

Navigating Environmental Cooperation on Air Pollution amid Political Competition in East Asia*

Azusa Uji

Kyoto University

**Final accepted version by International Relations of the Asia-Pacific*

Abstract

East Asian countries have recently upgraded their regional cooperation for clean air, the Acid Deposition Monitoring Network in East Asia, with elaborate arrangements for monitoring and capacity-building assistance for multiple pollutants. This represents a departure from the earlier informal regimes with vague arrangements on acid deposition. However, despite this notable shift, this formalisation in the regional governance for clean air remains largely unexplored in the existing literature. This study fills this gap by analysing the dynamics of formalisation through aid from theories of regime complexity and legalisation. It focuses on the decade from 2012 to 2021 employing documentary analysis and interviews. The results reveal that governments actively pursue their state interests by adjusting institutional arrangements through regime competition and selection that drive formalisation. Sharing cognition of the hazardousness of multiple pollutants achieved through interactions between regional and global institutions serves as a catalyst for reaching an agreement on the arrangements.

Keywords: air pollution; institution; formalisation; negotiation; capacity building

1. Introduction

In 2021, the East Asian countries upgraded their regional cooperation regime for clean air, the Acid Deposition Monitoring Network in East Asia (EANET). They agreed to improve EANET as a unified regional regime that monitors and analyses specified multiple transboundary air pollutants, through precise and elaborate project activities and funds for capacity-building assistance. This represents the formalisation of the regime involved, which is a major departure from the pre-reform fragmented regimes with vague arrangements centered on acid deposition, as seen in other policy realms covered in the special issue, of which the current article is a part. While employing nonbinding rules for emission reduction or control, the new formal regime still challenges the conventional view that regional governance in East Asia is essentially informal at best, with vague goals and imprecise arrangements because of intergovernmental rivalries as well as the principle of sovereign territoriality strongly embraced by countries in the region (Takahashi 2017)¹. However, this institutional change is considered unprecedented given that similar earlier attempts to upgrade EANET had failed. Despite this, no studies have examined the extraordinary institutional change in the regional environmental regime. Therefore, this study analyses the dynamics of formalisation for clean air, to improve our understanding of a possibly new phase of regional governance in East Asia that qualitatively differs from the preceding one.

This study addresses the following questions: Why did member countries agree on the 2021 formalisation that had failed a decade earlier? How did they overcome intergovernmental rivalries that impeded earlier attempts to formalise? What were the contents of the agreement that made formalisation possible? To address these questions, I use the conceptual framework of formalisation presented in the introductory article of Suzuki's series (n.d.). Drawing on theories of regime complexity and legalisation, the conceptual framework posits that formalisation, defined as precision and non-delegation, comprises a

means for and an outcome of a regime-initiating country, to ensure institutional benefits in order to attract member countries in a region where multiple regimes compete to set rules and standards for particular regional ordering.²

The definition of formalisation in the special issue elucidates the major changes in the institutional arrangements that have occurred in the regional regimes on air pollution and other issue realms over the last two decades. Thus, the definition facilitates theoretical investigations in the issue. Specifically, precision means that, guided by goals, principles, and norms, arrangements are specifically stated and delineated courses of behaviour are prescribed or proscribed, which ensure coherence among the arrangements and outcome predictability (Abbott et al. 2001). Non-delegation arrangements provide states with the behavioural freedom to either choose the best regime or mix multiple regimes through overlapping memberships in order to derive greater benefits (versus committing to a single regime on an ex ante basis).

Multiple regimes emerge in a system of capability dispersion wherein more than one state is motivated to initiate regimes to obtain order-defining privileges, by employing a regime-shifting strategy (Drezner 2013; Helfer 2009; Henning and Pratt 2023). Among regimes with non-delegating arrangements, states tend to select the venues based on where they are best able to promote specific policy preferences (Alter and Meunier 2009, p. 16). Such concern about regime selection prompts regime-initiating major states to seek to outbid their rivals, in order to obtain support from other countries for their regimes. To do so, they propose formalised regimes equipped with unambiguously defined goals and precise arrangements, to signal that their regimes can provide greater benefits with certainty than their rivals' without stifling members' behavioural freedom (restrictions would discourage support). Therefore, competitive regime creation and selection create a positive loop for formalisation.

Using the above framework, I develop my argument as follows: The 2021 institutional reform of EANET, in terms of expansion of its scope and financial diversification represent formalisation. The scope expansion helped enhance the benefits of participating in EANET by encompassing the monitoring of multiple air pollutants as a major goal of EANET, while financial diversification promotes robust capacity building, which helps the recipient countries monitor air pollutants. The arrangements of non-delegation were maintained in EANET to allow behavioural freedom for voluntary emissions reduction, monitoring, and financial contributions, in order to solicit new memberships (The arrangements mandating delegation discourage membership). I argue that, amid competition with a rival regime led by Korea, with its growing economic power and acute environmental concern, Japan, the initiator of EANET, utilised the formalisation as a means to promote participation in EANET by clarifying and enhancing its benefits to member countries. In section 5, I evaluate the robustness of my explanation by comparing it with an alternative power-oriented explanation that attributes regime change to a shift in the distribution of capabilities between states (Krasner 1983; Mearsheimer 1995).

To empirically evaluate my argument, I evaluated intergovernmental negotiations in which members agreed on the improved EANET arrangements, focusing on the crucial decade from 2012 to 2021. As data, my analysis uses (1) the minutes that detailed negotiations, proposals, and statements by representatives from member countries regarding reforms in the EANET; (2) publications released by the EANET on the regional status of air pollution; and (3) reports by other global environmental institutions. Additionally, to reveal the intricacies of the negotiations that remained unclear in these documents, interviews were conducted with representatives from the Secretariat for EANET, an official of the Network Center (Asia Center for Air Pollution Research) in Japan, officials of the National Institute of Environmental Research (NIER) in Korea, and several government officials from member

countries who attended annual intergovernmental meetings of the EANET. Informed consent was obtained from the interviewees at the beginning of the interviews.

Based on the results of the above comprehensive documentary analyses and interviews, this study offers four major contributions to the literature on regional governance in East Asia. First, it buttresses the conventional view of regional governance in East Asia, positing that governments actively pursue the state interests they define by establishing and adjusting regional regimes as policy tools (Pempel 2021). Thus, the institutional arrangements they agreed upon were the main drivers of formalisation as a tool to promote their interests. Such arrangements collect funds for capacity-building assistance from diverse sources to engage in expanded activities, such as monitoring multiple pollutants, data analysis, and health research. These arrangements distribute ownership and authority across member countries and help establish a region-wide monitoring system for transparency and reputation building, thereby dispersing the constraining effect of intergovernmental rivalries on formalisation.

Second, by interacting with global and regional institutions, member countries reduce their cognitive differences through sophisticated and impartial scientific assessments of the hazards of multiple air pollutants and their mutually reinforcing effects on human health and the environment. Such interactions helped amend fragmented epistemic communities and incoherent science–policy interfaces in member countries. Shared cognition achieved through global–regional interactions serves as a precondition for reaching an agreement on institutional arrangements.

Third, contrary to conventional East Asian practices, governments use regional organisations and global–regional linkages to reach and implement agreements. However, this is not a genuine transgovernmental process³ but a government negotiation strategy to adjust regional institutions and pursue state interests. Fourth, the rival structural theory, often

used to explain East Asian regionalism and regional governance,⁴ cannot account for the formalisation of regional institutions on air pollution, promoted by a declining power.

