Judiciousness of Networks in Environmental Governance? :
A Case Study of the Acid Deposition Monitoring Network in East Asia (EANET)

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1. Introduction

In East Asia, international cooperation on transnational environmental issues is crucial. However, thus far, it has been difficult for this region to attain effective and instant cooperation, although the necessity to address the serious environmental problems which impact across states is very important in terms of problem-solving as well as for the fundamental well-being of nations.[1] The difficulty stems from the fact that, before the 1990s, there was a great variety among the nations in the degree of economic development, the awareness of environmental issues, and the advancement of scientific research.

The mode of environmental governance needed for the solution of global, regional, or transnational environmental issues is a system comprising international institutions, and founded on the cooperation of many actors or networks formed by various kinds of actors connected by the desire to achieve certain goals. The creation of measures for dealing effectively with the environment demands both the reduction of international conflict among nations and the implementation of policies by those nations linked by particular environmental issues.[2] In order to realise these measures, there needs to be a number of heterogeneous relations among actors who have interests in both international cooperation and in the environmental problem that they suffer from. The term, environmental governance, is used for the cooperation of various actors affected by, or concerned with, the issues, and the realisation of a system which designs, selects, and implements institutions which can mobilise cooperation.

Most of the literature on environmental governance written during the 1980s and 1990s discussed the global environmental issues of the ozone layer and climate change, and transboundary air pollution, and was based on the extension of international regime theory.[3] The studies on the role of scientists and other

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[1] Wolfgang H. Reinicke and others, eds., *Critical Choices: the United Nations, Networks, and the Future of Global Governance* (Canada: International Development Research Centre, 2000), 27-64.

[2] Thomas F. Homer-Dixon, "On the Threshold: Environmental Changed as Causes of Acute Conflict," *International Security*, 16/2 (1991): 76-116.

[3] Oran R. Young, *International Governance: Protecting the Environment in a Stateless Society* (Cornell University Press, 1994). There are many studies on air pollution in Europe and North America employing regime theory. A representative example is: Don Munton, Marvin Soroos, Elena Nikitina, and Marc A. Levy, "Acid Rain in Europe and North America," in *The Effectiveness of International Environmental Regimes: Causal Connections and Behavioral Mechanisms*, ed. Oran R. Young (Massachusetts Institute of Technology, 1999), 155-247. Regarding regime theory, there are different perspectives on the building of international regimes: (neo) realists and neo-liberal institutionalists. For instance, Stephen D. Krasner defined the regime as 'institutions possessing norms, decision rules, and procedures which facilitate a convergence of expectations.' Stephen D. Krasner, "Structural Causes and Regime Consequences: Regimes as Intervening Variables," in

experts in policy-making and negotiation of international treaty since the 1990s have led to the development of an environmental governance which considers non-state/ transnational actors and which has led to an enlargement of the sphere of analysis[4]. However, investigation on the complexity in the structure of environmental governance has been limited, and much work still needs to be undertaken.

An analysis of the network examined in this research, the Acid Deposition Monitoring Network in East Asia (EANET), has the potential to assist in a further understanding of the constitution of environmental governance in East Asia. EANET was established at an international meeting of experts on acid rain in 1993. It is a network comprising a wide range of actors, such as governmental officials, experts, international organisations, local authorities, and NGOs. It has contributed to the promotion of international cooperation on acid rain issue at a bilateral level and in the region. Its activity was launched with the monitoring of the pollutants, such as NO_x and SO_x, which cause acid rain. Its ongoing activity has acquired a good reputation (for instance, respect from the OECD) for its contribution to improving one of the environmental issues in East Asia, although no international treaty for the reduction of contamination which leads to acid rain in this region has yet been signed.[5]

Previous literature on EANET has chiefly focused on a description of events during the network's short existence, and has often been written by the people in charge of the activities of EANET[6]. In this article, there are two questions to be answered using the idea of network analysis, a concept which has only been partially introduced recently in the discussion on global governance:[7] Why has the international cooperation on acid rain developed in East Asia since 1990? How have the relevant actors worked together to cultivate the international debate on the acid rain issue and how have they, through this relationship, contributed to the establishment of concrete international cooperation? One of the most important reasons for the raising of these questions is that there has been no study of note which focuses on what networks consist of, how they are formed, how they interact, and how they are changed.

In order to answer these queries, in the first section, the idea of network analysis will be defined for the observation of the several stages of the changing idea of the term. The idea, forms, and conditions of network analysis will be used as the theoretical framework in this article. In the case study section, the development of EANET will be divided into three stages: its formation, its maintenance, and its

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International Regimes, ed. Stephen D. Krasner (Cornell University Press, 1983), 1-21. A social perspective on institutions is included in a broader sense of the international regime by Oran R. Young. Oran R. Young, "International Regimes: Toward a New Theory of Institutions," *World Politics* 39/1(1986): 107; *International Cooperation: Building Regimes for Natural Resources and The Environment* (Cornell University Press, 1989).

[4] Peter M. Haas, *Saving the Mediterranean: the Politics of International Environmental Cooperation* (New York: Columbia University Press, 1990). This study shows the possibility of policymaking influenced by scientists; however, it has also been criticized by some scholars who argue that it is one of the factors formulating regimes.

[5] OECD, Environmental Performance Reviews: Japan (OECD report: Nihon no Kankyou Seisaku), Japanese translated by the Strategic Environmental Planning Division, Environmental Policy Bureau, Japanese Ministry of the Environment (Tokyo:Chuuou Houki, 2002), 291.

[6] Some examples of recent studies in English are: Wakana Takahashi, "Formation of an East Asian Regime for Acid Rain Control: The Perspective of Comparative Regionalism," *International Review for Environmental Strategies* 1/1(2000): 97-117; Inkyoung Kim, "Environmental Cooperation of Northeast Asia: Transboundary Air Pollution," *International Relations of the Asia-Pacific* 7/3 (2007): 439-462. However, the former study uses regime theory, while the latter did not analyse EANET in detail.

[7] The following references are representative examples. James N. Rosenau and Ernst-Otto Czempiel, *Governance without Government: Order and Change in World Politics* (Cambridge: Cambridge University Press, 1992); Martin Hewson and Timothy J. Sinclair eds., *Approaches to Global Governance Theory* (State University of NY Press, 1999).

development. The theoretical framework will be applied to each of these stages. The conditions thought necessary for the formation of a network will be examined to identify to what extent they hold true in this case. After this analysis of networks, there will be an examination of networking as it has contributed to the addressing of the issue of acid rain and how it has promoted cooperation by related actors. Finally, insights on the relations of networks and environmental governance will be made throughout this study.

2. Environmental Governance in East Asia and Theoretical Framework for the Analysis of the Case

2-1. Multi-layered Environmental Governance in East Asia

In East Asia, many regional, bilateral, and multilateral frameworks for cooperation have been established, especially since 1990. These are among several modes of environmental governance based on international cooperation; these include international regimes, framework cooperation (at the governmental level), bilateral or regional cooperation, transnational civil society cooperation, and networks which connect many actors and organisations.[8] Global or regional environmental governance can be created by the intermingling of these modes of governance.

Currently, in East Asia, international treaties, framework cooperation, bilateral or regional cooperation, transnational civil society cooperation, and networks are the modes of environmental governance which can be found. The ASEAN Haze Agreement, which has been in force since 2003, is an example of an international environmental treaty in this area. Examples of regional framework cooperation (mostly forums) on the environment are the Environmental Congress for Asia and the Pacific (ECO-Asia), the Northeast Asian Conference on Environmental Cooperation (NEAC), the Northeast Asian Sub-regional Programme of Environmental Cooperation (NEASPEC), and the Tripartite Environment Ministers Meeting (TEMM). The, Asia Water Environment Partnership (WEPA), EANET, the Joint Research Project on Long-range Transboundary Air Pollutants in Northeast Asia (LTP), the Asia-Pacific Network for Global Change Research (APN), and the Northwest Pacific Action Plan (NOWPAP) can be counted as examples of network-based cooperation.

