

## The Roles of Epistemic Communities in Policymaking: A Systematic Literature Review and Case Studies on Southeast Asian Transboundary Haze

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### ABSTRAK

*Komunitas epistemik ditekankan dalam wacana konstruktivisme sebagai aktor non-negara yang kuat dan dapat menggerakkan kebijakan di ranah internasional. Munculnya konsorsium ilmiah dalam pengambilan kebijakan telah mendorong arah kebijakan menggunakan standar ilmiah. Namun, jenis dan peran komunitas epistemik yang mempengaruhi pembuatan kebijakan di berbagai tingkat pemerintahan sebagian besar diteliti dengan prosedur yang tidak jelas. Pertama, dengan menggunakan Tinjauan Literatur Sistematis (SLR), makalah ini menemukan: 1) Meskipun memiliki keahlian ilmiah yang menonjol, pengaruh komunitas epistemik dalam pembuatan kebijakan diperluas dengan mendanai penelitian untuk kebijakan, 2) Komunitas epistemik yang dipimpin negara kurang dipercaya oleh negara lain dalam menentukan kebijakan. menyelesaikan isu-isu transnasional, 3) Kepentingan donor mempengaruhi mekanisme komunitas epistemik, 4) Sebagian besar penelitian dilakukan di negara-negara utara. Kedua, dengan menggunakan data Google Berita, makalah ini mencoba melihat permasalahan dan program Kabut Asap Lintas Batas Asia Tenggara dan menemukan: 1) Tiga organisasi non-negara berbasis sains berpengaruh dalam pengambilan keputusan dan satu organisasi berperan dalam pendanaan proyek berdasarkan kepentingan menuju transisi dari donor, 2) Komunitas epistemik mendapatkan pengaruh dengan terus menunjukkan kompetensi mereka dalam penelitian dan pengembangan kapasitas, mengadakan lokakarya multipihak dengan pembuat kebijakan sebagai peserta utama, bernegosiasi dengan prioritas nasional, dan mendanai proyek. Baik di wilayah utara maupun selatan, pendanaan dan kedekatan interaksi ilmiah mereka dengan pembuat kebijakan menentukan peran komunitas epistemik, dan yang terakhir, organisasi non-pemerintah mempunyai pengaruh dalam pembuatan kebijakan.*

**Kata kunci:** Komunitas epistemik, sains, kebijakan, hubungan internasional

### ABSTRACT

*Epistemic communities were emphasised in constructivism discourse as powerful emerging non-state actors that can drive policies in international domains. The rise of scientific consortiums in policymaking has driven policy directions using scientific standards. However, the types and roles of epistemic communities that influence policymaking at different governance levels are mainly investigated with unclear procedures. First, employing a Systematic Literature Review (SLR) this paper found: 1) Despite prominent scientific expertise, the influence of epistemic communities in policymaking was expanded by funding research for policy, 2) State-led epistemic communities are less trusted by other countries in solving transnational issues, 3) The donors' interests influence the mechanism of epistemic communities, 4) Most studies were conducted in the global north. Second, by using Google News data, this paper tried to look at Southeast Asian Transboundary Haze issues and programs and found: 1) Three science-based non-state organisations are influential in decision-making with one organisation playing roles in funding projects based on the interests toward transition from the donor, 2) Epistemic communities gain influence by constantly demonstrate their competency for research and capacity building, conduct multistakeholder workshop with policymakers as the main participants, negotiate with national priorities, and fund projects. Both in the global north and the global south, funding and their scientific interaction proximity with policymakers determine the influence of epistemic communities, and lastly, non-state-led organisations are influential in policymaking.*

