framework. Transglobal leadership offers a distinct theoretical contribution by synthesizing these dimensions into a comprehensive governance-oriented leadership model. It extends beyond organizational and managerial contexts by emphasizing the capacity of leaders to connect local actions with global responsibilities, foster collaborative diplomacy across jurisdictions, and promote environmental justice through inclusive governance mechanisms. As such, transglobal leadership provides a more suitable framework for understanding and addressing complex transboundary environmental challenges, where ecological systems, political boundaries, and governance structures intersect (Sharkey & Sharkey, 2012; Muhammad et al., 2018; Sedarmayanti et al., 2020).

3.1 Transglobal Leadership in the Landscape of Global Governance

The concept of transglobal leadership emerges as a response to the paradigm shift in public governance which is becoming increasingly complex and interconnected across nations. In the era of globalization, the boundaries between domestic and international affairs are becoming increasingly blurred, marking the urgency of establishing a leadership model capable of bridging diverse systems, values, and interests (Morton, 2017; Muhammad et al., 2018; Stolz & Oldenziel Scherrer, 2022). However, much of the governance literature conceptualizes this complexity primarily in institutional terms while paying less attention to leadership as an enabling force that actively shapes cross-border coordination.

In the context of ecological crises, the complex relationships among states, markets, and societies require a leadership approach that can integrate various resources and interests. Research by Muhammad et al (2018) shows that transglobal leadership has a significant influence on good governance practices, particularly in natural resource management. This reinforces that the performance of environmental policies is largely determined by the leader's capacity to build strategic coalitions among national and local governments, the private sector, civil society organizations, local communities, and international institutions.

One example is the environmental crisis of forest fires and transboundary haze in Southeast Asia which reveals the limitations of conventional bureaucratic models in addressing ecological problems that transcend jurisdictions (Afni, 2019). The hierarchical and administrative nature of bureaucratic governance is no longer considered effective in managing dynamic environmental crises. This challenge underscores the need for leadership that is adaptive, collaborative, and network-based (*network governance*) to create solutions that transcend administrative and political boundaries (Biermann, 2014; Pierre & Peters, 2020).

In this context, transglobal leadership emerges as a new paradigm that combines moral values, adaptive intelligence, and cross-cultural collaborative capabilities (Muhammad et al., 2018; Sedarmayanti et al., 2020). This interconnection aligns with the concept of *transformative governance* which emphasizes that leadership and innovation are the two main drivers of systemic change (Chaffin et al., 2014). *Transglobal leadership* also involves the ability to connect global visions with local actions and to ensure inclusive policies for vulnerable groups such as smallholder farmers, women, and indigenous communities. Thus, transglobal leadership can be manifested as a strategic practice that determines the effectiveness of transboundary environmental governance in the ASEAN region.

3.2 The Transglobal Leadership Framework in Environmental Policy Diplomacy

The Environmental Policy Diplomacy Framework is developed to understand how transglobal leadership influences diplomacy and cross-border environmental policy. This model consists of three main components, synthesized from several relevant works of literature: (1) core leadership values, (2) policy operational mechanisms, and (3) diplomatic outcomes. Systemically, this framework represents the relationship between leadership capacity, policy governance and outcomes.

3.2.1 Core Leadership Values

Transglobal leadership is rooted in values-based leadership that places moral principles and global vision as the foundation of strategic action. Based on a synthesis of literature Pless & Maak (2011); Sedarmayanti et al (2020); Sharkey et al (2012), there are five key values that shape the orientation of cross-border leadership:

- Strategic Global Vision: the ability to understand the interconnection between local actions and global impacts, aligning national policies with international commitments (Bandari et al., 2024; Tosun & Leiningner, 2017). A transglobal leader must be able to connect national policies with commitments

agreed upon in international forums such as emission targets, conservation efforts, and regional climate adaptation (Abbott, 2014; Chan et al., 2016; Michaelowa & Michaelowa, 2019).

- **Adaptive Resilience:** the capacity to remain stable and innovative amid political and ecological uncertainty (Cooper & Wheeler, 2015; Djalante, 2012; Sott & Bender, 2025). Adaptive leaders can transform crises into opportunities for cross-border cooperation.
- **Ethical Responsibility:** a commitment to ethical principles such as justice, transparency, and accountability in public decision-making (Pless & Maak, 2011; Voegtlin, 2015). Technically, transglobal leaders must also ensure transparency in cross-border corporate practices and guarantee fair distribution of environmental benefits and risks.
- **Collaborative Diplomacy:** the ability to build consensus and foster dialogue across sectors and cultures (Gradwell, 2018). This may take the form of joint monitoring systems, data sharing, and multi-stakeholder dialogues involving governments, corporations, and civil society (Ayhan, 2016; Pierre & Peters, 2020).
- **Knowledge-Based Innovation:** the ability to integrate scientific knowledge and local wisdom for environmental mitigation and adaptation policies (Andresen et al., 2017; Stanovcic et al., 2015).

These five values form the normative foundation for leaders to integrate global and local interests in a balanced manner. The following section elaborates on these core values in relation to leadership functions and their relevance to environmental governance.

Table 2 *Core values of transglobal leadership*

Core Value	Leadership Function	Relevance in Environmental Governance	References
Strategic Global Vision	Aligning national policies with global agendas	Harmonization of domestic policies with international commitments	Bandari et al., 2024; Tosun & Leininger, 2017.
Adaptive Resilience	Responding to transboundary crises innovatively	Strengthening adaptation and mitigation systems	Cooper & Wheeler, 2015; Djalante, 2012; Sott & Bender, 2025.
Ethical Responsibility	Enhancing moral legitimacy and accountability	Promoting policy transparency and justice	Pless & Maak, 2011; Voegtlin, 2015.
Collaborative Diplomacy	Building inter-actor networks	Cross-jurisdictional coordination	Ayhan, 2016; Pierre & Peters, 2020.
Knowledge-Based Innovation	Integrating science with local wisdom	Contextual and inclusive policy formulation	Andresen et al., 2017; Stanovcic et al., 2015.