2-2. Definition of Network Analysis

2-2-1. Characteristics of a Network and Conditions of its Formation

The term, network, is actually not a new word in the IR context. However, it has, in recent years, increasingly been employed by scholars in IR in discussions of the complex/multiple direction of the global governance process. In order to develop the theoretical framework of network analysis in IR, the idea of networks as used in other areas of study, such as Administrative Studies and Sociology, will be introduced as thinkers in those fields have developed a considerable expertise on networks and network theory. Based on this broader literature, we can see that that what we call a network has five characteristics:[9] First,

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[8] WRI, *World Resources 2002-2004: Decisions for the Earth: Balance, Voice, and Power* (World Resources Institute, 2003), 7.

[9] Christopher K. Ansell and Steven Weber, "Organizing International Politics: Sovereignty and Open Systems," *International*

networks form around certain issues; secondly, networks can be formed when more than two actors participate spontaneously[10]; thirdly, there is autonomous adjustment by horizontal coordination through deliberation among participants; fourthly, the network utilises mutually complementary resources possessed by the participating members; fifthly, networks have the ability to respond quickly and adapt to changes in the environment.[11] These characteristics can be summarised in the following three aspects: the formation of a network, its functions, and its "networkness".

There are two chief characteristics of the first of these aspects, network formation. A network is formed in response to an issue and by more than two actors, spontaneously. Regarding the former, the fact that a network is focused on an issue does not mean that there is a single network for each issue; rather, there can be a multi-network.[12] The expression, a 'network of networks', a compound of function networks (such as monitoring, dissemination of information and cooperative research), illustrates this idea of the multi-network.[13] Regarding the latter, the network is formed when more than two actors agree, spontaneously (i.e. not as the result of coercion), to participate.[14] The actors who participate in a network have an interest in a particular issue, knowledge about it, and seek to act together to attain their goals. Examples of actors are states (policy-makers), experts, NGOs, international organisations, and (transnational) cooperations.

Considering the second aspect, the functions within and outside of networks are (i) the autonomous adjustment by horizontal coordination through deliberation among participants, (ii) the use of mutually complementary resources possessed by the participating members, and (iii) the ability to respond quickly and adapt to changes in the environment.[15]

Firstly, regarding horizontal coordination, a horizontal network is one that generally does not have a series of functions of vertical commands or orders, but this does not mean to deny the existence of a hub (an actor or organization in this sense) which plays central roles in the network. A hub is described in both administrative and sociological studies as the platform of lots of information pools, the site or locus of coordination with other actors, and the actor which gets involved in a wide range of focal points.[16] Members are able to understand themselves as a network through this coordination. As Heclo argues, this demonstrates that networks are not always amorphous.[17]

The complementing of resources within a network is the second function. Usually, resources that each actor possesses, such as technical knowledge and skills, funds, authority, information, and specialized knowledge, are different both in quality and quantity. Actors can obtain resources that they do not have

Political Review 20/1 (1999): 73-93; R. A. W. Rhodes, *Understanding Governance: Policy Networks, Governance, Reflexivity and Accountability* (Open University Press, 1997), 29-45; John Gerard Ruggie, "Theory and Practice of Learning Networks: Create Social Responsibility and Global Compact," *Journal of Corporate Citizenship* 5 (Spring 2000): 27-36.

[10] Joel M. Podolny and Karen L. Page, "Network Forms of Organization," Annual *Review of Sociology* 24 (1998): 57-76.

[11] Ansell and Weber, *op. cit.*, 73-93; Rhodes, op. cit. 29-45; Ruggie, *op. cit.*, 27-36.

[12] Hugh Heclo, "Issue Networks and the Executive Establishment," in *The New American Political System*, ed. Anthony King (Washington DC: The American Enterprise Institute, 1978), 104.

[13] Heclo, *idem*; Anne-Marie Slaughter, A *New World Order* (Princeton: Princeton University Press, 2004), 135-144.

[14] Podolny and Page, *op. cit.*, 57-76.

[15] Ansell and Weber, *op. cit.*, 73-93; Rhodes, op. cit., 29-45; Ruggie, *op. cit.*, 27-36.

[16] W. Richard Scott, *Organizations: Rational, Natural, and Open Systems* (New Jersey: Prentice-Hall, Inc., 1997), 149-160.

[17] Heclo, *op.cit.*, 87-124.

enough of from other actors through the network activity. Necessary "resources" are shared quickly within the network since the aim(s) of the group cannot be achieved without information sharing and creation of knowledge.[18] Prompt learning by members is possible through activities of resource-sharing, such as capacity building (CB), problem perception via dialogue, and collaborative projects.[19] These cooperative activities can reduce the costs which would be incurred if nations operated alone.[20] Networks are, in a sense, formed by these resource transfers and sharing.

The third function is the ability to respond quickly to the changing environment; this is a particular quality of networks. The study by Anne Holohan (see note 18) is striking for its analysis of network dynamics. Holohan focuses attention on the flexibility, the adaptive ability, and the quick-response capacity of networks; her analysis concentrates on three points: the degree of participation by, and awareness of, members, their engagement, and their activity as a specific network.[21] In another paper, Walter W. Powell identifies know-how, the demand for speed, and trust as the constituent factors in networking.[22] In short, actors recognise the need, for operational purposes, to be active themselves as a network through network operations and communication via their contacts and meetings.

The final aspect of networks is that each network has its own particular character; we might call it its "networkness". Networks are characterized by openness, flexibility, and size/scale. Openness, which 'puts porousness of boundaries at the centre of the discussion', was introduced in organization theory during the 1960s and 1970s.[23] This focus required (and requires) scholars to note openness (i.e. to observe the entrance and exit of actors to and from the network); note: a closed system, without this fluidity of membership, will contain a limited number of actors.

Other characteristics, such as flexibility and size/scale, can be counted as conditions of an effective network. Regarding the former, networks are flexible forms of governance since they can basically transform themselves; they are not reined in by rules and conditions. Thus, a network can be formed or maintained through the unprompted binding among actors if a new aim (or aims) can be found by a member of a network at that time. It is not that goals are converged so much as that they are changed as the environment changes. Accordingly, networks are formed through the voluntary connection of actors. A network can also be dismissed after achieving its goals, or reconfigured as another network, or become connected to other networks to create a 'networks of networks' if the network's participants are able to identify new aims because of its flexible capacity to change its shape and state. Thus, it can be argued that networks are dynamic form of governance.

With respect to size/scale, it should be noted that networks feature both indirect and direct relations. That is, there are relations other than those described as direct relations within organisations; there are indirect relations with actors beyond the organisations or framework of the network. The recognition of

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[18] Anne Holohan, *Networks of Democracy: Lessons from Kosovo, for Afghanistan, Iraq and beyond* (Stanford University Press, 2005), 38.
[19] Slaughter, *op. cit.*, 19, 57-8 and 185-6.
[20] Scott, *op. cit.*, 155-8; Podolny and Page, *op. cit.*, 57-76.
[21] Holohan, *op.cit.*, 33.
[22] Walter W. Powell, "Neither Market nor Hierarchy: Network Forms of Organizations," *Research in Organizational Behavior* 12 (1990): 323-7.
[23] Ansell and Weber, *op. cit.*, 76-7.

such relations allows for a more complex analysis of environmental governance than has been made in previous studies, especially in the analysis of international regime building.