The remainder of this article is structured as follows. Section 2 reviews the literature. Section 3 covers the initial phase of regional governance from its establishment in the 1990s to the abortive attempt at formalisation in 2010. Section 4 discusses scientific consensus building, scope expansion, and financial diversification—all contributed to clarifying and enhancing the benefits of EANET as a main driver of formalisation. Section 5 evaluates the robustness of my explanation by comparing it with power-based explanations on institutional change. Section 6 concludes the article by summarising the main findings, clarifying their contributions to the literature on regional environmental governance, and suggesting directions for future research.

2. Literature Review

East Asian countries have been suffering from acute transboundary and national air pollution for decades. Several regional cooperative frameworks have been established to address this problem. The most important frameworks are EANET and Joint Research on Long-range Transboundary Air Pollutants in Northeast Asia (LTP).⁵ The two and all other frameworks comprise imprecise and legally nonbinding instruments, thus being characterised as informal and soft based on the classification scheme advanced by Abbott et al. (2000). They are in stark contrast to the regional environmental institutions in Europe, which have legally binding emission rules for multiple air pollutants under the Convention on Long-Range Transboundary Air Pollution (CLRTAP).

The literature has evaluated the reasons for East Asia's constrained regional air governance. Yarime and Li (2018) and Shu et al. (2020) attributed the low level of formalisation to fragmented epistemic communities in the region, which impedes the building of a scientific consensus on diagnosing and prescribing transboundary air pollution. Komori

(2010), Reimann (2014), Elliott (2017), Takahashi (2017), and Otsuka and Cheng (2022) argue that national security concerns, intergovernmental conflicts, and divergent national interests are the major culprits of informality.

Kanie and Soden (2013) argued that a Japanese initiative in EANET was a double-edged sword in that it contributed to the implementation of EANET activity and fuelled scepticism about Japan's hegemonic intent among other East Asian countries. This contradicts the fact that EANET is, by definition, has been a multilateral institution with an intergovernmental decision-making body since its initiation. It consists of representatives of the participating countries, who jointly make decisions on network activity operations. However, it was regarded as an institution led by Japan, the largest financial contributor with dominant influence. Kim (2014a) found that a fear of Japanese assertiveness discouraged China from participating in EANET activities. At the same time, Yoon (2006) stated that the Chinese and Korean governments related the dominant Japanese position in the EANET to the legacy of Japanese prewar militarism and questioned the legitimacy and transparency of the EANET. Because of such interstate rivalries, regional governance on air pollution remained congruent with "stunted regionalism" in other policy realms (Ravenhill 2009; Rozman 2004).

Despite the deterioration of transboundary air pollution in the region in the following decade, as predicted in the literature, East Asian countries have failed to upgrade regional institutions toward formalisation due to the political constraint on cooperation. More precisely, they had divergent views on whether to maintain the existing focus on acid deposition or encompass multiple pollutants. In addition, their views differed sharply concerning the intensity and geographical coverage of monitoring activities. Therefore, East Asian countries failed to agree on a comprehensive solution to the deterioration of air quality

that resulted from multiple pollutants and their interactive effects on air that remained unmonitored in the informal regional institutions.

3. The Politics of Constrained Regional Governance before Formalisation

3.1. Institutional weakness of informality

Comparing the two major regional frameworks, the EANET and LTP had institutional weaknesses deemed inappropriate for formalisation. Korea launched the LTP in 1995 upon the conclusion of the first Northeast Asian workshop on long-range transboundary pollutants held with China and Japan. Since the inception of the LTP, Korea has provided a large portion of its financial resources and hosted annual expert meetings, as Japan has done for the EANET (Kim 2014b). Both the LTP and EANET targeted transboundary air pollution, although the two differed in activity and substances. LTP was more effective than EANET, which focused exclusively on acid deposition, in dealing with multiple pollutants, including particulate matter (PM) and ozone (O₃) (Kim 2014b). While EANET focused on measuring pollution for long-term purposes, LTP aimed to establish a common understanding of short-term modelling (Kim 2007). The LTP developed neither common methods for monitoring nor common modelling programs for research, thus making it difficult to compare the results.

Despite these differences, there was some commonality between the LTP and EANET regarding the substantive function of monitoring, for which both could be integrated into a single framework. In comparison, regional cooperation in the EANET was deeper, geographically wider, and institutionally stronger than that in the LTP. Thus, LTP should be merged into EANET rather than vice versa if integration occurred. This upset the prospects of Korean environmental leadership, which the Korean government could not accept (Kim 2014b). Thus, Japan regarded Korea's opposition to the EANET expansion as an attempt to maintain its regional influence through the LTP (Kanie and Soden 2013). However, this concern might have been excessive. In 2009, Korea proposed that LTP be integrated into the

EANET for an effective division of labour, although this idea was later rejected by both China and Japan (Kim 2014b). As expected, this exchange manifested political rivalry between Korea and Japan, which was inimical to regional environmental cooperation.

In contrast, the EANET appeared institutionally more robust, comprising 13 member countries, intergovernmental meetings (IGs) as the decision-making body, the scientific advisory committee for the IG, the secretariat, and the network center (Kim 2014a).⁶ EANET was established to achieve Agenda 21, adopted by the United Nations Conference on Environment and Development (UNCED) in 1992. The agenda stated that successful cooperation over transboundary air pollution in Europe under the CLRTAP should be repeated in other regions (Takahashi 2000).

To address the acid deposition problem in East Asia, the EANET launched its pilot-phase operation in 1998 and became an intergovernmental regional network in 2001. It established a regional network by connecting monitoring sites and research institutes across member countries and standardising monitoring methods and analytical techniques to facilitate a common understanding of the state of acid deposition in East Asia. This underscores the lack of common monitoring and analytical methods, which has prevented countries from comparing and evaluating data on a regional scale for transparency (Akimoto et al. 2022). EANET was expected to solve the problem through a monitoring network for data sharing and joint assessment among epistemic communities and provide policymakers with assessment outcomes to facilitate regional cooperation (Kim 2014a). In IG 2 of 2000, member countries agreed to define the main activities of the EANET by approving technical guidelines encompassing (1) data collection procedures through compilation, evaluation, and storage at the network centre and (2) data reporting and formatting procedures by member governments for data comparison (Kim 2014b).

However, EANET provides only a partial solution to compounded air pollution problems in the region by covering only acidic air pollutants and ignoring other equally hazardous pollutants. In addition, it does not undertake modelling, emission control, or reduction (Kim 2014a). Unlike the CLRTAP, the EANET has neither established a common regulatory policy nor promoted harmonisation for a common preventative measure for multiple transboundary air pollutants (Yoshimatsu 2016). Therefore, despite a shared understanding of acid deposition, EANET suffers from weak institutional arrangements, allowing members to use their idiosyncratic standards and freely emit excluded pollutants.

As argued by Komori (2010), these omissions can be partly attributed to intergovernmental rivalries between major countries. In 2001, EANET had no formal agreement concerning its principles, scope of activities, or administrative functions (EANET 2001). This left a political space for Japan to assume a de facto leadership role in the EANET. Its role includes hosting expert meetings, leading financing activities, and drafting a design for monitoring networks (Yoshimatsu 2016). For example, Japan paid more than 90% of the budget to the secretariat and more than 99% of the total contributions of the participating countries in 2009 (Kim 2014a). In effect, EANET was a one-country program in which no other country claimed authority, control, or ownership (Kim 2014a).