3.2.2 Operational Mechanisms and Diplomatic Outcomes

To transform values into concrete policy practices, transglobal leadership operates through three main mechanisms: adaptation, integration, and collaboration (Abuka, 2024; Biermann, 2014; Emerson & Gerlak, 2014; Pierre & Peters, 2020).

- **Adaptation** emphasizes institutional learning processes in responding to the dynamics of climate, political, and economic changes. Transglobal leaders promote policy flexibility through adaptive policy cycles and iterative governance learning mechanisms (Newig et al., 2016; Rao, 2014).
- **Integration** aims to connect various sectoral policies (e.g., forestry, energy, trade) within the framework of sustainable development. Policy coherence approaches are crucial to avoid overlapping or conflicting policies across jurisdictions (Khatoon, 2025; Nilsson & Weitz, 2019; Weitz et al., 2018).
- **Collaboration** involves creating interactive spaces among actors across scales through diplomatic forums, public-private partnerships, and transnational knowledge cooperation. Such collaboration is not only technical but also reinforces moral legitimacy and political trust among nations (Abbott & Snidal, 2021; Picavet et al., 2023).

3.2.3 Diplomatic Outcomes

These three mechanisms generate three main diplomatic outcomes that serve as indicators of successful transglobal leadership:

- Inclusive Environmental Governance is characterized by **Inclusive Environmental Governance is characterized by** the participation of diverse actors in environmental policymaking. This approach positions local communities and Indigenous peoples as key actors in natural resource management. It rejects the dominance of top-down formal mechanisms and promotes recognition of local governance systems that have proven effective in preserving global biodiversity (Apgar, 2017; Dubash, 2012).
- Transboundary Cooperation refers to coordination among countries in addressing cross-border issues such as pollution and deforestation. It embodies collaboration across territories or institutions divided by national boundaries, encompassing economic, political, social, and institutional dimensions (Brunet-Jailly, 2022).
- Environmental Justice denotes the fair distribution of environmental benefits and responsibilities at the regional level. Regional ecological justice reflects the idea that different political authorities whether among nations, provinces, or cross-border communities share moral and political obligations to cooperate for ecological well-being. This principle recognizes that political borders do not always align with ecological boundaries (such as forests, rivers, or ecosystems). Hence, responsibility for ecosystem preservation must be shared equitably and collaboratively, rather than being borne by a single nation (Baard, 2024).

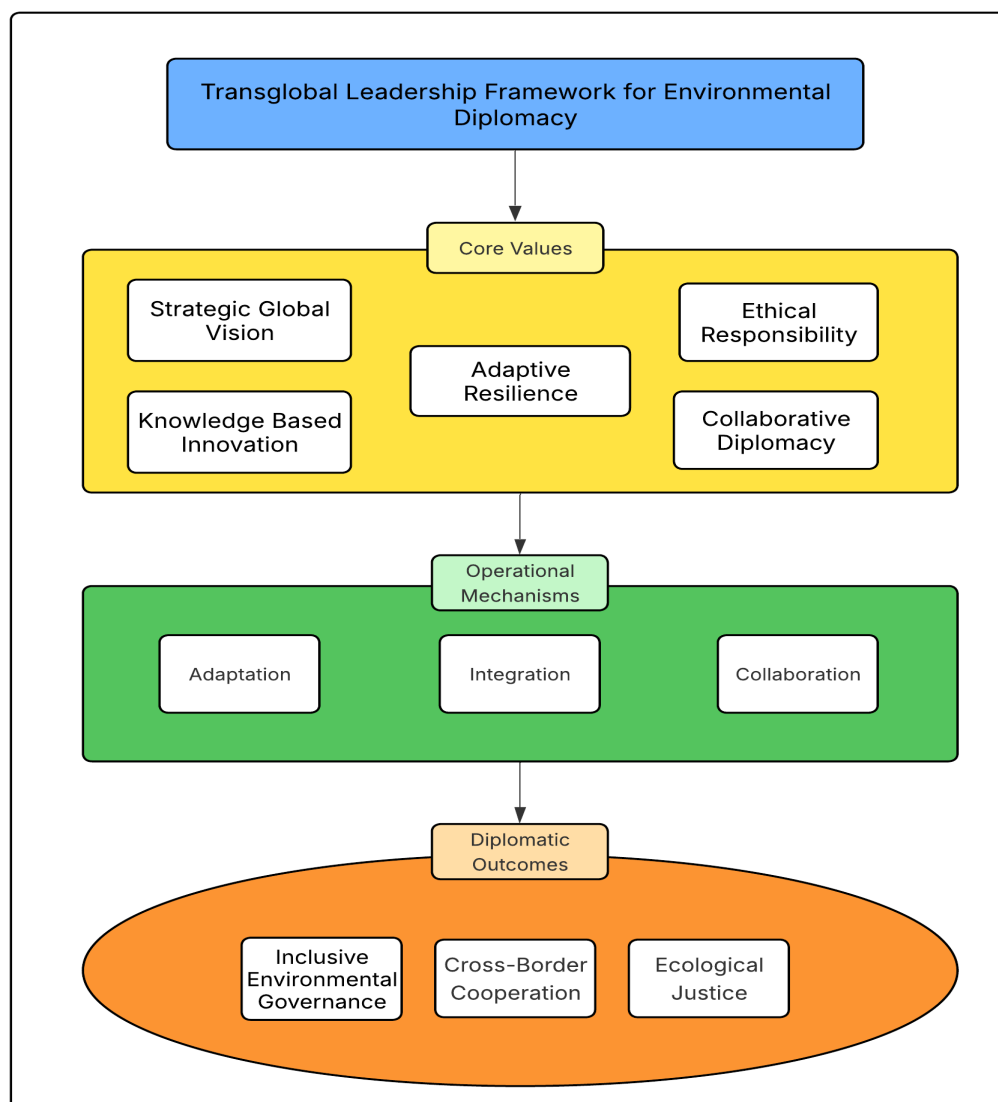


Fig. 3 Framework of Transglobal Leadership for Environmental Policy Diplomacy in ASEAN (Illustrating the interconnection between Core Values, Operational Mechanisms, and Diplomatic Outcomes within a cross-border governance system) Source: Synthesis from various literatures Abuka (2024); Biermann (2014), Emerson & Gerlak (2014), Pierre & Peters (2020)