With regard to the analysis of the formation and advancement of networks, Banuri and Spanger-Siegfried provide a list of eight key elements: reputation, leadership, inclusivity, size, accomplishments, agility, communications sophistication, and coordination and exploitation of synergies.[24] These elements are, in fact, based on a list proposed by Wolfgang H. Reinicke, who developed the concept of the Global Public Policy Network (GPPN).[25] Actors recognise that they should become involved in a network based on these factors. This is because the behavioural principle of actors participating in a network is mutual reciprocation and trust rather than self-help.[26] In considering the three aspects discussed in this section (the formation of a network, its functions, and its "networkness"), it can be seen that a network can be regarded as a continuous link among actors and organizations. Through these activities, the members of a network also recognise (i.e. identify and define) their involvement in that network.

As mentioned earlier, EANET is the network which deals with acid rain and other pollutants in issues of transboundary air pollution. It conforms with the definition of a network discussed in the preceding pages in that there are various actors, such as experts, scientists, governmental officers, international organisations, local authorities, and NGOs in it. They form a 'network' consisting of specific function networks which understand the situation that each nation has and which share information.

A network is one of the most efficient types of governance for responding to the changing environment because it allows for the fast exchange and sharing of a wide variety of resources, quick learning, and relationship flexibility. Various actors in networks may have more to offer than simply the provision of existing information; that is to say, actors acquire, create, and disseminate knowledge/ideas as a consequence of gathering to exchange information within the network.[27] In addition, Powell insists that interest and liability for the issues will be shared by the participants, and that new relationships and effects are created when the network develops.[28] These are examples of "emergence", a concept that appears in sociology literature. The members of networks will also increase their motivation if their activities (and impacts) are positively evaluated by actors outside of the network.

2-2-2. Types of Networks

In order to describe the connections between actors, it is necessary to consider the structure of networks. The diagrams discussed in this section describe the connections, or ties, (lines/links) between actors (points/nodes). According to Richard W. Scott, there are, theoretically and diagrammatically, four types of network: the Circle, the Wheel, the Chain, and the All-Channel (Fig. 2.1).[29] In addition, it can be stated that

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[24] Tariq Banuri and Erika Spanger-Siegfried, *Global Public Policy Networks: An Emerging Innovation in Policy Development and Application* (Stockholm Environment Institute-Boston Center, 2001), 41-42; Holohan, *op. cit.*, 33.

[25] Reinicke et al., eds., *op. cit.*, 2000, 27-64; Wolfgang H.Reinicke, "Global Public Policy," *Foreign Affairs* 76/6 (1997): 127-38.

[26] Emanuel Adler and Michael Barnett eds., *Security Communities* (Cambridge: Cambridge University Press, 1998).

[27] Powell, *op. cit.*, 325.

[28] Powell, *ibid.*, 300-5, 325.

[29] Scott, *op. cit.*, 159.

members are able to understand themselves *as* a network through its coordination, or maintenance.
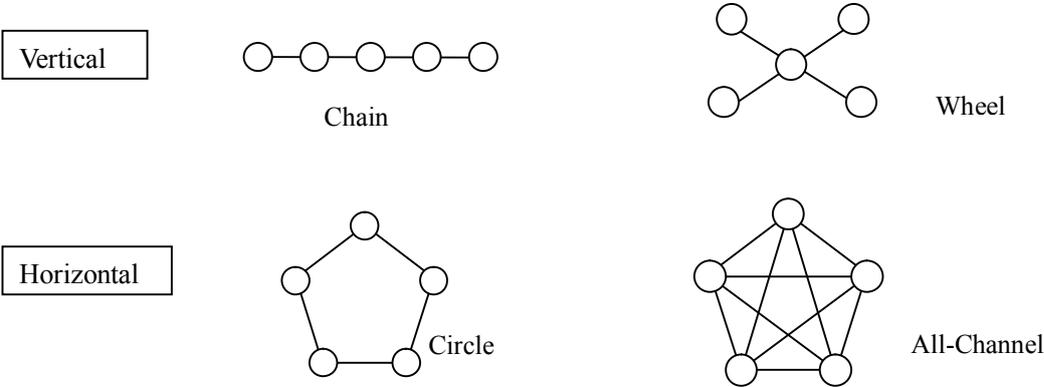

Figure 2.1 Types of network using five actors (Source: Scott 1997)[30]

The Wheel and Chain have a vertical structure. The Wheel contains spokes which connect the actors with the hub at the centre. In addition, the hub and spokes express the degree of concentration, denseness, or agglomeration of the network. The hub which appears in the centre of a vertical network is one of the main contributing factors to the formation and ongoing activity of a network, as it acts as the coordinator of the other actors.[31]

The Circle and All-Channel types have a horizontal structure of communication. Generally, when a network develops, it is said that it tends to change its shape from vertical to horizontal.[32] Networks then tend to form another larger network, i.e. a 'network of networks'.[33] In this case, it can be said that development of a larger network results in the levelling of networks in the larger network.

In describing types of networks, one is only presenting a sort of snapshot of a network at a particular moment; however, such descriptions are one of the important ways in which we can conceptualise how a network forms and how the actors are connected by different densities of ties. In this paper, such diagrams will be utilised to demonstrate the several stages of the development of EANET. The degree of connection and kind of network being formed is identified by observing who the actors and non-actor organisations (examples include research organisations) are, the frequency of contact among them, and the identities of participants at formal and informal meetings.[34] The relationship between networks and governance will be also examined through looking at these types of networks.

In this study, the typology discussed above will be used in the analysis of each stage of EANET's

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[30] Scott, *idem*.
[31] Scott, *ibid.*, 149-60.
[32] Scott, *ibid.*, 159; Holohan, *op. cit.*, 32-38.
[33] Heclo, *op.cit.*, 104.
[34] John Scott, *op. cit.*, 2-5.

development. The following section will explore the degree of influence that networks, as they develop, have had on the improvement of environmental governance in East Asia.

2-2-3. Development of Networks and Their Impact

The creation of a 'network of networks' can be regarded as one of the stages of network development. In providing complementary skills and resources, networks, as they adapt, contribute to making members more productive. In addition, profits and obligations are shared within a network.[35] However, the intellectual and affective commitment is often more important for the member than direct economic interests.[36] In the earlier literature on networks, it was argued that the indicators identified by Banuri and Spanger-Siegfried (reputation, leadership, inclusivity, size, accomplishments, agility, communications sophistication, and coordination and exploitation of synergies) were relevant during the period of network formation; however, it was unclear whether they could be found in other periods, such as maintenance, transition, and development of the network. To help answer this question, this study, therefore, attempts to explore the dynamics of networks in environmental governance.

The contents of "network analysis" are linked to a broader discussion of how network formation affects policy cooperation and the formation of environmental governance structures in Asia. In this article, I will chart the advancement of EANET, focusing on the idea, form and conditions of networks that I have discussed above, and identify some of the key factors impacting upon environmental governance. Since it is unclear whether the key elements of network formation provided by Banuri and Spanger-Siegfried can also be observed in the development phase, the factors identified by Holohan[37] (flexibility, adaptive ability, and quick-response capacity) and Powell[38] (know-how, the demand for speed, and trust) as promoting engagement will also be taken into consideration. The case study in the following section will focus on these elements in its examination of the different stages of EANET's development.

3. Case Study: EANET as a Network
3-1. Formation of Network before the Establishment of EANET (1970-1997)
3-1-1. Types and Conditions of Network in a Primary Phase

There are three important elements to the background against which EANET was established in 1997. Firstly, there were a number of states in East Asia which had been affected by acid rain since the early 1970s. Measures to combat the issue were therefore eagerly sought by the countries most seriously affected, Thailand, Vietnam, and Japan.[39] However, it had proven difficult to bring into being bilateral cooperation between the emitters of NOx and SOx and the nations affected by pollutants due to differences on

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[35] Powell, *ibid.*, 303-4.
[36] Heclo, *op. cit.*, 88-113.
[37] Holohan, *op.cit.*, 33.
[38] Walter W. Powell, *op. cit.*, 323-7.
[39] Hajime Akimoto, "Efforts on Acid Rain in East Asia: Launched Networks of Ten Countries (Higashi Ajia no Sanseiu he no Torikumi: 10 Kakoku no Network wo Tachiagete)," *Gaiko Forum* 13/10 (2000):42-46.

recognition of the issue, specifically on how it is actually caused and whether its effects spread beyond national borders.