Japan's motives for EANET have received mixed interpretations. Some observers noted that this resulted from bureaucratic politics in the Ministry of Environment (MOE) (Kanie and Sodenno 2013), while others viewed Japan's activism in post-Cold War environmental diplomacy as driven by its attempts to gain an international reputation as a middle power (Sakaguchi 2011). By contrast, policy experts in the MOE expressed a different view that Japan, with the greatest economic power in the region at the time, was the only country financially and technically capable of (and thus responsible for) leading regional cooperation on acid deposition.⁷

Sceptical of Japanese political motives, both the Chinese and Korean governments requested that the Japanese government share managerial authority with its regional counterparts to enhance transparency in the network hub (EANET 2003). Korea requested the division of the hub operation into several different locations, as in the European Monitoring and Evaluation Programme (EMEP), an epistemic body of the CLRTAP with a coherent science–policy interface for regional cooperation on transboundary air pollution in Europe. Similarly, in IG 5 of 2000, China recommended that the United Nations Environment Programme (UNEP) assume the role of secretariat from the EANET, using its capacity to coordinate national environmental authorities (EANET 2003). In response, Japan agreed to transfer the secretariat from the MOE in Tokyo to the UNEP Regional Resource Centre for Asia and the Pacific (RRC.AP) in Bangkok.

Regarding financial contributions, repeated negotiations did not produce a measure of diversification. In 2002, a working group on financial measures was established. In the IG 5 of 2003, member countries used the fruits of the meetings to agree to “make effort on a voluntary basis to contribute to the budget to be directly spent by the Secretariat using fully the latest UN assessment on scale-based burden sharing from the 2005 budget” (Yoshimatsu 2016, 12-13). In the same meeting, they established a working group for future development (WGFD), which replaced the existing working group on financial measures, to “review the possibility of developing an international agreement to provide a sound basis for financial contributions” (Yoshimatsu 2016, 13). Despite these efforts, “fundamental concern about legitimacy and transparency remained a crucial issue in the entire process of the EANET” (Yoshimatsu 2016, 21). No substantive agreement was reached in these meetings.

3.2. Formalisation failure

From 2005 to 2010, WGFD members held nine consecutive meetings to discuss ways to improve EANET. However, they faced two major issues: the legal status and scope of

substances and activities. The issue of legal status concerned whether to maintain informal regional cooperation based on fragmented sub-regional entities or sign an agreement or protocol to consolidate the entities into the EANET as a formal regional framework on clean air. Another issue was whether to change the scope from acid deposition to multiple air pollutants and expand the extent of monitoring activities accordingly. This expansion would augment the coverage of the instrument from existing monitoring to emission inventory and simulation modelling, leading to the establishment of region-wide preventive measures for regional air pollution. At IG 7 in 2005, member countries discussed the instruments and legal status of the EANET and reported the outcomes at IG 10 (EANET 2005). However, member countries had divergent views on the two issues and failed to agree on a comprehensive regional framework with formal arrangements.

Sharpest disagreements among Japan, Korea, China, and Southeast Asia emerged concerning the issue of scope expansion while there was a rough consensus on nonbinding instruments for different reasons. Japan favoured an effective regional cooperative mechanism to address many transboundary air pollutants. While initially expressing a neutral stance on the legal issue, it changed the stance and advocated for legally nonbinding instruments (EANET 2007). This is because a legally binding instrument, which would require developing members with weak capacities to actively engage in monitoring activities, could discourage their participation and negatively affect overall EANET performance (Kim 2014a). As the founder of EANET, Japan hoped “to foster it as an authentic Asian institution to provide regional public goods” (Yoshimatsu 2016, 18). Thus, Japan strongly supported the expansion of scope over multiple air pollutants that interact with one another to significantly deteriorate air quality, emulating the CLRTAP in the European Union (Yoshimatsu 2016).

In contrast, Korea opposed the proposed scope expansion. Korea found it premature to adopt common instruments for multiple pollutants, claiming that its members had different

economic and technological levels. Equally worrisome to Korea was that an expanded EANET would threaten the legitimacy of the LTP with weak instruments (Yoshimatsu 2016). Likewise, China rejected the scope expansion in the EANET regarding substances and activities because it was more apprehensive of Japan's hegemonic intent. To prevent Japanese domination, China advocated incremental scope expansion (Kim 2014b). China, the largest contributor to air pollution in Asia, was concerned that under a strengthened EANET, it might be obligated to release information on the sources of pollution and substantially reduce emissions that could slow down its economic growth (Kanie and Sodeno 2013).

For these reasons, Chinese delegates presented a draft protocol for a legally nonbinding instrument with the existing scope of substances and activities, emphasising that China would not consider other instruments (Kanie and Sodeno 2013). Considering the power balance, China adopted different attitudes toward the EANET and LTP. It tolerated expanding the scope of the issue in the LTP to include new short-lived climate pollutants (e.g. O₃ and PM) and new hazardous pollutants (e.g. Hg, PAH, and POPs).⁸ Perhaps, the LTP appeared less threatening to China because it supported Korea, a lesser power (Kim 2014a).⁹ Southeast Asian countries opposed scope expansion because they were unwilling to make serious commitments to improving EANET out of fear that they would incur substantial financial burdens (Yoshimatsu 2016).

Until 2010, the five-year discussion did not resolve the differences in members' views on scope expansion. While they considered such phrases as "monitor, prevent, and control" for the expanded scope of activities and "regional air pollution" for the expanded scope of substances, they agreed only to "monitor acid deposition" in East Asia (EANET 2008, 2009, 2010). One observer viewed this outcome as a sign of slow institutional development in EAENT by comparing the tentative design in the establishment year 2000 with the operating instruments in 2010 (Kim 2014a, 107). In short, the EANET remained an intergovernmental

network with a legally nonbinding “instrument” on acid deposition, which was distinct from an international “agreement” that reformists advocated (Kanie and Soden 2013).

4. Dynamics of Formalisation in EANET

Almost ten years after the failure, member countries have successfully upgraded their EANET in 2021. They agreed to expand the scope of substances and activities for monitoring, although they maintained a legally nonbinding framework. Further, they agreed to introduce a new funding arrangement, the Project Fund, to accommodate varying capacity-building needs that intensified owing to the expansion of the scope of the issue. In our definition, these instruments are formal in that they are precise, albeit nonbinding, in establishing the region-wide monitoring of specified multiple air pollutants. The scope expansion helps enhance the benefits of participating in EANET by encompassing multiple air pollutants, while the new financial arrangement provides stable and predictable capacity building assistance for countries to conduct monitoring activities. As discussed below, the key to formalisation was the invention of institutional arrangements for fulfilling diverse state interests premised upon the shared scientific understanding of the hazardousness of multiple air pollutants. In the following sections, I first discuss how scientific consensus set the stage for formalisation and then elaborate on intergovernmental negotiations for the scope expansion and financial arrangement.

4.1. Scientific consensus

Epistemic communities generally provide policymakers with scientific assessments, advice, and recommendations through a robust science–policy interface, which allows for exchanges, co-evolution, and joint construction of knowledge between scientists and policymakers (Van den Hove 2007). Therefore, such an interface aims for scientifically informed and enriched policymaking (Ojanen et al. 2021). Since 1972, diverse science–policy interfaces have been deployed at the international level in order to identify global environmental risks and propose

policy solutions, including Intergovernmental Panel on Climate Change for climate change and Science-Policy Platform on Biodiversity and Ecosystem Services for biodiversity (Kohler 2022). However, East Asia's epistemic communities of air pollution remained fragmentary and could not provide policymakers with appropriate scientific assessments and evidence-based policy advice to establish robust regional regimes for transboundary air pollution (Yarime and Li 2018; Shu et al. 2020). Furthermore, gaps in the science-policy interface impeded policy advice from reaching policymakers (Takahashi 2017).