4. Result and Discussion

4.1 Research Trends Related to Transglobal Leadership

The analysis conducted using Publish or Perish with the keyword “transglobal leadership” indicates that this topic has grown considerably over the past decade (2015–2025). A total of 200 articles were collected, accumulating 2,580 citations in total. Each article received an average of 12.9 citations, suggesting a moderate yet meaningful level of academic attention. The citation matrix is shown below:

Citation metrics Help	
Publication years:	2015-2025
Citation years:	10 (2015-2025)
Papers:	200
Citations:	2580
Cites/year:	258.00
Cites/paper:	12.90
Cites/author:	1553.65
Papers/author:	112.02
Authors/paper:	2.42
h-index:	26
g-index:	48
hI,norm:	18
hI,annual:	1.80
hA-index:	12
Papers with ACC >= 1,2,5,10,20:	88,52,30,17,7

Fig. 4 Citation matrix of transglobal leadership publications (Google Scholar)
Source: Publish or Perish Analysis

With an average of 258 citations per year, the findings suggest that the discourse on transglobal leadership continues to attract scholarly attention. The g-index value of 48 further indicates the presence of several highly influential works that serve as key references within leadership studies. The citation distribution reveals a broad variation while some studies remain in the emerging category with low citation counts, others have achieved above-average impact. This pattern demonstrates that transglobal leadership research is still evolving toward academic maturity. Although most studies remain descriptive and conceptual, the steady increase in citation trends signals a transition from exploratory discussions toward theoretical consolidation and applied research.

Consequently, this field shows strong potential to develop into a strategic research domain in the near future particularly within the contexts of multinational leadership, cross-border governance, and global collaboration. This opens significant opportunities for scholars especially in Southeast Asia, to explore the concept of transglobal leadership within various applied contexts such as diplomacy, environmental policy, education, and cross-cultural management.

4.2 Bibliometric Network Analysis of Transglobal Leadership (2015–2025)

The bibliometric analysis using VOSviewer on 200 publications related to transglobal leadership (2015–2025) identified 92 connected keywords grouped into seven main clusters with a total of 1,181 links and an overall link strength of 2,696. This network structure illustrates an epistemological shift in the study of transglobal leadership from being merely a managerial concept within business organizations to becoming a multidisciplinary paradigm bridging ethics, performance and global sustainability.

The central node, transglobal leadership exhibits strong connections with terms such as leadership, employee performance, quality, effect, and innovation. This suggests that the concept is increasingly understood as a mechanism integrating leadership values with policy outcomes and organizational performance. Overall, the bibliometric landscape indicates that transglobal leadership has evolved into an integrative framework linking global ethics, institutional performance, and sustainable governance. This development positions it as a promising foundation for advancing regional and international studies on environmental diplomacy.

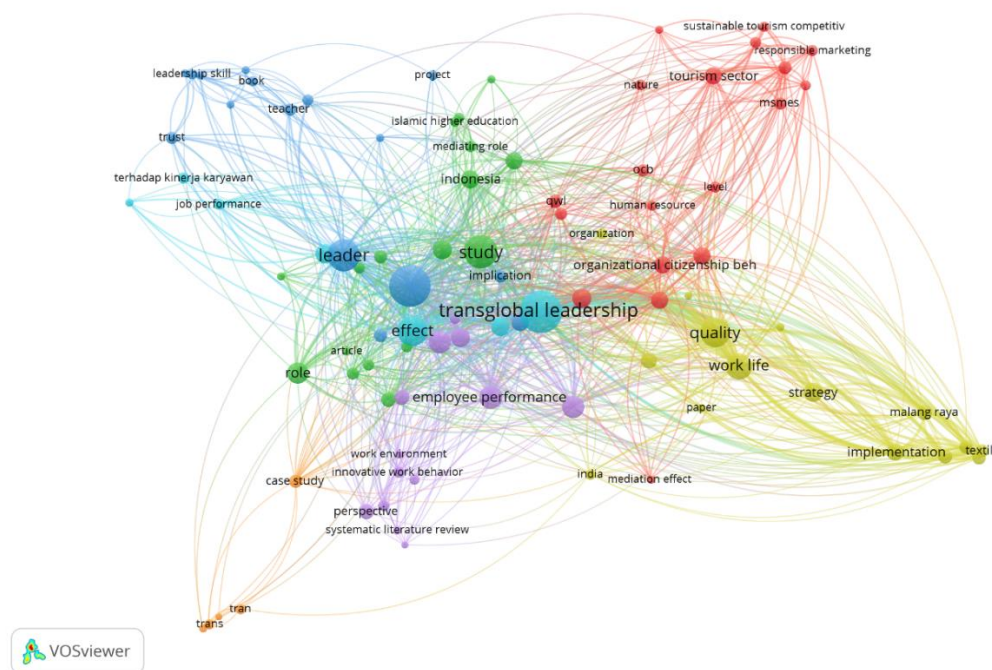


Fig. 5 VOSviewer analysis results with the keyword “Transglobal Leadership”
Source: VOSviewer Analysis Results

The green cluster highlights themes such as leadership effect and employee performance reflecting a focus on cross-cultural leadership effectiveness. The red cluster features human resources, organizational citizenship behavior, and sustainable tourism, indicating an expansion of research toward sustainable governance. Meanwhile, the yellow cluster, centered on work life, strategy, and implementation, dominates publications from 2020 to 2025, signaling growing scholarly attention to the integration of values, ethics, and organizational productivity particularly within cross-border and public-sector collaboration contexts. The temporal overlay analysis shows a color shift from blue to yellow marking a conceptual evolution from the normative phase (2015–2018) which focused on ethics and moral values of global leaders toward the empirical and applicative phase (2020–2025), emphasizing innovation, adaptive strategies, and organizational sustainability.