Secondly, there have been problems of "resources" in many nations of East Asia. It is essential, in gathering data on pollutants, to employ a single method of analysis and to find the financial and human resources necessary for the comprehension of the extent of contamination and the implementation of measures for its reduction. European nations had entered into negotiations for an international treaty in 1970. The accumulation of data gathered by the European Monitoring and Evaluation Programme (EMEP) and the momentum of the Helsinki process consequently led to the 1979 Convention on Long-range Transboundary Air Pollution (CLRTAP). Similarly, the collecting and analysing of SOx and NOx emission data by the National Acid Precipitation Assessment Program (NAPAP) had contributed to the realisation of the international treaty on acid rain between America and Canada in 1986, after a Memorandum of Intent (MOI) had been agreed upon in 1980. Thus, looking at these cases, it could be said that through the building of international institutions, affected nations in both Europe and North America had been able to implement concrete measures for the reduction of those pollutants which caused acid rain.

In East Asia, however, it had been difficult before the establishment of the EANET not only to take measures to reduce the amount of pollutants, but also to grasp the current state of pollution in the region. In addition, it had been difficult to recognise and understand the cause-and-effect of acid deposition. This was due to the fact that, at this time (until the early 1990s), most East Asian nations were developing countries. According to Agenda 21, adopted at UNCED in 1992, there was a lack of "resources" in developing countries to undertake the essential monitoring of air pollution in those nations.[40] Moreover, although monitoring had been undertaken in some countries, it was difficult to analyse the data from different countries due to the absence of a common method of monitoring necessary for a comparative survey.[41] Therefore, it was extremely difficult to ascertain certain key facts, such as the extent of damage caused by acid rain, the source of emissions, and the discharge amounts. In short, there were not enough "resources" for implementing measures for the reduction of pollutants. Traditional schemes could not address fully the issue from a holistic view, due to four governance gaps (the participatory gap, the ethical/normative gap, the communication gap, and the operational gap).[42]

The third and final element of the background picture is that global and regional attention on the acid rain in Asia had increased. After the necessity of taking measures to address the acid rain issue in Asia had been pointed out at UNCED, the importance of devising an action plan which included, for instance, commitments to joint research and the realisation of regional cooperation on acid rain, was proposed and insisted on at the Northeast Asian Conference on Environmental Cooperation (NEAC) conference in October 1992.

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[40] United Nations Division for Sustainable Development, "D. Transboundary Atmospheric Pollution," *Agenda 21*, 1997, paragraphs 9.25-9.35.

[41] Eiji Hirai and Tetsuji Choji "Present condition on Acid Rain in Asian region (Asia Chiiki ni okeru Sanseiu no Genjyou)," *Journal of Industrial Pollution (Sangyou Kougai)* 27/10(1991): 40-44.

[42] Tariq Banuri and Erika Spanger-Siegfried, *Global Public Policy Networks: An Emerging Innovation in Policy Development and Application* (Stockholm Environment Institute-Boston Center, 2001), 10-13; Wolfgang H. Reinicke and others, eds., *Critical Choices: the United Nations, Networks, and the Future of Global Governance* (Canada: International Development Research Centre, 2000), 27-64.

Each of these three elements contributed to the fostering of momentum on the necessity of cooperation for dealing with the common issue of acid rain in East Asia.[43]

It was against this background that, in 1993, the international experts meeting on acid rain in Asia was held.[44] Forty-four people, both government officials and researchers, from Japan, China, Korea, Indonesia, Malaysia, the Philippines, Singapore, Thailand, Russia, and Mongolia, attended, as well as experts from EMEP, NAPAP, and the World Bank.

There were five key conditions for the formation of EANET by these actors. Firstly, there was the leadership of the Japanese Agency of the Environment (since 2001, this department has been known as the Japanese Ministry of the Environment) in promoting the idea of forming EANET; in addition, the Agency agreed to begin, and continue holding, conferences. The offer by Japan to play an ongoing leading role was well-received by most East Asian nations at the conference; moreover, as far as the Japanese government was concerned, it was a win-win situation for Japan.[45] Two further background factors should be noted here. First, international aid from Japan to East Asia had been limited until the early 1990s. However, in 1991, the Green Aid Plan (GAP) had been launched. The GAP is just one of the programs of bilateral aid from Japan to East Asian nations established in the 1990s. Five nations have received Japanese aid as part of GAP: Thailand (since 1991), China (since 1992), Indonesia, the Philippines, and Malaysia (since 1993).[46] Hence, Japanese initiatives were appraised by other nations in East Asia as indicative of a tendency of developed nations in the region to offer assistance. The second background factor was that the Asia had not been held in good repute in international negotiations on global environmental issues. For instance, many countries outside Asia frequently regarded several Asian countries, such as China and India, were as developing nations which took an antagonistic attitude towards the climate change issue.[47] Therefore, at the time of EANET's formation, under such circumstances, it was expected that the Japanese government should take the initiative on acid rain in East Asia because it had relatively more experience and expertise than other ASEAN countries and China in the monitoring of acid deposition. Additionally, these nations embraced the initiatives of Japan. Another advantage of the formation of the network was that it sent positive signals both within and between countries that there were engagements on global/ regional environmental issues in East Asia.

Japan, too, had interests, both at the international and domestic levels, in taking a leadership role on

[43] Japanese Environmental Agency, *Acid Deposition Monitoring Network in East Asia: Reports on Expert's Meeting (EANET Senmonka Kaigou no Seika)* (1997), 1.

[44] Chairman's Summary of first Expert's Meeting, http://www.eanet.cc/event/expert/expert01.html (Accessed on 25/ May/ 2006); Eisaku Toda, "Progress and Future of Acid Deposition Monitoring Network in East Asia (EANET no Keika to Shourai)," *Journal of Resources and Environment* 36/10 (2000):15-19; Yutaka Horie, "Expert's Meeting on Acid Deposition Monitoring Network in East Asia: Reports on Outcome (EANET ni Kansuru Senmonka Kaigou: Kekka Houkoku)," *Environment (Kankyou)* 18/12 (1993): 32; Kentaro Murano, "Acid Rain: Considering the Emerging Damage, Infuence, and Measures through Recent Activities (Sanseiu: Hirogaru Higai, Eikyou, Taisaku no Yukue wo Saikin no Doukou kara Toraeru)" *Journal of Resources and Environment* 32/12 (1996): 17-25.

[45] Chairman's Summary at the first Expert's Meeting, op. cit, paragraph 12.

[46] Study Group on Technical Cooperation at Ministry of Economy, Trade and Industry(METI), Japan (Keizai Sangyou Shou Gijyutsu Kyouryoku Kenkyukai), http://www.meti.go.jp/policy/oda/gijutsu/theme/1/pdf/4kai/4-3.pdf; METI, "The Fourth Meeting of Study Group on Technical Cooperation at METI (Dai Yon Kai Keizai Sangyou Shou Gijyutsu Kyouryoku Kenkyukai)", http://www.meti.go.jp/topic/data/eoda300j.html; http://www.meti.go.jp/policy/oda/gijutsu/theme/1/pdf/4kai/haifu.html (Accessed on 20/ May/ 2006).