Despite these odds, regional-global interactions for shared cognitions found a pathway in the EANET to tap global movements for clean air into the region. This is because Japan promoted it, an enthusiastic supporter of scope expansion. In IG 14 and 15, led by Japan, there was a call to establish an Asia Science Panel on Air Quality or Asia Science Panel on Air and Climate to help nurture a robust epistemic community among East Asian scientists and promote a common understanding of air pollution (EANET 2012, 2013). Ultimately, the Asia Pacific Clean Air Partnership (APCAP) Science Panel, established in 2015, became instrumental in motivating epistemic communities to promote atmospheric science in the region and delivered a clear message about the necessity of evidence-based solutions to air pollution in Asia (Otsuka and Cheng 2022).

Specifically, UNEP officials were invited to attend the 2014 IG 16 meeting and reported that the APCAP, a mechanism for better coordination and collaboration of clean air programs in the region, would be established based on the UN Environmental Assembly (UNEA) resolution on air quality (EANET 2014). Regional-global interactions began in earnest between APCAP and EANET. Based on Resolution 1/7 of the first UNEA meeting in 2014, APCAP became a platform to promote coordination and collaboration for regional clean air initiatives. In EANET, messages and assessments conveyed by the APCAP are infused into annual IG meetings.

Global movements for strengthening international cooperation garnered momentum at the UN level and traversed East Asia through APCAP and EANET. Specifically, global movements commenced when the UNEP reported that the environmental pollution situation worldwide had worsened significantly due to the accumulation of scientific knowledge that defined urgent and important fields of action (EANET 2020b, 7). The 6th Global Environment Outlook (GEO-6), released by the UNEP in 2019, showed that air pollution was the main contributor to global environmental destruction, leading to seven million premature deaths and the loss of millions of healthy years of life (UN Environment 2019; WHO 2021). This new research finding was swiftly transmitted to the General Secretary of the United Nations, who decided to include air pollution control measures in its global project, the Sustainable Development Goals (SDGs) (EANET 2020b, 7).

This global assessment was reverberated by a regional assessment in the Third Periodic Report on the State of Acid Deposition in East Asia (PRSAD3). Their report showed that the major air pollutants shifted from NO_x and SO_x to PM_{2.5}, O₃, and VOCs. In response to the Resolution 3/8 of the third UNEA meeting in 2017 on ‘Preventing and reducing air pollution to improve air quality globally,’ in 2019, the APCAP, joined by the UNEP and the Climate and Clean Air Coalition (CCAC), published the first regional assessment report, “Air Pollution in Asia and the Pacific: Science-Based Solutions.” This report was revealed by a UNEP official at the IG20 (EANET 2018). The report assessed the air quality in the region, with PM_{2.5}, CO₂, methane (CH₄), and black carbon as major pollutants, and presented a package of solutions for the Asia-Pacific region (UNEP, APCAP, and CCAC 2019). The report intended to improve the region's divided science–policy interface by providing policy recommendations based on a scientific understanding of air quality shared in the regional epistemic community.

Through coherent epistemic communities and science-policy interfaces, member countries increasingly recognised the seriousness of transboundary air pollution and the necessity of addressing multiple pollutants through greater regional cooperation.¹⁰ This was confirmed in the statement by a delegate from a member government that these scientific reports stimulated intense discussions in the EANET for scope expansion.¹¹ Thus, it can be inferred that the global–regional linkage via the APCAP and the EANET played two important roles in regional environmental governance in East Asia. It provided authoritative scientific assessments of multiple pollutants and their interactive effects on human health and the environment, underlining the limitations of targeting only substances related to acid deposition. It amended the fragmented epistemic communities and disconnected science–policy interfaces in the region to constrain scope expansion.

4.2. Scope expansion

In the EANET, negotiations for scope expansion began in the early 2010s before global–regional interactions began. However, members expressed mixed opinions. Several members worried that the expansion would increase their financial burden and urged the EANET to maintain its focus on monitoring acid deposition and promoting capacity building on the issue (EANET 2012, 7–8). In contrast, others advocated that the scope should expand on a step-by-step basis to keep pace with the improvement of capacities in member countries to monitor PM_{2.5} and O₃, stressing the importance of additional technical support and capacity-building assistance for the implementation of an expanded scope (EANET 2013, 8).

From 2014, when the APCAP became operational, the movements in the EANET toward scope expansion took advantage of global–regional interactions at the epistemic level. EANET conducted a feasibility study on expanded activities in participating countries in 2017. Based on the feasibility study results, Japan indicated at IG 19 that scope expansion would be possible (EANET 2017, 6), and at IG 20 suggested an idea for concrete instruments

for scope expansion (EANET 2018, 6). While the proposal garnered limited support, Japan took the initiative to turn the proposal into concrete action.

At IG 21, Japan submitted a proposal as an agenda comprising scope expansion, flexible activities, and financial diversification (EANET 2019, 6). In response, members did not endorse the proposal outright but decided to consider it by establishing the Working Group on Reviewing the Scope of Instrument and the Working Group on Drafting the Medium Term Plan (2021–2025) (EANET 2019, 6). At IG 22, based on the deliberations of the working group, member countries agreed to expand the scope of the EANET and requested that the Secretariat at the network hub make necessary adjustments that led to the adoption of an annex to the Instrument for Strengthening EANET in the subsequent IG meeting (EANET 2020a, 15).

The Annex stipulated that EANET cover atmospheric environment-related substances in light of the changing demands of participating countries to address broader air pollution (EANET 2021a). The newly added substances include CO, VOCs, DSS, PM, and O₃ (EANET 2021b, 5).¹² The last two items monitored as dry deposition in the pre-reform EANET were monitored more explicitly as air pollutants in the expanded scope.¹³ Item 3 of the Annex designates methodological research and capacity building of scientific research activities related to emission inventories, modelling, and human health effects (EANET 2021b, 4). Covering emission inventories, modelling, and human health effects in research activities is a major step in transcending monitoring.

The 2021 agreements comprise highly specified instruments that cover a wide range of precisely defined activities conducive to robust monitoring. The agreements that emerged from the global–regional interactions centring on the APCAP and EANET helped nurture shared cognitions through coherent epistemic communities and the science-policy interface. With the shared scientific understanding among member countries on the need to tackle air

pollutants, the scope expansion was a means to enhance the benefit of cooperation under EANET for member countries. However, while most member countries favoured expansion, some expressed reservations that their financial burdens were likely to increase due to their insufficient capacity to implement the expanded scope of the EANET. Thus, the agreement on scope expansion was conditional upon a combination of nonbindingness and robust funds for capacity-building assistance to implement expanded monitoring activities.

4.3. Financial diversification

The first session of the Working Group Meeting in 2021 suggested that capacity-building activities should support the expanded scope of EANET to meet the demands for capacity-building assistance in member countries (EANET 2021c). In the second session, it was reminded that expanded activities should be covered as non-core activities and subject to the availability of funds based on voluntary contributions (EANET 2021d). Finally, a consensus was reached at the IG 22 meeting to establish a Project Fund as a new mechanism for financing non-core budgets for individual projects. The guidelines for managing this fund were adopted at IG 23. The regional fund for capacity-building assistance was scheduled to begin in the fourth medium-term plan (MTP) for 2021–2025.