This pattern indicates that transglobal leadership now functions as an adaptive governance framework, capable of responding to complex and dynamic policy challenges. The strong interconnections among the term’s innovation, adaptive strategy, and knowledge-based behavior further emphasize a new research direction toward knowledge-based and adaptive resilience leadership. These findings directly resonate with the framework of environmental policy diplomacy where adaptive resilience, collaborative diplomacy, and knowledge-based innovation form the core pillars. Hence, the bibliometric map validates the conceptual position of this study affirming that transglobal leadership represents a transformative leadership paradigm highly relevant to strengthening environmental policy diplomacy within the ASEAN region.

4.3 Core Values of Transglobal Leadership in Addressing Transboundary Forest Fire Impacts

Leadership in mitigating transboundary forest fires is fundamentally grounded in moral, social and ecological values. In an era where environmental crises transcend territorial boundaries, the success of a policy is no longer determined solely by administrative capacity but by the leader’s ability to internalize humanitarian and sustainability values in every decision-making process. Within this perspective, transglobal leadership views leaders as bearing responsibility toward an interconnected global ecological community.

The transformation of leadership paradigms toward a collaborative transnational model marks a significant shift in the role of leadership values. In this sense, the core values of transglobal leadership serve as guiding principles for policy direction, diplomatic strategy and leadership behavior in confronting the challenges of transboundary forest fires. Theoretically, the five core values of transglobal leadership as proposed by Pless & Maak (2011); Sedarmayanti et al (2020); Sharkey et al (2012) form the conceptual foundation for understanding the evolving patterns of environmental leadership in Southeast Asia.

4.3.1 Strategic Global Vision

This value demands that leaders view forest fires as part of the broader global climate crisis. Leaders with a global vision must be able to synergize international commitments with domestic policies. In practice, Malaysia has implemented the *Malaysia Greening Programme (2021–2025)*, which targets the planting of 100 million trees as part of its carbon offset strategy. Meanwhile, Indonesia has established the *FOLU Net Sink 2030* target, under which the forestry sector aims to become a net carbon sink, aligning with its Nationally Determined Contribution (NDC) under the *Paris Agreement*. Both countries have linked these efforts within the framework of the *ASEAN Haze-Free Roadmap 2030*, reflecting the shared cross-border responsibility embraced by their national leaders. However, achieving this global vision still requires the development of more concrete mechanisms particularly regarding cross-border carbon trading schemes in land-use and forestry sectors. Such mechanisms could provide ASEAN countries, especially Indonesia and Malaysia, with opportunities to mutually balance carbon emissions and sequestration in a transparent manner. Furthermore, harmonization of green fiscal policies across ASEAN nations is needed to create economic incentives for companies and communities implementing sustainable practices. These efforts would strengthen the integration of environmental policy with global carbon markets, demonstrating transglobal leadership grounded in collaboration and environmental justice.

4.3.2 Adaptive Resilience

This value reflects the capacity of leaders and institutions to continuously learn and adapt in response to climate change impacts, socio-economic dynamics and other environmental crises. In practice, the Malaysian government has developed the National Peatland Management Strategy (2021–2030) which strengthens peatland conservation efforts through data-driven monitoring systems. Meanwhile, Indonesia established the Peatland and Mangrove Restoration Agency (BRGM) in 2020 to expand its restoration mandate from peatland to coastal ecosystems. Both institutions were created to mitigate forest fires that frequently occur in peatland areas. These agencies illustrate a process of institutional learning in which lessons from past failures such as the 2015 fire crisis serve as the foundation for institutional reform. This kind of institutional adaptation aligns with the concept of adaptive governance (Chaffin et al., 2014). Resilience can be further enhanced through the establishment of cross-border early warning systems and community-based fire response units operating in border regions.

The cross-border early warning system represents a fundamental step toward strengthening regional coordination in addressing forest and land fire risks. This system integrates data from multiple ASEAN countries including satellite imagery, soil moisture sensors, meteorological information and fire risk indices. Such data integration enables early detection of potential hotspots across borders and facilitates real-time alerts to national authorities and local communities. Through mutually agreed data-sharing mechanisms, this system helps minimize delays in response and prevents the escalation of transboundary fires. The involvement of institutions such as the ASEAN Specialized Meteorological Centre (ASMC) and national restoration agencies in each member state is crucial to ensure system reliability. Meanwhile, the establishment of community-based fire response units in border areas serves to strengthen local preparedness through participatory approaches. These units consist of local communities trained specifically in fire prevention, early suppression, and fire monitoring. Beyond technical training, this empowerment initiative incorporates environmentally based economic incentives allowing communities to gain economic benefits from conservation and land restoration activities. Such participatory mechanisms not only enhance local emergency response capacity but also foster a collective sense of ecological responsibility, reinforcing adaptive governance at both community and regional levels.

4.3.3 Ethical Responsibility

This value serves as the moral foundation that legitimizes cross-border leadership. Transglobal leaders must demonstrate moral courage in upholding public ethics within environmental governance. One crucial dimension of ethical responsibility in this context is law enforcement against deforestation practices. For instance in Malaysia, the implementation of the National Action Plan on Peatlands (2011–2020) and its revision (2021–2030) strengthened the monitoring of concession permits and imposed sanctions on companies violating peatland drainage regulations. These measures reflect how integrity and moral motivation are essential to ensuring that economic development does not come at the expense of ecosystems. Similarly, in 2019, Indonesia imposed strict sanctions on a major palm oil company found guilty of conducting illegal land burning in Riau. This action demonstrates the government's commitment to enforcing environmental laws against powerful corporations. Beyond enforcement, ethical responsibility also encompasses the protection of local community rights and participation reinforcing the dimension of social justice within environmental governance in both Indonesia and Malaysia, two nations facing structural challenges in balancing conservation interests, corporate power, and indigenous rights. In Indonesia, the Social Forestry Program has opened access to over 5 million hectares for indigenous and local forest communities. Conceptually, this initiative aims to strengthen local agency in resource

management and community-based fire prevention. However, implementation often encounters obstacles such as overlapping concession permits, weak legal protection for indigenous peoples, and limited technical support.