[47] Kiyotaka Akasaka, "Environmental Negotiation is the Japan's Own Ground: from the Field of UN," *Gaiko Forum* (2000): 36-41.

environmental issues in Asia.[48] As a matter of fact, the government of Japan, particularly the Japanese Ministry of the Environment, had been seeking an issue requiring environmental cooperation at a regional level (a project involving good practices similar to those adopted in Europe and North America) to take a leadership role on. Agenda 21, approved at UNCED, had included recommendations for the introduction of measures for the reduction of air pollution. Although there were a few Asian countries, such as Korea and Japan, where research on internal measures on acid rain had already been implemented, there had never been a comparative survey using the data that both nations had collected.[49] The background conditions for regional cooperation on acid rain and air pollution were therefore present. Making that cooperation a reality, sharing the awareness and understanding of the problem of acid rain, and agreeing to an approach to address the problem were all very important challenges for East Asia.

The second key condition for EANET's formation was, it will be argued, that the agenda item, 'monitoring of acid rain using a common method', had been agreed to at the 1993 meeting. This decision was crucial for not only the establishment of the EANET, but also for those South East Asian nations, such as Thailand and Vietnam, which had been keen that measures for addressing civic environmental issues (such as of air pollution) be undertaken.[50] This recognition of the wider issue of air pollution was different to the more specific concern (about acid rain) of the North East Asian nations, such as Japan. Despite this difference in focus, it is important to note that, through the process of meeting, scientific knowledge on acid deposition could be disseminated among the participants in Asia.

Participating countries, after a sequence of meetings, agreed that a common method of gathering data on acid rain was an essential part of the process of the civic environmental issue of air pollution. In other words, aware that monitoring on acid rain was the basis of a broader air pollution monitoring process, participants were able to grasp the degree of domestic damage to the urban areas in each nation; they perceived that scientific knowledge was vital, and thus increased their commitment to, and ability at, monitoring. The understanding of the scientific knowledge gained helped them appreciate the extent to which their interests were linked. It can be adduced as a proof of the assumption that one of the main advantages of forming networks was the dissemination and interpretation of new information.[51]

The third condition for EANET's formation was the recognition that 'monitoring of acid rain using the common method' was a shared goal that all participant countries could achieve. During the experts meeting, information on the current state of implementation of monitoring in each nation was revealed. For instance, although there were a few countries which had monitored acid deposition, the methods of, and items, monitored differed fundamentally. This meant that it was impossible to make comparative evaluations across the data. To address this problem, at the third expert's meeting, the framework of the

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[48] EANET gathers the positive evaluation from OECD report. According to this review, OECD appreciates that Japan has contributed to the development of relationship among China and Korea and has played important roles of the establishment of EANET. Also, more than thirty percent of Official Development Assistance was distributed to the environmental projects. OECD, *op. cit*, 278; Japanese Ministry of the Environment, *Press Release*, January 2002, http://www.env.go.jp/press/file_view.php3?serial=3219&hou_id=3082 (Accessed on 25/ July/ 2006).

[49] According to the interview, the idea for international cooperation as international policy that Japan proposed was derived from the head of the Division of Air Pollution Control, Air Quality Bureau in Japanese Ministry of the Environment. Interview with the ex-Japanese focal point in EANET (Conducted on 2/September/ 2004).

[50] Horie, *op. cit*., 32.

[51] Powell, *op. cit*., 325.

Acid Deposition Monitoring Network in East Asia (EANET) was approved. In this tentative scheme, the goal of the network was the establishment, or development, of a common method of constant monitoring.[52] It was also agreed among the participants that EANET should be formally launched as soon as possible, by 2000 at least.

The fourth and fifth conditions for EANET's formation were the obtaining of a) inclusivity and b) size which expanded the definition of "East Asia" and acid deposition. At the second experts meeting (in 1995), the interpretation of the term, "acid rain" was defined. Thus: "acid precipitation" denoted "the emission, transportation, transformation and deposition of causative substances", while it was agreed that the term "acid deposition" was to include acid precipitation, which meant that acid rain was officially recognised as an environmental issue.[53] Since this meeting, the issue of acid rain had been covered comprehensively, from its creation to the development and implementation of measures to diminish or prevent it.

Furthermore, at the third meeting, it was agreed that the domain of EANET was to be "East Asia" in a broad sense (i.e. to consist of Northeast Asia and Southeast Asia).[54] The Joint Research Project on Long-range Transboundary Air Pollutants in Northeast Asia (LTP), led by the Korean government since 1995, included, as its title suggests, only the Northeast Asian area, Korea, China, Mongolia, Russia, and Japan. However, the eleven participating countries in EANET at the time of the third experts meeting included Vietnam, from Southeast Asia.[55] It was frequently argued at the time that Japan should limit the network (and hence the extent of regional cooperation) to the countries of Northeast Asia as, after considering the geographical and meteorological conditions, this would include all the countries which could possibly affect Japan. It is quite common for government officials and scientists to fail to realise the significance of other nations as polluters. However, the Japanese government insisted that transboundary air pollution could affect all of East Asia.[56]

It should also be understood that not only were inclusivity and size essential conditions of the network's formation, but that they were also among the most important influences on the maintenance of EANET as a network during the subsequent series of experts meetings. Despite the importance of these well-attended and inclusive meetings to the network, the discussion on the reduction of pollutants was actually proposed by Russia and Philippines during later negotiations. By the same token, promotion of south-south cooperation emerged from discussions among Southeast Asian countries. It seems that the setting of the scope of activity in EANET had contributed to the lessening of the tension among the participating nations.

It can be argued that, at this early stage, the type of network was the wheel, with Japan playing the

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[52] Chairman's Summary at the First Expert's Meeting, op. cit, paragraphs 6 and 9.

[53] Teruyuki Deguchi, "The Second Expert's Meeting on EANET (Dai 2 Kai EANET ni Kansuru Senmonka Kaigou)," *Environment (Kankyou)* (1995): 31.

[54] Japanese Ministry of the Environment, "The Outcome on the Fourth Expert's Meeting on EANET," *Press Release*, February 1997, http://www.env.go.jp/press/press.php3?serial=277 (Accessed on 25/ March/ 2006).

[55] The Chairperson's Summary in the Third Expert's Meeting, http://www.eanet.cc/event/expert/expert03.pdf (Accessed on 25/ March/ 2006).

[56] Akimoto, *op. cit.*, 42-46. He was one of the participants at the experts meeting. A similar point was mentioned in the interview with the ex-focal point in EANET (Conducted on 2/ September/2004).

role of the hub at the centre.[57] Other participants joined as a result of initiatives of the Japanese government. The activity undertaken by actors other than Japan was basically the exchange of information and the growing recognition, through the meetings, that they were all connected despite the physical distance between the countries. Therefore, the network structure was strongly vertical.[58] Hence, the connectivity among them was weaker than that between them (as individual actors) and Japan (the hub).

3-1-2. Establishment of International Networking in East Asia

A review of the formation process of EANET reveals that this international network on acid rain had been formed through recognition of the issue as a problem, and that the idea for the network had been developed at a succession of expert meetings. As argued in the last section, there was a lack of "resources" in most of East Asian nations up until this time. Thus, the demand for the international cooperation on resource sharing was widespread; in particular, the necessity of providing information and other "resources" to resource-poor countries was recognised by many. This need was embodied in Japan's international policies and action plans which addressed the problem of transboundary air pollution. This was evident in the distribution of Official Development Assistance (ODA) in the Initiatives for Sustainable Development toward the 21st Century (ISD) and the announcement of the establishment of a network (i.e. EANET).[59] EANET has since become widely known by other international organisations and a broader international public.[60]

EANET, the idea of which emerged from a sequence of discussions at the 1993 experts meeting, was established with the goals of sharing scientific findings that confirmed that acid rain was a transnational problem, of identifying the major source of pollutants, and of finding the level of reduction of pollutants needed to control the problem. The geographic area of activity was East Asia, and any nation from Northeast Asia and Southeast Asia was invited to submit an application to join; participants could also withdraw from EANET at any time.[61] Together, all of the foregoing elements show that EANET meets the definition of a "network".