This decision considered members' concerns. Myanmar has indicated its interest in improving national air quality standards, conditional upon support from other member countries to improve its monitoring infrastructure (EANET 2021c). Russia stated that it would support expansion if external funds were established instead of increasing the core budget of the EANET at its expense (EANET 2021c). These member countries favoured expansion, perhaps because the EANET had a track record of aiding them in acquiring essential monitoring capacities since its inception,¹⁴ fostering their confidence that additional support would help them implement the expanded scope of pollutants and activities.

This fund is called a non-core Project Fund and covers non-core “Project Activities” that are added to the existing core activities on acid deposition supported by its core budget (EANET 2020b, 6).¹⁵ Project activities financed by the Project Fund are expected to increase the flexibility of EANET and permit members to engage in new activities under proper guidelines to identify hazardous pollutants and support its expanded scope (EANET 2020b, 9). Project activities and project funds differ qualitatively from core activities and budgets. Conventional core activities are activities that *all* Participating Countries consider indispensable, priority, and essential for achieving EANET objectives and are beneficial for all Participating Countries directly and indirectly (EANET 2020b, 12).

In contrast, non-core Project Activities are supposed to include activities in which beneficiaries are limited to a *part* of the Participating Countries but are duly financed by additional voluntary contributions from some Participating Countries or external partners (EANET 2020b, 13). In practice, project activities and funds are directed toward emerging countries in the region. The majority of non-core activities approved at IG 24, discussed below, were categorised as capacity-building projects, corroborating this point. Indeed, Southeast Asian countries have high expectations for the future implementation of Project Activities.¹⁶ Korea expects capacity building and research activities to be the main benefit from the expanded scope of EANET.¹⁷

Project Activities seek to involve diverse actors collaborating with partners who agree to contribute to such activities. In the fourth MTP, members strongly encourage potential partners to support EANET activities through project collaboration or financial contributions (EANET 2020b, 13–14). The Project Fund’s sources include additional financial, voluntary, and in-kind contributions from participating countries and other nongovernmental organisations (EANET 2020b, 14). One of the five objectives set for EANET activities under the MTP underlines collaboration with diverse entities: “Objective 5: Enhancement of

cooperation and collaboration—Enhance collaborative and/or joint activities with relevant entities including international and/or regional organisations, acid deposition-related regional frameworks, financial institutions, research institutes, and interested governments of Non-Participating Countries, to tackle acid deposition issues” (EANET 2020b, 12).

Indeed, the projects approved at IG 24 in November 2022 (the first IG after the expansion of the scope and launch of the Project Fund) received funds from diverse sources, accommodating diverse interests in capacity building. More specifically, the IG24 meeting approved eight project activities, five categorised as capacity-building and three as monitoring (EANET 2022, 11).¹⁸ First, the Asian Development Bank agreed to support the Methodology Study for the Development of the LCS Hybrid Air Quality Monitoring Network (HAQMN) (EANET 2022, 12). In addition, the estimated income for Project Activities in 2023 totalled US\$ 489,700. It came from sources including funding from the available cash balance of the Secretariat, financial support from the Japanese MOE and the NIER in Korea, and in-kind support from Japan (Japan Automobile Research Institute and National Institute for Environmental Studies), Mongolia, the Philippines, and Vietnam (Vietnam Institute of Meteorology, Hydrology, and Climate Change and Ministry of Natural Resources and Environment; EANET 2022, 12).

While Japan has been the largest financial contributor to EANET since its establishment despite its economic decline, the Project Fund with financial diversification was aimed to enhance the stability and predictability of capacity building for EANET. Furthermore, a wide range of contributions by non-member countries, external international organisations, research institutes, and the private sector¹⁹ helped make EANET activities more transparent and equitable, and less susceptible to manipulation and intergovernmental discord. From my documentary analysis and interviews, I infer that as Japan has been a major financial contributor to the core budget, budgetary increases associated with capacity-

building assistance for scope expansion might augment the Japanese financial contribution and influence. Thus, the creation of non-core project funds would help diversify the EANET's financial structure and reduce the total Japanese contribution relative to others, thereby diluting Japanese influence over EANET activities. An official in the EANET Secretariat observed that scope expansion, coupled with project funds and activities, helps improve multilateral norms in the EANET and augments its impact by offering benefits to all individual member countries.²⁰ An official in the Korean NIER expressed the personal view that, ideally, the EANET core budget should be more diversified and determined by all participating countries based on a consensus rule, as in the non-core project fund.²¹ This suggests the Project Fund is consistent with Korea's expectations for widely distributed benefits in EANET.

Overall, consistent with the conceptual framework of the special issue, facing regime competition from the Korea-led LTP, Japan, the initiator of EANET, led institutional reform, scope expansion and financial diversification, for the comparative advantage of EANET, thereby clarifying the benefits of participating in EANET to member countries. In the intergovernmental negotiations, scientific evidence on the severity of air pollutants helped member countries notice the benefit of monitoring cooperation on air pollutants through an improved EANET.

5. Alternative Structural Explanation

Thus far, this analysis has focused on institutional arrangements as the central explanatory variable for formalisation. To evaluate the robustness of my explanation, I compare it with an alternative structural explanation based on power (Krasner 1983; Mearsheimer 1995). This structural theory has often been used to explain East Asian regionalism and governance in various issue realms (See the introductory article of the special issue for the related studies). The theory views institutions as an epiphenomenon of power and thus attributes change in

institutions to change in interstate structure (Mearsheimer 1995). Seemingly consistent with the theory, the institutional change in regional environmental governance in East Asia is coincided with the structural change in regional interstate relations resulting from the rise of China. However, as discussed below, this does not render empirical support for structural realism in the realm of the environment.

Indeed, the formalisation of EANET was timed with the major change in the power structure in East Asia. Japan had established and led EANET based on its economic strength and technological superiority. In 2011, China superseded Japan as the largest economy in East Asia, likely permitting the Chinese government to dislodge its Japanese counterpart from the hub of regional governance and redefine its mission to suit Chinese interests. With its declining economy, Japan could have been exposed to a Chinese revisionist pressure to dilute regional environmental governance for industrial growth and compelled to relinquish its leadership role in the EANET. However, contrary to this prediction, EANET became more formalised in 2021. There is no evidence to suggest that Chinese revisionist pressure was a culprit for the formalisation with precise and elaborate arrangements on funding and broader acceptance.

5.1. Financial diversification

Wang and Zhang (2015) argued that if EANET were to maintain Japanese domination, the Chinese government would refuse to support EANET's expansion, wishing to reduce Japanese representation in the Secretariat, and increase the proportion of funding support from other Northeast Asian countries to diffuse Japan's dominant position (Wang and Zhang 2015, pp.100–102). Faced with the economic decline, the Japanese government recognised that it might no longer be possible to maintain the current volume of contributions to EANET.²² From Japan's perspective, the diversification of project funds was welcomed because it was aligned well with its interest in scope expansion needed to improve EANET.

This represents a shift from Japan's earlier insistence on leadership to a more pragmatic approach toward clean air (Huang 2013).

Scope expansion could be possible only through financial diversification, by meeting the Chinese preference and addressing the heterogeneous capacities of member countries. Thus, financial diversification emerged as a Japanese strategy to promote scope expansion in EANET, not as an outcome of coercion associated with the power shift envisioned in the structural explanation of institutional change.