*Keywords: Epistemic communities, science, policy, international relations*

## **INTRODUCTION**

The special roles of scientists or epistemic communities are often discussed in constructivism, one of the international relations realms. An epistemic community is a group of scientific-based experts who address global challenges such as food security, global warming, and global and health issues to be voiced through policies both through their influence on state and other non-state actors (Fritsch, 2011; Peter M. Haas, 1992). Cross, (2013) expanded the definition of epistemic communities, which can come from state and non-state actors and scientific or non-scientific agencies who should be capable of making decisions based on shared scientific knowledge. In more precise boundaries, epistemic communities are manifested in policy issues where science is crucial, such as environment and health, but where science does not exist, like in human rights, epistemic communities are not needed (Ernst Haas, 2000). Foucault's knowledge and power inspired constructivists to establish the term epistemic communities to explain the power of knowledge and science in constructing norms and rules in international relations (Peter Haas, 2021). Some other features in epistemic communities are shared common principled beliefs, causal beliefs, notions of validity, and policy purpose (Peter M. Haas, 1992). This article limits the definition of epistemic communities to scientific consortiums and state and non-state actors with scientific expertise in policymaking.

In facing global challenges, the roles of epistemic communities are more prevalent and cannot be pressurised by state-centric political powers as they address global challenges faster through philanthropy, multidisciplinary networking, and creating scientific standards (Bicchi, 2022; Kaltofen & Acuto, 2018). Another perspective revealed that even though epistemic communities are strong, the interactions between scientific recommendations and the policy-making process can be unpredictable, as policymakers can interpret evidence differently (Wood-Donnelly & Bartels, 2022). As a result, energy security and climate governance became two conflicting purposes (Wood-Donnelly & Bartels, 2022). Therefore, a future inquiry, such as how epistemic communities balance the research and decision-making in environmental protection, energy security, and economic growth equally, can be a valuable research agenda (Wood-Donnelly & Bartels, 2022). The next question in the

debate is, who shapes policymaking most when the expertise of science is necessary to construct (Peter Haas, 2021)? What kind of mechanism and scientific actors or epistemic communities influence decision-making (Wood-Donnelly & Bartels, 2022)?

The influence of epistemic community for science in global policy has become distinguished in transforming science into forces (Mai'A K.Davis Cross, 2013). However, the concept of epistemic communities by Peter M. Haas, (1992) has developed and been criticised as rising elitism, overlooking Eastern knowledge systems and their influence on regional policy, and unclear explanations on power dynamics among epistemic actors (Mai'A K.Davis Cross, 2013; Walker & Martinez-Vargas, 2022). Cross, (2013) provided an understanding of the roles of epistemic communities not only in policymaking but also in the political process, even though the study was still focused on the northern perspectives and global actors. Therefore, it is necessary to explore the roles of epistemic communities in regional issues in the global south, where values, knowledge systems, and institutional barriers and enablers are different from those in the Northern view (Walker & Martinez-Vargas, 2022). Legrand & Stone, (2018) also calls for more studies to investigate the effectiveness of scientific knowledge in transnational governance and decision-making and whether scientific collaborations with non-state actors lead to policy changes at the transnational level.

In dealing with climate change, the outcomes of epistemic communities were associated with national policy strategies; in developing countries, the roles of non-state actors are more prominent. However, few systematic investigations suggest a more precise model for governments to employ non-state actors (Hsu, Brandt, Widerberg, Chan, & Weinfurter, 2020). Thus, to fill the gap in the previous studies notably lacking perspectives from the global south (Mai'A K.Davis Cross, 2013; Walker & Martinez-Vargas, 2022) and not systematically synthesised evidence on types, roles and antecedents of epistemic communities' effectiveness in policymaking (Peter M. Haas, 1992; Özkaragöz Doğan et al., 2021; Toke, 1999; Wood-Donnelly & Bartels, 2022; Zhao, 2006), this paper systematically consolidates previous evidence on the types of epistemic communities, roles, outcomes, and conditions that influence policymaking in different contexts and institutions. This paper tries

to answer two questions: What are the types and roles of epistemic communities in influencing policy systematically synthesised from previous empirical studies? Later, this paper takes a case in Southeast Asia to represent the global south case and investigates the second question: What types and roles of epistemic communities in decision-making to solve Southeast Asian transboundary haze? Varkkey, (2015) described Southeast Asia's palm oil network and haze governance. However, future exploration is necessary to determine how network actors address the haze issues through their scientific competency and run across various governance levels (Varkkey, 2015). Much of the focus has been put on the roles of state actors, but the roles of non-state actors, particularly the ones with scientific expertise, are still under-explored (Fongissara & Buddharaksa, 2022; Forsyth, 2014; Miller, Rigg, & Taylor, 2022; Varkkey, 2022).