3-2. Network Maintenance and Transition (1998-2000)
3-2-1. Types and Factors of Network in the Second Stage

At the first Inter-Governmental (IG) meeting, participants agreed that EANET would officially come into being after a two-year preparatory phase beginning in 1998. The following factors were important for its maintenance during this period. First of all, the network was enlarged by the development of sub-networks. The experts meeting group (in existence during the formation period) was reorganised as the Interim Scientific Advisory Group (ISAG), while the IG meeting group, the Working Group, the Interim Secretariat,

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[57] Scott, *op. cit.*, 159-160.
[58] Slaughter, *op. cit.*, 131-165.
[59] The Initiatives for Sustainable Development toward the 21st Century (ISD), http://www.mofa.go.jp/mofaj/gaiko/summit/denver/isd_h.html (Accessed on 8/ January/ 2005).
[60] Japanese Ministry of Foreign Affairs, http://www.mofa.go.jp/mofaj/gaiko/summit/denver/kankei.html (Accessed on 20/ December/ 2004).
[61] Japanese Ministry of the Environment, "Tentative Design of EANET," *Press Release*, February 1997; EANET/IG/2/5/3, http://www.eanet.cc/event/ig/ig02/ig02_5_3.pdf (Accessed on 27/January/2007); EANET Interim Secretariat, *Activation of Interim Operation of EANET (EANET Shikou Kadou no Jisshi)*, Pamphlet.

the Interim Network Centre (INC), and the Domestic Centre were newly set up. These networks have their own functions which undertake specific activities of EANET. In this period of interim activity of EANET, discussions and agreements of each function network were shared in IG meetings after having been collected by the INC and the Interim Secretariat. This coordination between function networks confirmed and maintained EANET as a network.

Secondly, EANET assisted in filling the "resource" gaps of each of the participating nations; this was one of EANET's most important goals during the preparatory phase. This achievement could be thought of as an example of inclusivity, coordination, and exploitation of synergies.[62] There are two international assistance projects in EANET which are regarded as cooperation schemes.[63] The first is that coordinated by the Japanese International Cooperation Agency (JICA). JICA, which offers technical training and expertise, had been established before EANET. Following the launch of EANET, decisions about international aid from JICA to countries in East Asia were based on discussions at EANET meetings Most of JICA's Japanese acid rain monitoring projects were undertaken in cooperation with local (prefecture) authorities, such as those in Niigata, Hyogo, and Fukuoka.[64] These local authorities usually have great expertise in, and experience of, monitoring acid deposition because the government has entrusted them with monitoring responsibility. Thus, it is n fact the local authorities who provide the training and expertise offered as aid by JICA. Regarding cooperation with other actors, the INC in EANET coordinates with NGOs, publicises EANET activities, and raises their awareness.

The other project is that of the assistance offered by the Acid Deposition and Oxidant Centre (ADORC), designated as the INC. This has the ability to respond quickly and adapt to changes in the environment, one of the features of networks.[65] ADORC has responsibility for one of the most important activities in EANET. That is, the on-site audit activity (hereinafter, this will be described as the "detachment of technical mission") of Quality Assurance/Quality Control (QA/QC). INC (i.e. ADORC) staffs were sent to institutions in participating countries to not only survey the essential measures being undertaken in those countries, but also to consult with the staff of those institutions. These efforts accelerated progress in EANET's aim of filling technical and perception gaps among participating countries.

Thirdly, another factor which contributed to the maintenance of EANET was the establishment of its good reputation, both inside and outside the network. EANET attempted to share information about its

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[62] Banuri and Spanger-Siegfried, *op. cit.*, 41-2; Holohan, *op. cit.*, 33.
[63] Japanese Ministry of the Environment, *Information Packets on International Environmental Cooperation by Local Authorities (Chihou Jichitai Tou ni yoru Kokusai Kankyou Kyouryoku Shiryoushu)*, 2001; Council of Local Authorities for International Relations (CLAIR), *Summary Report on the Promotion Projects of Inter-council Cooperation at International Level (Jichitai Kokusai Kyouryoku Suishin Jigyou Houkokusho Youyakushu) from the Year of 1996 to 2000*, 2001; Overseas Environmental Cooperation Centre(OECC) Japan, *Information Packets on the Promotion Projects for International Environmental Cooperation Collaborated with the Local Authorities and NGOs in the Year of 2002: Information on the International Environmental Cooperation by Local Authorities(Heisei 14 Nendo Chihoukoukyoudantai, NGO tou no Renkei niyoru Kokusai Kankyou Kyouryoku Suishin Shien Jigyou: Chihoukoukyoudantai ni yoru Kokusai Kankyou Kyouryoku Shiryoushu)* , 2003; Japan Bank for International Cooperation (JBIC), http://www.jbic.go.jp/japanese/oec/info/yen_loan_list.php（Accessed on 10/ January/ 2005）; JICA Knowledge Site, http://gwweb.jica.go.jp/km/km_frame.nsf（Accessed on 10/January/2005）.
[64] Motonori Tamaki, "Training on Aid Rain by JICA in Hyogo Prefecture (Hyogo Ken deno JICA Sanseiu Kenshu)," *Environment (Kankyou)* 23/5(1998): 10-11; OECC Japan, *Ibid.*
[65] Ansell and Weber, *op. cit.*, 73-93; Rhodes, *Understanding Governance: Policy Networks, Governance, Reflexivity and Accountability*, op. cit. 29-45; Ruggie, *op. cit.*, 27-36.

activities not only within the network (through IG and WG meetings and the ISAG, for example) but also with outsiders (e.g. at ministerial meetings, such as ECO-Asia and TEMM: introduced in Section 2-1, as well as at workshops for the general public and with NGOs). Thus, EANET promoted itself indirectly, through contacts with other actors and frameworks, and directly, through the dissemination of information about its activities.

In October 1999, the East Asia Workshop on Acid Rain, attended by experts from each nation in East Asia, was held under the auspices of the Thai Pollution Control Department (PCD) and the JICA in Thailand.[66] Another workshop, on public awareness for citizens, was also held. Neither workshop was an official EANET event, although later workshops on these subjects were part of EANET's activity. In consequence, EANET's concrete efforts and links to other activities were elements of its transition to a more established network; during this transition, it also shifted from just monitoring to also modelling and providing comprehensive measures to deal with the issue of acid rain. It also increased to a high degree the level of concern on acid rain in the East Asia again.[67]

Fourthly, there were accomplishments, high levels of trust, and sophistication of communication observed during this period. For instance, problem recognition was shared more widely within participating countries through deliberations at the field level, in addition to the discussions by decision-makers at formal meetings. Another example is that the practical demands for resource sharing (i.e. ones based on the needs of each situation) were able to be met. "Resources" have been shared rapidly among participants (for instance, before, during, and after meetings), leading to an accumulation of accomplishments. Participants have gradually come to understand the achievements of EANET, and, thus, the potential benefits to them. The accomplishments of, or announced in, the proceedings of each meeting and the workshops have been shared within the network, contributing to greater trust by participating nations and an increased prestige outside the network. At the end of this maintenance stage, these activities were also evaluated and additional workshops and meetings related to the network's activities were held. Thus, participants gradually came to realise (or, at least, consider) the necessity of concrete measures on the reduction of pollutants to address the acid rain issue, and value the efforts of a network such as EANET which they could trust. The creation of new relations, and increased efficacy (as a result of deliberation and evaluation) were consequences of network interaction.[68]

At this stage, there were two hubs (the INC and the Interim Secretariat) in the network. In fact, the Japanese government was the hub in each, taking the facilitating role of connecting each function network (IG, ISAG, Working Group, and Workshop) via "spokes". As in the primary stage of its existence, EANET was a vertical network, since the connectivity between other participants and Japan was relatively stronger than that among the participants themselves. At the same time, further recognition of the issue and the need for appropriate resource sharing were stimulated within each function network and in the participating

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[66] Japanese International Cooperation Agency(JICA), "Work Shop on specific area within the region (Tokutei Bunya Ikinai Kyouryoku Work Shop)", http://www.jica.go.jp/thailand/activities/03_11.html（Accessed on 8/January/2005）.