For example, in Riau Province, the Sakai and Talang Mamak communities continue to face conflicts with palm oil and pulpwood plantation expansions around their customary lands. Despite this, these communities remain actively engaged in monitoring their territories, conducting independent patrols, and practicing zero-burning land preparation, an example of ecological adaptation and social resistance to corporate dominance. In Malaysia, similar challenges persist in Sarawak and Sabah where Native Customary Rights (NCR) are often not fully recognized. The Community Forest Management (CFM) program in Sarawak attempts to integrate local wisdom such as the traditional *temuda* system (hereditary land use) with state-level conservation strategies. Yet, many communities still face resource access inequalities due to the expansion of plantation concessions and extractive projects in customary areas. Even so, the success of some indigenous groups, such as the Iban and Penan in participatory land mapping and engaging international institutions for environmental advocacy marks progress toward more inclusive environmental governance.

A strategic recommendation is the establishment of an ASEAN Regional Environmental Accountability Charter, a regional framework for environmental responsibility that serves as a *moral compass* for member states in implementing sustainable development policies. As an operational measure, ASEAN could also develop a Joint Eco-Audit Mechanism. This mechanism is a cross-country environmental auditing system to evaluate ecological performance, corporate compliance, and the effectiveness of fire and deforestation mitigation policies. Furthermore, both countries should strengthen the legal recognition of indigenous land rights through the acceleration of *hutan adat* designation in Indonesia and the reinforcement of NCR frameworks in Malaysia, providing both moral and legal legitimacy. The empowerment of local institutions such as Indonesia's Masyarakat Peduli Api (MPA) and Malaysia's Community Forest Management (CFM) should be expanded to enhance community technical capacity in fire mitigation and natural resource conservation. Finally, sustainable financial and livelihood incentives such as a *Green Livelihood Fund* should be established to ensure that communities receive tangible benefits from sustainable ecological practices. At the regional level, community participation can be institutionalized through an ASEAN Local Environmental Forum ensuring that indigenous and local voices are substantively represented in policy formulation processes.

4.3.4 Collaborative Diplomacy

This value emphasizes that transglobal leadership must be grounded in multi-actor cooperation among states, the private sector, civil society, and local communities. In the context of haze mitigation, Indonesia–Malaysia technical collaboration has been institutionalized through the Joint Committee on Environment (JCE), the Sub-Regional Ministerial Steering Committee on Transboundary Haze Pollution (MSC) and the renewed MoU on Transboundary Haze Pollution Control (2020). These forums illustrate a shift from formal diplomacy toward trust-based diplomacy in which data exchange, resource sharing and technical cooperation occur more openly. However, their effectiveness still faces challenges such as differing interpretations of transboundary pollution data, limited transparency of public information and weak law enforcement at the field level. For example, different hotspot detection methodologies between Indonesia and Malaysia often result in unsynchronized early warnings. Moreover, environmental data transparency remains low plantation companies in both countries rarely publish real-time information about concession locations, emissions, or environmental audits forcing the public to rely on media reports or independent data.

To address coordination and effectiveness gaps in cross-border collaboration, two concrete and implementable mechanisms are proposed. First, the establishment of an ASEAN Joint Environmental Data Hub would be a strategic step to integrate all cross-national environmental databases including hotspot, emission, and wind direction data in real time. This platform would operate under the coordination of the ASEAN Specialized Meteorological Centre (ASMC) and involve active participation from research institutions, universities and civil society organizations. Through this hub, discrepancies between Indonesia and Malaysia's haze data interpretations could be minimized, while early warning systems become more synchronized. Moreover, data transparency could strengthen public accountability and rebuild trust among states that has often been eroded by disputes over claims and political narratives. Second, the creation of a Cross-Border Environmental Task Force is essential to reinforce joint law enforcement and cross-border investigation against companies suspected of illegal land burning. This task force could function as a joint investigation mechanism with a verified evidence-sharing system between environmental authorities and legal institutions in both countries. Such an approach would reduce jurisdictional loopholes often exploited by corporations, enabling faster and more coordinated law enforcement. Additionally, the task force could develop joint sanction guidelines and emergency coordination procedures to ensure that forest fire responses are structured and prevention oriented. Through these two instruments, Indonesia–Malaysia collaboration could evolve from mere technical diplomacy into a form of networked environmental governance that is transparent, responsive, and ecologically just.

4.3.5 Knowledge-Based Innovation

Transglobal leadership rests on mastery of science, technology and local wisdom to address forest fire challenges systemically. In the regional context, both Indonesia and Malaysia have demonstrated practical forms of knowledge-based innovation. Indonesia operates the SiPongi and LAPAN Fire Hotspot Monitoring systems for daily hotspot surveillance while Malaysia has developed the Fire Danger Rating System (FDRS) for predicting fire risks. These systems are connected through the regional platform ASEAN Specialized Meteorological Centre (ASMC) to strengthen early detection and cross-border data sharing. Innovation has also advanced using drone surveillance for hotspot mapping and the application of traditional ecological practices such as *sekal kanal* (peat waterway blocking) and *ladang tanpa bakar* (no-burn farming) by Indigenous communities in Kalimantan and Sarawak.