### **ANALYTICAL FRAMEWORK**

Previous studies have explored antecedents of epistemic communities' effectiveness in policymaking. Kelley, (1989) indicated that epistemic communities can influence policy agenda-setting when proven competent and embedded in civil society. Peter M. Haas, (1992) suggested that epistemic communities are influential in policymaking, particularly if the policy issues are uncertain and require scientific knowledge, yet some scientific recommendations are still not considered. In the context of China, Zhao, (2006) revealed that scientific communities have influenced foreign policymaking in China through several channels, yet, the authoritarian-centred approach of the state hampered scientific influence in policy debate. Later on, Mai'a K.Davis Cross, (2013) highlighted that some epistemic communities are more likely to influence decisions when the goal is to improve human well-being, there is proven professionalism and social proximity in policy-making, the policy challenges are uncertain and need scientific recommendations, and the recommendations are not costly. Mai'a K.Davis Cross, (2015) added that non-transparent and hierarchical organisational cultures created non-conducive environments for epistemic communities to function. Some studies have offered conditions for epistemic communities to influence policies, yet those studies were conducted in different contexts and with unclear procedures for collecting evidence (Peter M. Haas, 1992; Kelley, 1989; Toke, 1999; Zhao, 2006). Mai'a K.Davis Cross, (2013) suggested future studies need to systematically compare the roles of epistemic communities as most previous studies focused on single case studies.

Özkaragöz Doğan, Uygun, & Akçomak, (2021) used secondary data and compared five cases of scientific communities' roles in addressing climate change; however, the selection criteria and the database used were not transparent.

## **METHODS**

This paper employs systematic literature reviews (SLR) to synthesise previous evidence and minimise biases. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement helps authors structure the processes of selecting and analysing SLR studies more transparently (Page et al., 2021). This study does not use one mainstream approach in conducting SLRs, Population, Intervention, Comparator and Outcome (PICO) because the use of PICO is usually limited for quantitative studies in health research and does not reveal what and how questions (Schiavenato & Chu, 2021); this article rather uses sample, the phenomenon of interest, design, evaluation, research type (SPIDER) to reveal sample (epistemic communities with clear scientific expertise), the phenomenon of interest (contexts of issues such as health, climate changes, and other development goals related), design (only black literature), evaluation (the outcomes for policy in international domains and conditions of the engagement of epistemic communities), and research type (the methods used are transparent and systematic). SPIDER is the most appropriate for research databases of qualitative and mixed methods and bigger specificity (Methley, Campbell, Chew-Graham, McNally, & Cheraghi-Sohi, 2014). Three databases are used in the SLR, such as Scopus and Wiley Open Library. Scopus and Wiley Online Library provide a large peer-reviewed scientific output database that is reproducible and appropriate for SLR (Gusenbauer & Haddaway, 2020). On Scopus, some keywords like “epistemic community” or “epistemic communities” or “university” or “universities” or “NGO” or “think tank” or “research” or “science” and “international relations” or “diplomacy” and “qualitative” or “quantitative” and “interview” or “survey” in titles, abstracts, and keywords are used for only articles, conference papers, and all open access. As a result, the search found 83 documents found. The keywords are employed to ensure all types of actors as epistemic communities are covered and to ensure the databases found are based on empirical and systematic investigations. On Wiley Online Library, terms such as epistemic communities are used to

find articles that use the terms as keywords and international relations are used anywhere in the articles and are limited to all open-access journal articles. The result shows 23 studies are found. After applying some inclusion criteria specialised to the associations with clear scientific backgrounds and outcomes in the international policy domain, this study selected 11 previous literatures to be included. The data will be categorised qualitatively based on the roles and outcomes of the scientific associations and epistemic communities.