[67] Katsunori Suzuki, "Present and Challenge on Acid Rain Issues in East Asia: the promotion of the EANET (Higashi Asia ni okeru Sanseiu Mondai no Genjyou to Kadai: EANET no Suishin)," *Newsletter of Research on Global Environment (Chikyu Kankyou Newsletter)* 10/ 8, 1999.

[68] Powell, *op. cit.*, 325.

countries themselves during this period. In proportion to this change, the connections between actors in the network had gradually expanded or strengthened. Simultaneously, relationships of mutual trust among actors were built through discussions at meetings and at other sites in which international cooperation occurred. The links among the participants (other than those connections involving Japan) had been enhanced in the development of function networks. Moreover, prestige/trust from outside and inside EANET increased, and many participants became to be actively and constantly involved in events, sometimes suggesting or instigating action.

The above processes reveal how the relationship between the functional networks had gradually been transformed from vertical to horizontal. Still, on the whole, it can be said that EANET remained a vertically-connected network (i.e. a wheel type), much the same as it had been during the primary stage.[69]

3-2-2. Improvement of Ability of Governance

To have had a preparatory phase encouraged many nations in East Asia with little monitoring "resources" to maintain their participation in the network, as it provided them with the opportunity to attain /develop a monitoring ability.

As mentioned in Section 3-2-1, some nations, such as Thailand, Malaysia, and Vietnam, had been developing their monitoring ability through schemes such as bilateral aid via JICA and capacity building (CB) through continuous assistance by the INC and the prompt transfer of "resources". In addition, joint research on the method of monitoring on acid rain in a frigid climate had been conducted by the Institute of Limnology in Irkutsk, Russia and the INC since 1999. This had substantially improved the monitoring ability and quality of research in Russia. Such mutual assistance was important for all nations as they sought answers to an issue that concerned them all. It also contributed to the promotion of motivation to maintaining networks such as EANET.

3-3. Advancement Stage of Network in EANET (2001-2006)
3-3-1. Types and Factors of Network in the Development Stage

It could be argued that the Japanese initiative contributed to the formation of the network and that Japan ran EANET before the official activation phase. For instance, Japan had played important roles in the network through hosting experts meetings, connecting other sub-networks (with itself as a hub), providing opportunities for discussions on environmental aid for resource sharing within EANET, and on suggesting or introducing measures for the reduction of pollutants. Japan's contribution has won approval within East Asia for its positive approach to the environmental issues facing the region.

Notwithstanding this widespread support, after EANET's official launch, the network became increasingly concerned of the complete withdrawal by two countries, China and Korea. China had originally regarded acid rain as a 'domestic issue'.[70] China had prioritised economic development to generate funds for measures to deal with the issue. China was concerned, and had to be coerced into continuing involvement in the network, when it became clear that the burden of cost for countermeasures to

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[69] Slaughter, *op. cit.*, 131-165.
[70] Akimoto, *op. cit.*, 45.

the problem was bigger than it had estimated. It seemed for Japan that this concern was growing with the expanding of activity within EANET (e.g. with the accumulation of data and the shift from monitoring to taking concrete measures).

For its part, Japan was worried about the damage caused by the transboundary air pollution produced by China (its emissions were the greatest in East Asia); Japan therefore considered China's involvement as essential for the improvement of the environmental issue in the region. The fact that China was involved could have another benefit in that it would encourage international cooperation on acid rain throughout the area as a whole. Japan, therefore, keenly encouraged China to participate. In order to achieve this aim, during the interim process of EANET, various considerations had been made for China. For example, it was agreed that the primary aim of activity in EANET was monitoring only according to China's wishes.[71] Furthermore, the Japanese government offered assistance in monitoring. In 1996, such assistance was provided in Guang Dong Province, Dalian, and Liu Zhou. Following the first IG meeting in 1998, capacity building and other schemes of bilateral-based-cooperation were provided each year in, amongst other areas of China, Jilin Province, Anhui Province, Tianjin, Chongqing, Dalian, and Guiyang.[72] Such assistance served as practical measures on acid rain within the area covered by EANET as well providing not only technical know-how on monitoring, but also incentives to China to raise both the level and standard of its monitoring.

Korea has endeavoured to expand the LTP, the project initiated and led by it. The aim of the LTP was the promotion of joint research and modelling on transboundary air pollution in Northeast Asia. It was not Korea's wish that the LTP might eventually be incorporated as part of EANET at the conclusion of the network's interim period since the latter's domain was larger. Before the second IG meeting, held in 2000, Japan sent special missions to Korea to confirm a shared understanding that the two projects would continue to co-exist. In particular, Japan stressed the different roles of the LTP and EANET.[73]

Simultaneously, Japan attempted to encourage both China and Korea at various meetings (EANET and non-EANET) to remain in EANET. Japan kept in close contacted with each country and engaged in many energetic arguments with them. In addition, Japan communicated with them outside of the meetings and in each function network to deepen their trust. At every meeting, other participants also explained the significance of their remaining members of the network.[74]

While continuing its negotiations with China and Korea, Japan, basing its view on the progress of discussions and success of activities, had come to realise that it was crucial that all participants needed to cultivate a greater sense of network identity if EANET was to advance. It was reasonable for Japan to desire this. Although EANET had been led by Japan at the outset, Japan now saw EANET as "belonging" to all members of the network; it was thus important that the future direction of EANET be determined by initiatives promoted by other participants. Japan was finally encouraged to cease taking leading roles as a

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[71] Public information about this subject was limited as much as possible to minimise the possibility of press reports which would produce needless friction between China and Japan. Interview with the participants of EANET (Conducted on 2/ September/ 2004).

[72] Japanese Ministry of the Environment, *op. cit.*, 91-148; CLAIR, *op. cit.*, 5-90; Website of JBIC (Accessed on 10/ January/ 2006) ; JICA Knowledge Site (Accessed on 10/ January/ 2006).

[73] Interview with the Japanese policy-maker who was in charge of EANET at that time (Conducted on 3/ September/ 2004).

[74] Interview with the participants of EANET (Conducted on 3/ September/ 2004).

result of its own encouragement of China and Korea to join a network based on sharing. This meant that, in order for EANET to advance, Japan adopted the stance that it was just one of the network's participants.

Thus, the change of aims of EANET (i.e. 'from monitoring to establishing concrete measures') generated from the end of the interim period was incorporated into the network's transformation process. At the same time, participants had continued the communication with China and Korea. One specific change which occurred within the functional networks during the development stage featured the United Nations Environment Programme / Regional Resource Centre for Asia Pacific (UNEP/RRC.AP), which serves as a commissioned secretariat. It supports the implementation arrangements and projects of EANET in close collaboration with relevant experts and organisations in East Asia. Membership of the secretariat was offered for public subscription, with the posts eventually being allocated to people from every country except Japan. The NC also reshuffled its administration and research staff; the Deputy Director General, for instance, is a Russian. The balance and scale of playing roles in network were acquired. Thus, the initiatives in EANET has shift from Japan to East Asia. In consequence, EANET was succeeded to maintain the participation fro China and Korea.

Following the official launch of EANET's sub-networks (NC, IG, ISAG, Working Group, and Workshop), there was a constant accumulation of accomplishments each year. These included the agreement on the full-scale operation of EANET, the establishment of a Secretariat (at the second IG meeting in 2000), and the official launch of EANET itself in 2001 (accepted at the third IG meeting that year). Moreover, EANET continued training sessions and other information gathering exercises. Since becoming a full-scale operation, the IG has been held every year, with the focus of the agenda changing from raising the awareness of issues in each nation to resource sharing, the future shape of QA/QC, and the addressing of measures to deal with the problem, including the importance of modelling and financial administration.