The integration of modern technology and local ecological knowledge represents a form of knowledge co-production that reinforces the social legitimacy of environmental policies at the grassroots level. The process of integrating scientific and Indigenous knowledge has proven effective in forest fire mitigation. Nevertheless, the expansion of such innovations remains necessary across regions vulnerable to natural disasters, particularly forest fires. ASEAN leaders should therefore promote the establishment of an AI-based Environmental Data Repository to integrate real-time data on hotspots, emissions, corporate activities and policies across member states. This initiative could be developed collaboratively through the ASEAN Centre for Biodiversity (ACB), ASEAN Institute for Green Economy (AIGE) and ASEAN Climate Change and Energy Project (ACCEPT), institutions with technical expertise in AI-driven environmental data management. The platform would strengthen the ASEAN Specialized Meteorological Centre (ASMC) as a regional climate data hub while providing public access to enhance transparency and independent monitoring. Supported by research networks such as the ASEAN Research and Innovation Action Plan (ARIAP) and Southeast Asian universities, this Data Commons could serve as the foundation for a knowledge-based environmental diplomacy that is collaborative, transparent, and ecologically just.

Table 3 *Elaboration of core values of transglobal leadership*

Core Value	Manifestation in Practice	Best Practice / Strategic Initiative
Strategic Global Vision	- Integration of FOLU Net Sink 2030 (Indonesia) and Malaysia Greening Programme (2021–2030) with the Paris Agreement and ASEAN Agreement on Transboundary Haze Pollution (AATHP). - Formulation of the ASEAN Haze-Free Roadmap 2030 as a collective regional agenda.	- Establishment of a Joint Climate Accountability Mechanism among ASEAN member states. - Implementation of cross-border carbon governance and green fiscal coordination in forestry and land sectors to strengthen transnational carbon trading.
Adaptive Resilience	- Establishment of the Peatland and Mangrove Restoration Agency (BRGM) in Indonesia and the National Peatland Management Strategy (2021–2030) in Malaysia. - Institutional reform through organizational learning derived from the 2015 large-scale forest fire disaster.	- Application of an adaptive governance framework to develop cross-border early warning systems and joint field training. - Strengthening community-based fire response units along the Kalimantan–Sarawak border.
Ethical Responsibility	- Enforcement of environmental laws against companies conducting illegal burning. - Implementation of the National Action Plan on Peatlands (2021–2030) and Malaysian Sustainable Palm Oil (MSPO) certification with a zero-burning policy.	- Formulation of the ASEAN Regional Environmental Accountability Charter to reinforce the moral legitimacy of leadership - Development of a Joint Eco-Audit Mechanism and acceleration of Indigenous land rights recognition (Native Customary Rights and hutan adat).

Core Value	Manifestation in Practice	Best Practice / Strategic Initiative
	Strengthening Indigenous land access through Social Forestry (Indonesia) and Community Forest Management (Malaysia).	Empowerment of local environmental institutions and community-based monitoring groups.
Collaborative Diplomacy	- Technical collaboration between Indonesia and Malaysia through the Joint Committee on Environment (JCE). - Persistent challenges in cross-border data interpretation, public transparency, and field-level law enforcement.	- Establishment of an ASEAN Joint Environmental Data Hub under the ASEAN Specialized Meteorological Centre (ASMC) to integrate real-time hotspot, emission, and wind direction data openly accessible to the public to foster data-driven diplomacy. - Formation of a Cross-Border Environmental Task Force as a joint investigation mechanism to enhance law enforcement and address jurisdictional gaps.
Knowledge-Based Innovation	- Utilization of SiPongi and LAPAN Fire Hotspot Monitoring (Indonesia) and Fire Danger Rating System (FDRS) (Malaysia), integrated under the ASEAN Specialized Meteorological Centre (ASMC). - Adoption of drone surveillance and traditional ecological practices such as <i>sekak kanal</i> and <i>ladang tanpa bakar</i> by Indigenous communities in Kalimantan and Sarawak.	- Development of ASEAN Environmental Data Commons powered by artificial intelligence to integrate real-time cross-national data on hotspots, emissions, and policy actions. - Collaboration among ASEAN Centre for Biodiversity (ACB), ASEAN Institute for Green Economy (AIGE), and ASEAN Climate Change and Energy Project (ACCEPT) to promote research-based innovation and public transparency.

4.4 Mechanisms of Transglobal Leadership in Environmental Policy Governance

Transglobal leadership must be materialized through institutional and policy mechanisms that connect actors across borders, sectors and levels of governance. In the context of transboundary forest fire mitigation between Indonesia and Malaysia, these mechanisms are shaped through a combination of formal diplomacy, technical cooperation, and transnational community networks. Such mechanisms function as critical instruments for strengthening coordination within the ASEAN region. Based on a compilation of official reports from ASEAN, UNEP, and the respective environmental ministries of both countries (2019–2024), several core mechanisms characterize the practice of transglobal leadership in Southeast Asia, as summarized below:

Table 4 *Compilation of key mechanisms in the practice of transglobal leadership*

No.	Mechanism / Forum	Time & Venue	Objectives and Main Outcomes
1	Bilateral Ministerial Meetings on Environment	2019 (Jakarta), 2021 (Putrajaya), 2023 (UNFCCC COP, Dubai)	Strengthened commitment to transboundary haze mitigation and peatland ecosystem protection.
2	Joint Committee on Environment (JCE)	Conducted regularly every two years	Evaluation of environmental policy implementation and facilitation of technical diplomacy between ministries.
3	Sub-Regional Ministerial Steering Committee (MSC) on Transboundary Haze Pollution	July 2022, Bangkok	Agreement to accelerate the implementation of the ASEAN Agreement on Transboundary Haze Pollution (AATHP) and to reduce hotspot occurrences in border regions.
4	Memorandum of Understanding (MoU) on Transboundary Haze Pollution Control	Renewed in 2020 (Jakarta–Putrajaya)	Expansion of technical assistance and enhancement of forest fire early detection systems.