5.2. Termination of LTP

Another major event concerning the formalisation of EANET might be the termination of the LTP led by South Korea in 2022. This occurred after the fifth-phase of the LTP research activity, which led to the belated publication of a joint report agreed by Korea, China, and Japan in 2019.²³ However, Korea and China disagreed on whether to launch the next monitoring program of investigating the severity of emissions from individual East Asian countries and their impacts on the quality of air across the region. Their intense disagreement resulted in the discontinuation of LTP joint research (Environmental Labour Team 2021).

Due to the incapacitation of LTP as a monitoring regime, the Korean government expressed its willingness to accept scope expansion in the EANET. This Korean acceptance can be viewed as a result of the judgment on comparative advantage between LTP and EANET for the latter having superior institutional arrangements and access to global institutions to promote regional governance that could improve the quality of air for its citizens. In consequence, EANET has maintained its mandate consistent with the UNEP's, with progressive environmental values and multilateral norms to counter economic nationalism and sovereign territorial norms.

Both the above events together suggest that EANET became formalised as the best possible regime consistent with the members' joint interests to monitor multiple air

pollutants, in order to facilitate national governments to advance domestic policy agenda. It is neither the most effective regime to mitigate air pollution, nor is it an outcome of change in the power structure in the region. However, EANET has marginally improved through competitive regime creation and flexible regime choice.

6. Conclusion

This study addresses why and how East Asian countries agree to improve existing informal regional institutions targeted at acid deposition into more formal ones with robust monitoring and funding arrangements over multiple pollutants. This institutional change contradicts conventional wisdom that formalisation is prohibitive for regions with various constraints. However, previous studies have not clarified the formalisation mechanism.

To fill these gaps, the study, guided by the conceptual framework for the special issue, analysed intergovernmental negotiations and documented the politics of East Asian regional governance on air pollution. Facing regime competition, Japan, an initiator of EANET and aided by a new scientific consensus on the hazardousness of air pollutants, clarified and enhanced the benefits of cooperation through the formalisation of EANET to encourage participation by member countries. A peculiar feature of regional governance on air pollution is that states exploited various international policy processes outside EANET, such as UNEA and regional development banks to promote institutional change. This suggests that skillful institutional building aligned with existing global regimes in response to the regional regime competition is the key to advancing environmental cooperation in East Asia. However, this does not mean that the politics of regional governance in East Asia have shifted toward transgovernmental processes. Governments remain the main actors defining state interests and using regional institutions to promote them. Thus, the new arrangements created in EANET remain consistent with the conventional political fabric discussed in the

literature on regionalism and regional governance in East Asia. The following three points are noteworthy.

First, the global–regional linkage is consistent with the “open regionalism” notion, a major characteristic of regionalism and regional governance in East Asia (Katzenstein 2005; Pempel 2021). This quasi-multilateralisation of regional institutions, albeit seemingly inimical to regional autonomy, helps reduce the adverse effects of intergovernmental rivalries on regional cooperation by using external institutions to disperse the fear of the hegemonic influence of a regional power that prompts other countries to advocate sovereign territoriality and prevent regional institutionalisation as a preventive strategy. In effect, sovereign territoriality is not completely impenetrable, so formalisation is still possible through open regionalism.

Second, formalisation in East Asian regional institutions maintains consistency with regional norms despite the intrinsic linkage with global institutions. Consistent with the Asian Way, they reject legalised arrangements, such as binding emission reductions and financial contributions, which necessitate the establishment of an overarching authority and delegating authority by member countries. Consequently, formalisation in regional institutions is moderate and attentive to the dilemma between regulatory effectiveness and political accountability in sovereign member countries.

Third, institutional innovation in the region requires a creative state (Japan in the case of EANET) that skilfully adjusts institutional arrangements and exploits global–regional linkages to encompass diverse state interests. Such a state agency has access to global and regional institutions and a preference that is only achievable via robust regional institutions and policy cooperation. This insight helps build a bridge between the theories of institutions and agency, thus improving our understanding of the politics of regional governance. Thus, insights into leadership are crucial for studying regime complexes that connect diverse

regions, a prominent feature of global environmental governance today and in the future (Alter 2022; Alter and Meunier 2009; Keohane and Victor 2011).

These insights will be useful for future negotiations at the UN level for a global treaty on transboundary air pollution (UNEP 2017). However, this study has several shortcomings. For instance, as the EANET does not aim to regulate emissions, it did not clarify how effectively regional institutions formed within the constraints of regional politics can reduce or control emissions in member countries. It did not assess how well East Asian regional institutions cooperated with global institutions. Future research should illuminate these points to contribute to the improvement of regional institutions and governance.

References

- Abbott, K. W., Keohane, R. O., Moravcsik, A., Slaughter, A., & Snidal, D. (2001) 'The Concept of Legalization'. In: Goldstein J., Kahler M., Keohane, R. O., & Slaughter A. M. (eds.) *Legalization and World Politics*, pp. 17–36. MIT Press: Cambridge, MA.
- Akimoto, H., Sato, K., Sase, H., Dong, Y., Hu, M., Duan, L., Sunwoo, Y., Suzuki, K., and Tang, X. (2022) 'Development of science and policy related to acid deposition in East Asia over 30 years', *Ambio*, 51(8), 1–19.
- Alter, K. J. (2022) 'The promise and perils of theorizing international regime complexity in an evolving world', *The Review of International Organizations* 17(2), 375–396.
- Alter K.J., and Meunier S. (2009) 'The politics of international regime complexity', *Perspective on Politics* 7, 13-24.
- ASEAN. (2021) 'ASEAN Regional Action Plan for Combating Marine Debris in the ASEAN Member States (2021–2025)'. <https://asean.org/book/asean-regional-action-plan-for-combating-marine-debris-in-the-asean-member-states-2021-2025-2/> (Accessed on 3 October 2022).

- Beeson, M. (2006) 'American hegemony and regionalism: The rise of East Asia and the end of the Asia-Pacific', *Geopolitics*, 11(4), 541–560.
- Beeson, M., and Lee-Brown, T. (2017) 'The future of Asian regionalism: Not what it used to be?' *Asia*
- Ciorciari, J.D., and Haacke, J. (2019) 'Hedging in international relations: special issue', *International Relations of the Asia-Pacific*, 19(3), 367–555.
- Drezner, D. (2013) The Tragedy of the Global Institutional Commons. In: Finnemore, M., & Goldstein, J. (eds.) *Back to Basics: State Power in a Contemporary World*, pp. 280–310. Oxford University Press: Oxford, UK.
- EANET. (2001) *Report of the session. The third session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia 19-20 November 2001*, Chiang Mai, Thailand' (EANET/IG 3/12).
- EANET. (2003) *Report of the session. The fifth session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia 27-28 November 2003*, Pattaya, Thailand (EANET/IG 5/10).
- EANET. (2005) *Report of the session. The seventh session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia 21-22 November 2005*, Niigata, Japan (EANET/IG 7/15).
- EANET. (2007) *Report of the session. The ninth session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia 19-20 November 2007*, Vientiane, Lao PDR (EANET/IG 9/12).
- EANET. (2008) *Report of the session. The tenth session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia 20-21 November 2008*, Chiang Mai, Thailand (EANET/IG 10/14).