## RESULT AND DISCUSSION

### Journals, Years, Research Methods and Countries

The studies on the roles of epistemic communities are not exclusively investigated in the international relations domain. The data represents that even though epistemic communities require scientific competency, their scientific recommendation could not be leveraged without their roles in transnational decision-making particularly in environmental issues. It can be seen from Table 1 describes the publication in various journals, not only in political science but also in other journals which have different scopes, such as forestry and sustainability. Some studies in the database described procedures in creating scientific standards and scientific involvement in communicating the scientific findings in policymaking (Lencucha, Kothari, & Labonté, 2011; Nago & Ongolo, 2021; Otsuka, 2022; Riordan, Machoň, & Csajková, 2023). More studies are needed to explore the roles of epistemic communities in global health and climate change and in emerging issues such as artificial intelligence, cyber security, agriculture, and natural resources.

Table 1 indicates more research was published in the following years, with most issues in global health and climate change with minor attention put on space diplomacy and archaeology. In the following years, more studies followed with other issues, such as climate change and environmental governance.

**Included Articles after Inclusion Method**

No.	Author(s)	Year of Pub.	Journal	Cited	Issues	Country of Affiliation
1.	Lencucha R.; Kothari A.; Labonté R.	2011	Health Policy and Planning	32	Global Health	Canada
2.	Modisenyane S.M.; Hendricks S.J.H.; Fineberg H.	2017	Global Health Action	3	Global Health	South Africa

3.	Moualla Y.; McPherson G.	2019	Sustainability (Switzerland)	5	Archeological sites	United Kingdom
4.	Nago M.; Ongolo S.	2021	Forests	4	Biodiversity	Germany
5.	Bonilla K.; Cabrera J.; Calles- Minero C.; Torres- Atencio I.; Aquino K.; Renderos D.; Alonzo M.	2021	Frontiers in Research Metrics and Analytics	1	Global Health	Brazil
6.	Otsuka, Kenji	2022	Review of Policy Research	3	Environmental governance and climate change	Japan
7.	Riordan N.; Machoň M.; Csajková L.	2023	The Hague Journal of Diplomacy	1	Space Science	United States

*Source: Selection Result after Applying Inclusion and Exclusion Criteria by the author*

All of the studies were conducted by qualitative method with purposive structured interviews are the instruments to collect questions on the political process and their engagement in policymaking. Three studies were conducted by authors and funded from United Kingdom (2), United States (US) (1), South Africa (1), Germany (1), Brazil (1), Canada (1), and Japan (1).

### **The Types of Epistemic Communities, Roles, and Outcomes**

Five studies included in this paper corroborated with (2021) that science that is manifested in epistemic communities is political and functions as an instrument to induce norms and rules in the transnational decision-making. Six studies indicated epistemic communities appear more to address global challenges. Lencucha et al., (2011) showed that Canadian non-governmental organisations (NGOs) that have special expertise in studying and advocating the impact of the tobacco market on public health were successful in advocating The Framework Convention on Tobacco Control (FCTC) to the World Health Organization (WHO). Funded by research institutes in tobacco control, the NGOs played a role in

monitoring the implementation of FCTC, compliance of countries, tobacco firms' activities during discussions, connecting governments, providing scientific expertise in evidence and training, facilitating inequalities, and funding, among other countries' research institutes (Lencucha et al., 2011). The interviews suggested that the involvement of the NGOs has increased countries' capacity and trust to comply with FCTC, particularly in developing countries (Lencucha et al., 2011).