No.	Mechanism / Forum	Time & Venue	Objectives and Main Outcomes
5	Joint Tree-Planting Program	2021–2023, West Kalimantan–Sarawak Border	Symbolic reforestation and cross-border public awareness campaigns.
6	ASEAN Haze Online Portal	Active since 2020	Real-time exchange of hotspot and air quality data among ASEAN member states.
7	Workshops and Capacity-Building Programs	2020–2023 (Pekanbaru, Pontianak, Kuching)	Technical training on forest and land fire management and best-practice exchange among field officers.
8	ASEAN Agreement on Transboundary Haze Pollution (AATHP)	Active 2019–2024	Established the regional legal framework for the ASEAN Haze-Free Roadmap 2030.

The mechanisms established between Indonesia and Malaysia illustrate the interconnection among political diplomacy, environmental policy and cross-border technical actions that mutually reinforce one another in building a shared environmental governance system. Each mechanism performs a strategic function that collectively forms a multilayered and interactive ecosystem of transglobal leadership. At the political level, bilateral ministerial meetings serve as strategic platforms where environmental leaders from both countries align policy directions and reaffirm their commitment under the ASEAN Agreement on Transboundary Haze Pollution (AATHP). Within this forum, leadership is expressed through the capacity to negotiate across jurisdictions and to maintain a delicate balance between national sovereignty and regional solidarity.

At the technocratic level, joint committees such as the Joint Committee on Environment (JCE) and the Sub-Regional Ministerial Steering Committee (MSC) act as coordination mechanisms linking ministries, environmental agencies and operational units. These committees transform policy agreements into actionable protocols, joint monitoring systems and operational data exchanges. Such arrangements demonstrate that transglobal leadership functions through collective mechanisms where success in mitigation depends on coherence and integration among institutions rather than unilateral decision-making. In parallel, digital platforms such as the ASEAN Haze Online Portal serve as adaptive knowledge-based instruments, enabling real-time data sharing on hotspots and air quality. This mechanism represents a form of knowledge-driven adaptation, where scientific data provides epistemic legitimacy for cross-border policy coordination. Through this technological adaptation, knowledge-based innovation becomes a concrete manifestation of transboundary leadership in practice.

Meanwhile, community-oriented programs such as joint tree planting and capacity building workshops embody the social dimension of transglobal leadership. These initiatives mark a shift toward social integration wherein borderland communities, indigenous groups, and local organizations are repositioned from being passive recipients of policy to active agents in mitigation and ecosystem restoration. Collectively, these mechanisms signify that transglobal leadership is neither individualistic nor hierarchical but rather embedded within networks of institutions and social relations that co-produce ecological governance. In this sense, the effectiveness of cross-border leadership depends on the system's ability to generate collective legitimacy rather than the dominance of a single actor.

From the perspective of environmental diplomacy, mechanisms such as AATHP, JCE, and MSC signify a structural shift from traditional cooperation models toward polycentric governance (Ostrom, 2010). This governance model is characterized by multiple decision centers that operate independently yet coordinate interdependently allowing more agile policy adaptation to ecological crises. The integration of scientific data through the ASEAN Haze Online Portal also indicates the emergence of knowledge diplomacy networks that connect scientists, policymakers and field practitioners. Simultaneously, community participation in reforestation and capacity-building initiatives reflects a transition toward more inclusive environmental governance.

Within a multi-level leadership framework, these initiatives link global (e.g., Paris Agreement), regional (e.g., AATHP), national (e.g., BRGM and National Peatland Strategy), and local (e.g., indigenous community institutions) dimensions. This inter-scalar linkage establishes continuity between values and actions across governance levels demonstrating that transglobal leadership operates not only through diplomatic negotiation but also through adaptive, collaborative and socially grounded mechanisms.

4.5 Diplomatic Outcomes of Transglobal Leadership in the ASEAN Context

The dynamics of cooperation between Indonesia and Malaysia in addressing transboundary forest fires have produced several diplomatic outcomes that reflect a transformation in environmental governance practices across Southeast Asia. In terms of information transparency, the implementation of the ASEAN Agreement on Transboundary Haze Pollution (AATHP) has facilitated member states' access to real-time MODIS and NOAA satellite data on hotspot distribution, land cover, wind direction and air quality. This system is designed to support

a transparent data mechanism allowing each country to independently verify information and thereby improve the speed and accuracy of reporting when transboundary fire events occur.

Additionally, the establishment of the ASEAN Haze Portal strengthens the region's early warning system. By integrating satellite data, air quality indices and field reports from member states, the portal provides real-time monitoring of potential hotspots, haze dispersion, and meteorological conditions that could lead to haze disasters. This enables early detection and rapid response to forest and land fire dynamics before environmental crises escalate. With standardized and verified data, the ASEAN Haze Portal serves as a crucial tool for ASEAN governments and regional institutions to activate timely cross-border mitigation and coordination mechanisms.

ASEAN also has technical and diplomatic coordination forums under the ASEAN Ministerial Meeting on the Environment (AMME) to ensure data coherence and policy follow-up among member states. These forums enhance interstate coordination by fostering evidence-based communication. The increased transparency and joint data validation have proven effective in reducing diplomatic tensions particularly among Indonesia, Malaysia, and Singapore which between 2015 and 2019 were marked by mutual blame during major fire incidents in Sumatra and Kalimantan.

From a technical coordination standpoint, ASEAN has established several mechanisms for fire mitigation such as the Sub-Regional Ministerial Steering Committee (MSC) and various Joint Technical/Task Forces which serve as platforms for harmonizing technical guidelines and operational agreements. ASEAN member states have also committed to monitoring, mitigation and providing technical assistance thereby demonstrating a political foundation for cross-border responses.

Operational synchronization has been institutionalized in the ASEAN Standard Operating Procedure for Monitoring, Assessment and Joint Emergency Response which outlines mechanisms for hotspot monitoring, alert-level setting, joint assessment, and coordinated actions during emergency situations. This SOP forms a technical framework that enables joint responses to be planned according to relatively uniform steps and responsibilities among states.