- EANET. (2009) *Report of the session. The eleventh session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia 19-20 November 2009*, Bangkok, Thailand (EANET/IG 11/14).
- EANET. (2010) *Report of the session. The twelfth session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia 20-21 November 2010*, Niigata, Japan (EANET/IG 12/15).
- EANET. (2012) *Report of the session. The fourteenth session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia 26–27 November 2012*, Yangon, Myanmar (EANET/IG 14/14 rev.1).
- EANET. (2013) *Report of the session. The fifteenth session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia 16–17 December 2013*, Chonburi, Thailand (EANET/IG 15/14).
- EANET. (2014) *Report of the session. The sixteenth session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia 25–26 November 2014*, Jakarta, Indonesia (EANET/IG 16/15).
- EANET. (2018) *Report of the session. The twentieth session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia, 27–28 November 2018*, Bangkok, Thailand (EANET/IG 20/12).
- EANET. (2019) *Report of the session. The twenty-first session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia, 12–13 November 2019*, Beijing, China. (EANET/IG 21/10)
- EANET. (2020a) *Report of the session. The twenty-second session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia 25–26 November 2020*, Virtual Meeting (EANET/IG 22/11).
- EANET. (2020b) *The medium term plan for the EANET (2021–2025)*, Virtual Meeting (EANET/IG 22/6_rev.1).

EANET. (2021a) *Report of the session. The twenty-third session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia, 24–25 November 2021, Virtual Meeting* (EANET/IG 23/17).

EANET. (2021b) Fourth draft (final) text for the supplementary document (annex) to the instrument for strengthening the Acid Deposition Monitoring Network in East Asia (EANET). The Twenty-third Session of the Intergovernmental Meeting on the Acid Deposition Monitoring Network in East Asia, 24–25 November 2021, Virtual Meeting (EANET/IG 23/8).

EANET. (2021c) *Report of the session. The Working Group Meeting in 2021 Session 1 (WG2021-1) Acid Deposition Monitoring Network in East Asia, 20-22 April 2021, Virtual Meeting* (EANET/WG2021-1).

EANET. (2021d) *Report of the session. The Working Group Meeting in 2021 Session 2 (WG2021-2) Acid Deposition Monitoring Network in East Asia, 18-20 August 2021, Virtual Meeting* (EANET/WG2021-2).

EANET. (2022) *Report of the session. The twenty-fourth session of the intergovernmental meeting on the Acid Deposition Monitoring Network in East Asia* (EANET) 24–25 November 2022 (EANET/IG24/13).

Elliott, L. (2017) ‘Environmental regionalism: Moving in from the policy margins’, *Pacific Review*, 30(6), 952–965.

Environmental Labour Team. (2021). Effective coordination of understanding with Japan and China needed for substantial cooperation in Northeast Asian fine dust reduction. National Assembly Legislation Research Service Press Release (January 4, 2021). [환경노동팀. 2021. 동북아 미세먼지 저감 협력의 내실을 기하려면 일본·중국과 이해관계 조율이 필요. 국회입법조사처 보도자료 (January 4, 2021).]

Helfer, L. (2009) ‘Regime shifting in the international intellectual property system’, *Perspectives on Politics*, 7/1: 39–44.

- Henning, C. R., & Pratt, T. (2023) 'Hierarchy and differentiation in international regime complexes: A theoretical framework for comparative research', *Review of International Political Economy*, 30/6: 2178–2205.
- Huang Changzhao. (2013). 'Japan's role analysis in the supply of environmental public goods in the east Asian region', *Journal of Japan* 6(0087-16). [黄昌朝. 2013. 日本在东亚区域环境公共产品供给中的作用分析. 日本学刊 6(0087-16).]
- Kanie, N., and Soden, R. (2013) 'Ajia ni okeru kokusai kankyo rejimu keisei no kadai [Challenges for creating an international environmental regime in Asia]', in S. Matsuoka (ed.), *Ajia no Kankyo Gabanansu [Environmental governance in Asia]*, Tokyo: Keiso Shobo, pp. 33–56.
- Katzenstein, P. J. (2005) *A World of Regions: Asia and Europe in the American Imperium*, Ithaca, Cornell University Press.
- Keohane, R. O., and Victor, D. G. (2011) 'The regime complex for climate change', *Perspectives on Politics*, 9(1), 7–23.
- Kim, I. (2007) 'Environmental cooperation of Northeast Asia: Transboundary air pollution', *International Relations of the Asia-Pacific*, 7(3), 439–462.
- Kim, I. (2014a) Still dirty after all these years: political leadership, knowledge, and socialization and regional environmental cooperation in Northeast Asia [Doctoral dissertation, University of Massachusetts Amherst], 103. https://scholarworks.umass.edu/dissertations_2/103
- Kim, I. (2014b) 'Messages from a middle power: Participation by the Republic of Korea in regional environmental cooperation on transboundary air pollution issues', *International Environmental Agreements: Politics, Law and Economics*, 14, 147–162.
- Kohler, P.M. (2022) Science-Policy Interfaces: From Warnings to Solutions. *International Institute for Sustainable Development, Policy Brief #30*. <https://www.iisd.org/articles/science-policy-interfaces>

- Komori, Y. (2010) 'Evaluating regional environmental governance in Northeast Asia', *Asian Affairs: An American Review*, 37(1), 1–25.
- Krasner, S. D., ed. (1983) *International Regimes*. Ithaca, NY: Cornell University Press.
- Mearsheimer, J. J. (1995) 'The False Promise of International Institutions', *International Security*, 19/3: 5–49.
- Nye, J.S., and Keohane, R.O. (1971) 'Transnational Relations and World Politics: An Introduction', *International Organization*, 25(3), 329–49.
- Ojanen, M., Brockhaus, M., Korhonen-Kurki, K., & Petrokofsky, G. (2021). Navigating the science-policy interface: forest researcher perspectives. *Environmental Science & Policy*, 118, 10-17.
- Pempel, T.J. (2021) *A region of regimes: Prosperity and plunder in the Asia-Pacific*, Ithaca, Cornell University Press.
- Rautiala, K. (2002) 'The architecture of international cooperation: Transgovernmental networks and the future of international law', *Virginia Journal of International Law*.
- Ravenhill, J. (2009) 'East Asian regionalism: Much ado about nothing?', *Review of International Studies*, 35, 215–235.
- Reimann, K. D. (2014) 'Environment, human security, and cooperation in Asia. In S. M. Pekkanen, J. Ravenhill, and R. Foot (Eds.)', *Oxford handbook of the international relations of Asia* (pp. 641– 663). Oxford University Press.
- Rozman, G. (2004) *Northeast Asia's stunted regionalism: Bilateral distrust in the shadow of globalization*, Cambridge University Press.
- Otsuka, K., and Cheng, F. T. (2022) 'Embryonic forms of private environmental governance in Northeast Asia', *The Pacific Review*, 35(1), 116–146.
- Sakaguchi, I. (2011) 'Nihon no kankyo gaikou: middle power, NGO, chihou jichitai [Environmental Diplomacy of Japan: Middle Power, NGOs and Local Governments]', *Kokusai seiji [International Relations]* 166, 26-41.