Another form of epistemic community in public health was shown by public health experts in pharmaceutical drugs in South Africa in advocating cheap antiretroviral therapy (ARV) drugs in the domestic domain and brought to the international scope (Modisenyane, Hendricks, & Fineberg, 2017). Those experts initially voiced the constitutions and rights for cheaper ARV. Later, with state policy makers, they were invited by multilateral organisations to draw frameworks in addressing drug inequalities globally. Later on, the drug price decreased, and pilot projects providing free HIV oral testing kits were started in South Africa (Modisenyane et al., 2017). In another scientific field, a project to preserve shared cultural heritage initiated by archaeologists collaborating with local communities in bordering countries has been shown to deepen social networks in Northeast Syria and Turkish borders (Moualla & McPherson, 2019). Through culture and networks, conflict can be minimised.

Even though the engagement of women in community building and science diplomacy in developing countries was limited socially, economically, and institutionally, an example of a women scientist organization in South America showed the consortium could connect them with policymakers (Bonilla et al., 2021). By playing roles in conducting research on public health issues, collaborating research and advocacy with the United States on HIV and influenza, addressing development challenges and participating in creating scientific agendas, the Organization of Women in Science for the Developing World (OWSD) have fostered critical public health issues in multinational scientific agenda (Bonilla et al., 2021).

In regional environmental governance, particularly in transboundary pollution in East Asia, Otsuka revealed some state initiatives and non-state initiatives in Japan, China, and South Korea have created research networks to create standards to minimise air and water pollution. Private initiatives not only provide research results and standards to monitor



pollution but also translate ideas into actions (Otsuka, 2022). Some countries questioned the standards and norms made by each initiative; later, the study highlighted maintaining independence and transparency of scientific initiative by separating knowledge production from the policymaking channel is important (Otsuka, 2022). The impact of the engagement of scientific initiatives in the study could not be observed as no agreement and standards were reached by Japan, South Korea and China. Transboundary pollution still a delicate and contested issue among three countries because the data of pollution transfer is sensitive and often controlled by governments (Otsuka, 2022).

Some think tanks in Congo Basin Countries (CBc) were supposed to contribute by giving scientific inputs for maintaining biodiversity and mitigating worse climate change effects in forest areas of Amazon (Nago & Ongolo, 2021). Nago & Ongolo, (2021) revealed the process of forest diplomacy failed to maintain biodiversity as most actors were influenced by Western countries that funded local agencies to avoid being blamed as the source of industrialisation. The funding was also given to some think tanks that provide scientific evidence for the diplomacy process (Nago & Ongolo, 2021). The think tanks influenced the direction of negotiation that affected forest governance at the national level.

In an area of space policy, scientific consortium and academia were involved in Artemis Accords (Riordan et al., 2023). The accords are a consensus among countries to support the US's attempts to expand NASA's Artemis programme, its conditions for peace and safe exploration for science and commercial purposes, and the presence of the Artemis program on the moon. The Hague International Space Resources Governance Working Group was involved in gaining concepts and rights for space explorations. Academia was also involved in NSpC UAG, an accords and national space policy advisory body. The epistemic communities were involved in drafting arrangements for US leadership in accords. Riordan et al., (2023) indicated that scientific actors can promote norms and values and influence other states to support states' interests.

From Table 2, the included database indicates some organisational types of epistemic communities, such as university academia, NGOs funded by independent scientific bodies, expert associations, informal communities of scientists, state-led research associations, think

tanks, and scientific consortiums. They gather public support and frame issues to influence policymaking, then conduct standards and include themselves as consultants and policy drafting. The instruments to gather support are research collaborations, research funding, and policy funding. The database also reveals that state-led scientific bodies and those funded by industries influenced transnational decision-making less than independent scientific bodies due to less trust from other countries. Therefore, epistemic communities must have a solid scientific stance and independent funding to influence decision-making. Lastly, the database corroborates with Walker & Martinez-Vargas, (2022) that most studies were conducted from the perspectives and phenomena of the Global North. In the Global North, state-led epistemic communities are not dominant based on the SLR finding, which corroborates with Peter M. Haas, (1992) that in more democratic nations, scientific evidence is more valued in policymaking. The following section explores the types and roles of epistemic communities in decision-making on Southeast Asian transboundary haze issues as representatives of the global north.