Within the ecological diplomacy dimension, joint initiatives between Malaysia and Indonesia such as border tree-planting programs in Kalimantan–Sarawak (2021–2023) and community-based fire management training mark the emergence of community-based eco-diplomacy. These activities aim to extend environmental diplomacy into the social realm, creating cross-cultural collaboration spaces between indigenous communities and state institutions. This process represents a key component of bottom-up diplomacy, reinforcing the social legitimacy of cross-border environmental policies.

Substantively, these mechanisms have resulted in three main forms of diplomatic outcomes:

- Institutionalized Cooperation: stable and continuous institutional collaboration under AATHP and the Haze-Free Roadmap 2030.
- Shared Environmental Norms: the creation of common norms regarding cross-border ecological responsibility.
- Collective Legitimacy: increased international trust in ASEAN's commitment to addressing transboundary haze pollution.

However, upon closer examination, these three outcomes still operate within normative boundaries. Institutionalized cooperation formed through the AATHP, the Haze-Free Roadmap 2030 and technical forums such as the MSC have successfully built regional cooperation structures. Yet, these institutions remain heavily dependent on voluntary compliance rather than binding enforcement mechanisms. As a result, despite the existence of institutional frameworks, their capacity to compel state behavioral change remains limited. This indicates that ASEAN functions more as a coordination platform than a governance authority prioritizing political harmony over ecological justice.

Secondly, the shared environmental norms developed represent an important effort to build common values around cross-border ecological responsibility. Nonetheless, norm formation is not always accompanied by consensus on what constitutes "shared values." Countries with stronger technical and diplomatic capacities such as Singapore and Malaysia often drive the creation of norms defining standards and success indicators for regional environmental practices. Meanwhile, states with weaker institutional capacity tend to become norm-takers following without influencing policy design. This asymmetry reflects hegemonic environmentalism where environmental collaboration is framed more around regional stability than ecological justice.

Thirdly, collective legitimacy remains the most complex and ambiguous dimension of ASEAN's environmental diplomacy. Institutionally, ASEAN seeks to position itself as a moral actor in addressing haze-related issues. However, the organization still lacks effective mechanisms to ensure member compliance with national-level fire prevention policies. Consequently, collective legitimacy serves more as symbolic capital, strengthening ASEAN's moral standing in international forums rather than functioning as an internal corrective instrument. Ironically, this legitimacy can obscure structural and political inequalities among member states, making ASEAN's environmental diplomacy appear successful rhetorically but limited operationally.

The limitations of these three diplomatic outcomes reveal that the effectiveness of ASEAN's environmental governance still operates within a normative framework that emphasizes political harmony over ecological justice. This condition underscores the need for regional environmental diplomacy to reform through the implementation of transglobal leadership that is more action-oriented. Such leadership would entail strengthening binding regional enforcement mechanisms rather than relying on voluntary state commitments. Moreover, reformulating the AATHP to include cross-border accountability clauses and sanctions for repeated violations would be crucial for ensuring responsible diplomacy.

Beyond institutional reform, reinforcing multi-level leadership networks involving governments, the private sector, the scientific community and local societies can broaden collaboration spaces and institutionalize values of adaptive resilience, ethical responsibility, and knowledge-based innovation in environmental diplomacy. Furthermore, integrating transparency and open-data principles systematically through the merger of the ASEAN Haze Portal, Joint Environmental Data Hub, and regional environmental audit systems would strengthen ASEAN's moral legitimacy and ensure that environmental diplomacy moves beyond political rhetoric. Ultimately, political diplomacy to address environmental crises must yield ecological governance that is adaptive, collaborative, and just.

5. Conclusion

The issue of transboundary forest fires and haze between Malaysia and Indonesia remains entangled in the weakness of regional environmental diplomacy mechanisms which are largely voluntary and lack effective enforcement measures. In this context, transglobal leadership emerges as a strategically relevant approach that emphasizes collaborative cross-border leadership. It is characterized by the ability to bridge multiple sectors and actors, build resilience to ecological uncertainty, and promote innovation rooted in both local and global knowledge systems. These characteristics enable leaders in Indonesia and Malaysia to formulate long-term strategies grounded in sustainability and shared environmental responsibility.

The key finding of this study is that environmental cooperation between Indonesia and Malaysia has evolved from reactive crisis management toward more structured and institutionalized coordination. However, this transition has not yet produced binding governance capacity capable of preventing recurring forest fire events. Existing mechanisms continue to operate largely within normative and diplomatic boundaries rather than enforceable regulatory frameworks. This structural weakness continues to undermine compliance.

This study makes an important theoretical contribution by the concept of transglobal leadership as an integrative analytical framework for understanding cross-border environmental diplomacy. Transglobal leadership synthesizes five core values including strategic global vision, adaptive resilience, ethical responsibility, collaborative diplomacy and knowledge-based innovation into a unified framework that links leadership capacity with policy mechanisms and diplomatic outcomes. In this way, the study extends existing literature by demonstrating that leadership is a structural driver shaping multilevel environmental governance across national boundaries.

By applying this framework to the Indonesia-Malaysia context, the study highlights that effective transboundary haze governance requires leadership-driven transformation that integrates accountability, data transparency, and cross-sectoral collaboration. Therefore, transglobal leadership provides a more comprehensive theoretical lens for analyzing and improving environmental policy diplomacy in Southeast Asia. In addition, various bilateral initiatives such as hotspot data exchange, firefighting training, cross-border reforestation programs and commitments under the ASEAN Haze-Free Roadmap 2030 demonstrate that environmental diplomacy grounded in transglobal leadership is increasingly necessary. Strengthening this approach requires integrating transglobal leadership values into national governance systems to become more binding and accountable. Future research is also encouraged to develop implementable models of transglobal leadership to strengthen environmental diplomacy across Southeast Asia.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

This research was written by Amir Syamsuadi as the main author, and other colleagues participated in assisting the collection and processing of data for this scientific article.

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