- Shu, M., Yamashita, K., and Ao, M. (2020) ‘Epistemic community no chiiki kankyo kyouryoku he no kouken to kadai [Contribution and challenges to regional environmental cooperation by the epistemic community]’, *Kankyo keizai • seisaku kenkyu [Review of Environmental Economics and Policy Studies]*, 13(2), 65–70.
- Slaughter, A. (1997) *The real new world order*, Foreign Affairs, September-October.
- Suzuki, M. (n.d.). ‘The rise of formal institutions in the Asia-Pacific region through competitive regime creation’, *International Relations of the Asia-Pacific*.
- Takahashi, W. (2000) ‘Formation of an East Asian regime for acid rain control: The perspective of comparative regionalism’, *International Review for Environmental Strategies*, 1(1), 97–117.
- Takahashi, W. (2017) *Ekkyo taikiosen no hikaku seijigaku* [The comparative politics of transboundary air pollution], Chikurashobo.
- United Nations Environment Programme (2019) Global Environment Outlook – GEO-6: Healthy Planet, Healthy People. <https://wedocs.unep.org/20.500.11822/27539> (Accessed on 10 January 2023).
- United Nations Environment Programme (2017) Towards a Pollution-Free Planet: Background Report. <https://wedocs.unep.org/20.500.11822/21800> (Accessed on 10 January 2023).
- United Nations Environment Programme (UNEP), Asia Pacific Clean Air Partnership (APCAP), and the Climate and Clean Air Coalition (CCAC) (2019) Air Pollution in Asia and the Pacific, Science-based solutions, Bangkok, UNEP.
https://www.ccacoalition.org/sites/default/files/resources/FULL_REPORT_2019_air-pollution-asia-pacific_v0226.pdf (Accessed on 2 October 2023).
- Van den Hove, S. (2007). A rationale for science–policy interfaces. *Futures*, 39(7), 807-826.
- Wang Zhifang and Zhang Haibin. (2015). ‘Strategic choices of China's atmospheric pollution and environmental cooperation in northeast Asia under the new normal’, *Subforum* 119(3). [王志

芳 张海滨. 2015. 新常态下中国在东北亚 大气污染环境合作中的策略选择. 亚论坛
119(3).]

WHO. (2021) New WHO global air quality guidelines aim to save millions of lives from air pollution.
<https://www.who.int/news/item/22-09-2021-new-who-global-air-quality-guidelines-aim-to-save-millions-of-lives-from-air-pollution> (Accessed on 22 September 2022).

Yarime, M., and Li, A. (2018) 'Facilitating international cooperation on air pollution in East Asia: Fragmentation of the epistemic communities', *Global Policy*, 9, 35–41.

Yoon, E. (2006) 'South Korean environmental foreign policy', *Asia-Pacific Review*, 13, 74–96.

Yoshimatsu, H. (2010) 'Regional governance and cooperation in the Northeast Asia: The cases of the environment and IT', *Ritsumeikan: RCAPS Working Paper No. 09-9*.

Yoshimatsu, H. (2016) 'Developing regional governance in East Asia: A case study of transboundary air pollution', *PCAPS Working Paper Series 15002*.

Notes

¹ In this paper, cooperation in Asia refers to cooperation that covers either a part of Asia (Northeast Asia or Southeast Asia) or the whole region of Asia.

² See the introductory article of this special issue by Suzuki (n.d.) for the alternative definitions of formalisation and discussions.

³ See Nye and Keohane (1971), Slaughter (1997) and Rautiala (2002) for theories of transgovernmentalism.

⁴ See Beeson (2006), Beeson and Lee-Brown (2017), and Ciorciari and Haacke (2019) for accounts on regional institutionalisation in the realist flavor.

⁵ Other regional frameworks on air pollution are the North-East Asian Sub-Regional Program on Environmental Cooperation (NEASPEC), the Tripartite Environment Ministers Meeting (TEMM),

and the Northwest Pacific Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP).

⁶ The EANET has 13 member countries: China, Indonesia, Japan, Malaysia, Mongolia, Philippines, Republic of Korea (ROK, Korea), Russia, Thailand, Vietnam, Cambodia, Lao People's Democratic Republic (PDR), and Myanmar.

⁷ Interview with Dr. Ken Yamashita, Head Planning and Training Department of Asia Center for Air Pollution Research (ACAP) (December 1, 2022).

⁸ The LTP has undergone three development phases: 1994–2004, 2005–2007, and 2008–2012. The LTP's scope of activity was expanded from monitoring on the ground and aviation to understand air quality (in the first phase) to understanding and examining source–receptor relationships in relation to their human health effects (in the second and third phases). Additionally, while the first phase broadly targeted air quality, the pollutants covered were expanded from SO₂ in the second phase, to NO, O₃, and PM in the third phase.

⁹ Apart from the three economic powers, Southeast Asian countries agreed to adopt a formal document but were more reluctant about the development of EANET due to its potential financial burden. On the other hand, Russia, which lies partially within Europe, strongly supported a legally binding instrument mainly based on its experience cooperating under a legally binding treaty to tackle managing transboundary air pollution in the EMEP (Yoshimatsu 2016, p. 18).

¹⁰ Interview with Dr. Ken Yamashita, Head Planning and Training Department of Asia Center for Air Pollution Research (ACAP) (December 1, 2022).

¹¹ Interview with an official of a less developed member country (October 1, 2023).

¹² For DSS, suspended dust and sand caused by dust and sandstorms are only applicable. While DSS covers all areas of work covered by conventional substances, (Monitoring and Reporting (Item 4), Assessment (Item 5), Research Activities (Item 6), Education and Training (Item 7), Public Awareness (Item 8), and Exchange of Information (Item 9), monitoring and reporting and assessment are exempted for CO and VOCs, being regarded as premature.

¹³ Interview with Dr. Ken Yamashita, Head Planning and Training Department of Asia Center for Air Pollution Research (ACAP) (December 1, 2022).

¹⁴ Interview with an official of a less developed member country (October 1, 2023).

¹⁵ EANET continues to engage in the core activities that all the participating countries consider an indispensable priority and essential for achieving EANET's objectives, which would benefit all participating countries directly and indirectly (EANET, 2020b, p. 12). Such activities include monitoring, developing technical manuals and guidelines, and implementing quality assurance and quality control (QA/QC) activities (EANET, 2020b, p. 12). These activities will utilise EANET's core budget. As before, the core budget is funded through the annual voluntary financial contributions of the participating countries, based on the calculations of the latest UN scale for voluntary assessment (EANET 2020b, p. 14).

¹⁶ Interview with an official of a less developed member country (October 1, 2023).

¹⁷ Interview with an official of Korea's National Institute of Environmental Research (NIER) (November 9, 2023).

¹⁸ "EANET (Acid Deposition Monitoring Network in East Asia) - Challenge, Perspective and Opportunities," a side event organised on November 30, 2022, for the seventh session of the Committee on Environment and Development at ministerial level. The Acid Deposition Monitoring Network in East Asia (EANET) Project List Adopted at IG24, MOE (<https://www.env.go.jp/content/000097525.pdf>)

¹⁹ While private sectors are not yet currently involved, future potential partners could be private companies, which have technologies related to air quality monitoring or measuring equipment. Therefore, the private sector can have a potential role in technological transfer and cooperation. Interview with Representatives from the Secretariat for the EANET (October 9, 2023).

²⁰ Interview with Representatives from the Secretariat for the EANET (October 9, 2023).

²¹ Interview with an official of Korea's National Institute of Environmental Research (NIER) (November 9, 2023).

²² Interview with Dr. Ken Yamashita, Head Planning and Training Department of Asia Center for Air Pollution Research (ACAP) (December 1, 2022).

²³ Interview with an official of Korea's National Institute of Environmental Research (NIER) on October 17, 2023.