#### **The Types of Epistemic Communities and Outcomes Categorizations**

<b>The types of epistemic communities</b>	<b>Roles</b>	<b>Impact</b>	<b>Studies</b>
NGOs	Champions public health policies and allies with governments opposing cigarette companies by providing evidence-based expertise to push tobacco control and policy drafting and advocacy. They gather public support to challenge opposition and frame tobacco as a human rights issue.	Significant impacts were observed from the adoption of the FCTC treaty globally and monitored implementation.	Lencucha et al., (2011)
Public Health Experts Associations	They engage at the domestic level and then leverage international health policy by initiating international collaborations in HIV-related medical provision.	It has shaped international intellectual property rights and trade agreements for equal HIV medicine access.	Modisenyane et al., (2017)
Community of Archaeologists	Cultural heritage development collaborations.	Minimised transnational conflicts.	Moualla & McPherson, (2019)

Organization of Women in Science for the Developing World (OWSD)	Conducting research, collaborating research and advocacy with donor countries on public health issues.	Fostered critical public health issues in multinational scientific agenda.	Bonilla et al., (2021)
State-led research associations, and private-led research consortium. Dialogues were facilitated by academia.	Provide standards to monitor pollution and the source of pollution and provide actionable recommendations when pollution occurs.	As tension in East Asian countries are high, some state-led research associations were trusted less by decision-makers than independent research consortium.	Otsuka, (2022)
Think tank	Provide scientific recommendations to maintain biodiversity and adapt climate change in Amazon areas.	Failed to maintain biodiversity because the funding was industrial actors.	Nago & Ongolo, (2021)
Scientific consortium in the Hague International Space Resources Governance Working Group. Academia at the NSpC UAG	Draft arrangements for US leadership in accords. The epistemic community agreed to support the US leadership in Space research with the conditions for peace and safe exploration for science and commercial purposes.	Support the states' interests in leading space research.	Riordan et al., (2023)

*Source: Qualitative categorisation by the author.*

## Case Studies on Southeast Asian Transboundary Haze

### The Case of CIFOR

CIFOR's initial engagement was indirect in the policymaking of Southeast Asian transboundary haze, which started in 2015 through the ASEAN Agreement on Transboundary Haze Pollution (AATHP) (Gaveau, 2015). CIFOR focused on capacity building, conducting causal-impact studies on forest fires in Southeast Asia to inform policy discussions during the implementation of AATHP (Velde, 2015). CIFOR has also hosted multistakeholder workshops for civil society, policymakers, and the private sector. While epistemic communities in the global north are more likely to receive support from academia (Staisch, 2005), the case of CIFOR was more collaborative with state-led institutions, local

communities, and private sectors (Gaveau, 2015; Velde, 2014). However, the decision-making in CIFOR might also be influenced by the donor's priorities in sustainability transitions. The workshop addressed governance problems mainly to inform policymakers of a new moratorium on logging and land conversion (Gaveau, 2014). Due to its frequent capacity building and scientific expertise in forest and environmental management, CIFOR was formally included to co-manage Measurable Action for Haze-Free Sustainable Land Management in Southeast Asia (MAHFSA) program by the ASEAN Secretariat (David, 2023; Evans, 2020). Further, CIFOR hosted a policy dialogue to mitigate haze and participated in the launch of the ASEAN Haze Portal. The workshop has informed regional bodies to address challenges and targets from the UNFCCC COP26 on haze mitigation (CIFOR-ICRAF, 2022). By contributing to capacity development, scientific research and advocacy, CIFOR actively established The Second ASEAN Haze-Free Roadmap (2023-2030) (CIFOR-ICRAF, 2024).

### **The Case of IFAD**

The engagement of IFAD with ASEAN started in 2009 to conduct a study to rehabilitate and sustainably use peatland forests in Southeast Asia and partnership with private sectors (GEF, 2011). IFAD also played a role in funding multistakeholder capacity building. Even though IFAD is a funding agency, it also possesses scientific expertise in capacity building. The success of the peatland forest project that ended in 2014 led to financing MAHFSA for US\$ 3.5 million (IFAD, 2019), AAHTP (CIFOR-ICRAF, 2024), and ASEAN Investment Framework for Haze-Free Sustainable Land Management (AIF-HFSLM) to 2030 (Parish, 2024). IFAD's decision to build capacity and invest in finding solutions for transboundary haze is related to its member states' interests, particularly Italy, which involves the transition agenda and several priorities for development projects of developed countries as the primary donor, even though organisational strategic priorities are defined by all members, including oil-producing countries, and developing countries, and its partnership with international organisations. In the decision-making process to fund a program, IFAD also negotiated with ASEAN member countries to match their national priorities and conduct the monitoring phase accordingly, as a result of negotiation, not all member of ASEAN countries might join the project (ASEAN Secretariat, 2019a; GEF, 2011; Wulandari & Terzano, 2021).

### **The Case of Global Environment Centre**

The Global Environment Centre (GEC) is a non-profit organisation based in Malaysia. It was founded in 1998 by an academic motivated by environmental governance. Most of GEC's funding comes from international organisations. Along with IFAD, the engagement of GEC started in the 2009 peatland sustainable management project (GEF, 2011). In the ASEAN Investment Framework for Haze-Free Sustainable Land Management (AIF-HFSLM) project, GEC was chosen as a partner of ASEAN due to its scientific expertise and its network on transboundary haze (Krishnan, 2022). GEC was also assigned to set priorities in AATHP (Wulandari & Terzano, 2021).

### **CONCLUSION**

Concisely, epistemic communities, which are groups of scientific-based experts, play significant roles in addressing global challenges and influencing policymaking, particularly when the major donor's interests support their scientific missions. The SLR result indicates that most studies were conducted in the global north. They provide scientific expertise, conduct research, advocate for policy changes, and engage in capacity building. Their impact can be seen in various areas, such as influencing equal access for public health and providing standards in environmental governance and space policy. However, the influence of epistemic communities can be more limited in state-led initiatives or when influenced by external funding priorities.

Different from the global north experience, which has more academia in universities and research experts, in the global North, science-based NGOs appeared to play significant roles. In the Southeast Asian transboundary haze, organisations like CIFOR, IFAD, and GEC have been actively addressing the issue through research, capacity building, and advocacy. Their roles are essential in developing regional policies and actions to mitigate haze. Looking at the frequency of mentions in the Google news data, CIFOR and IFAD are the most frequently influencing the transboundary haze discourse in Southeast Asia, particularly IFAD, which funds projects based on the interests toward the transition from the donor. In the Southeast Asian case, epistemic communities gain influence by constantly demonstrating their competency for research and capacity building, conducting multistakeholder

workshops with policymakers as the main participants, negotiating with national priorities, and funding projects. Both in the global north and the global south, funding and their scientific interaction proximity with policymakers determine the roles of epistemic communities, and lastly, non-state-led organisations are influential in policymaking.

This study has some limitations. First, the keywords used in the search for the Scopus database are more varied than just “epistemic communities”, which showed different results and contexts compared to when fewer keywords were employed. Second, this data is synthesised from only literature and reports. Therefore, it would be necessary for future studies to conduct multicase studies that employ interview with main actors in epistemic organisations, surveys or quantitative analyses on policymakers' perceptions towards epistemic communities. Primary data might identify the need for science and influential tools in international policymaking. Third, the database did not find emerging scientific themes such as artificial intelligence, cyber security, agriculture, and technologies that support sustainability. Therefore, future studies need to explore those areas.

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