Accordingly, the number of official participants in EANET has increased. Most new participants, such as Cambodia (approved in 2001), Lao PDR (approved officially at the fourth IG meeting in 2002), and Myanmar (approved at the seventh IG meeting in 2005) had participated as observers before formally joining.[75] The principal reasons for this increase in the number of EANET participants has been that EANET's activities have been positively evaluated by those outside the programme and that it has shared its information widely and at various levels.

The South-South cooperation was also enhanced in EANET between 2001 and 2006. Thailand, which, of the Southeast nations, had most developed its monitoring methods and expertise, started the South-South cooperation (capacity building) for new participants. Resource sharing has expanded, so that no longer is Japan (the ex-hub) the only donor. Now, all participants contribute. As I have mentioned earlier, the information on these activities has continued to be reported at various meetings, conferences, and

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[75] These nations were adopted as official focal points of EANET after acceptance of their applications for membership. Each had attended meetings as observers for a few years. Uzbekistan has been an observer at EANET meetings at the seventh IG meeting held in 2005; however it does not seemed to have attended the eighth and ninth IG meetings. The Seventh IG Meeting Report, http://www.eanet.cc/event/ig/ig07.pdf; The Eighth IG Meeting Report, http://www.eanet.cc/event/ig/ig08.pdf; The Ninth IG Meeting Report, http://www.eanet.cc/event/ig/ig09.pdf (Accessed on 29/January/2008).

seminars: These include workshops for citizens and experts, ECO-Asia, TEMM, ASEAN+3 Environment Ministers Meeting for policy-makers. Positive evaluations were also obtained from the participating nations, which were the same as at the previous stage, that of network maintenance and transition.

Furthermore, contact with other organisations, such as the UN/ECE, the UNEP, the UNEP/ ROAP, has increased through attendance by representatives at EANET meetings and the exchange of information. EANET has also started networking with outside organisations, such as the Northwest Pacific Action Plan (NOWPAP) which expressed a wish to collaborate with the East Asian network.[76] Thus, the network as a whole has advanced through changes of function networks and the promotion of measures which address transboundary air pollution issues.

The shape of network during the development phase was basically that of the wheel model, with the Secretariat and the NC playing the main coordinating role. However, function networks like the Senior Technical Manager (STM) became more horizontal more than those in the maintenance stage. In the advancement stage, EANET achieved success in many of its activities, cultivated greater trust among its actors, and developed its communication, both between members and with outside actors (including the general public and other international organisations) Regarding the connection of functional networks, it has been observed that not only were the connections between participants in function networks strengthened, but that new links were made with those outside of EANET. It can be said that, structurally, EANET in the development stage was vertical. Since the NC and Secretariat have been hubs, however; connections between each function network have increased, leading towards a more horizontal structure.[77]

3-3-2. Towards the Sharing of Burdens for Further Cooperation

It was at the fifth IG meeting, held in 2003, that EANET had the opportunity to share its burdens. For instance, there were positive and concrete proposals from Russia and Philippines for establishing concrete measures for reducing pollutants; both countries were prepared to make commitments in their national budgets. Sharing the financial burden and working towards a proposal for an international treaty on acid rain and other air pollution issues have become EANET's new goals, aims with which all of the network's participating countries have agreed.[78] This achievement meets the condition that actors in networks come to share not only a concern with the issue which originally united them (in the case of EANET's members this was acid rain), but also take responsibility for the network when it develops.[79]

EANET now provides the impetus for further concrete action on the reduction of pollutants. Within the network, the increase of the number of participating nations, the sharing of financial and other obligations, and the reinforcing of capacity building are encouraged in order to achieve the network's goals. Meanwhile, other projects run by international organisations, such as the one related to climate change, are accepted and implemented. Different ideas are also accepted; for example, the items monitored now include yellow sand. Thus, at the beginning, it was the acid rain issue which led to the

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[76] The Seventh IG Meeting Report, http://www.eanet.cc/meeting.html#Intergovernmental(Accessed on 20/ February/ 2007)
[77] Slaughter, *op. cit.*, 131-165.
[78] In this regard, however, detailed contents like article of treaty have been currently discussed at new Working Group and IG meetings, according to the reports of meetings.
[79] Powell, *op. cit.*, 300-305.

formation of this international network, and the subsequent enhancement of monitoring ability, before expanding to include implementing measures for the reduction of NOx and SOx. In short, EANET has substantially transformed its function, and no longer aims at one specific goal.

Moreover, EANET has advanced and improved its activity since 2004. For instance, the Working Group on Future Development of EANET (WGFD) was established in 2004 (a discussion at the fifth IG meeting led to this decision); it has started meeting on a ad-hoc basis since the seventh IG meeting of 2005.[80] At its meetings, the agenda has focused on the monitoring of air pollutants, a future agreement on a method for contributing funds, and the design of a regional treaty. The WGFD has also intensively discussed the possibility of an international treaty.

It can be argued that recent activity has led to the change of actors within the network. This change is also leading the network transformation through a change of goals, the creation of new links with external actors, as well as the accomplishment of EANET activity The mode of governance of a network like EANET, one which can respond flexibly to a change of aim, could possibly give us insights for further consideration on judicious governance. Such a claim is argued in the following section.

4. Concluding Remarks

The aim of this paper has been to discuss whether networks, which spread regionally and globally, could have any significance for the creation and development of environmental governance in the Asian region. Using a case study, that of the Acid Deposition Monitoring Network in East Asia (EANET), the paper has focused on why East Asian nations have chosen the acid rain issue around which to form a network, to explain how network formation affects, environmental cooperation in East Asia, and how its maintenance and transition have affected its activities.

In order to explain these focal issues from an analytical approach, "Network Analysis" as the theoretical framework was introduced and applied to three periods of EANET's existence: its formation, its maintenance and transition, and its development. It included a discussion on the networking within EANET and the perceptions of the network by participating nations, types of networks, and the network's advancement. This method of analysing networks is a judicious blending of ideas from other realms of study: Social Network Analysis from Sociology and Global Public Policy Networks from Policy/Administrative Studies. The conditions and types of network were also presented at each stage of the network's existence. The significance of using these systematic approaches is that introduces the "analytical side" of networks into the literature of International Relations. Networks in this area have been mostly regarded as the concourse of actors that could affect certain policy-making through their collective action.

The contribution of EANET to the creation of environmental governance in East Asia can be summarised in three aspects. Firstly, EANET was the site for the sharing of an issue (i.e. concern over the effects of acid rain), for confidence-building, and for the promotion of international cooperation. Against a background of rising international momentum on the need to address the issue and Japanese initiative,

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[80] Terms of Reference for the Working Group on Future Development (WGFD) of Acid Deposition Monitoring (EANET) for 2007-2008 (final), http://www.eanet.cc/event/ig/ig08.pdf (Accessed on 20/ February/ 2007)

actors concerned about acid rain and other air pollutants gathered to form a network in which they could meet and discuss the issue, even though there was some disagreement among states about the seriousness, extent, and causes of the problem. Another issue to be discussed was the amount of "resources" for measures each nation possessed to deal with the problem. During the experts meeting, participants exchanged information, coordinated their interests, reached an agreement on the implementation of monitoring using a common method, and successfully agreed to the establishment of a new idea, that of the establishment of EANET. One of the factors that aided the discussion on acid rain issue is that the issue had been discussed at experts meetings in East Asia since the 1990s; thus, EANET provided a site at which further cooperation could take place.

Secondly, four effects were created by the constant assistance of capacity building for monitoring: the gathering of data on acid deposition, the effective implementation of international cooperation, the strengthening of the ties between experts across the states, and the identification of measures for dealing with the problem. The ability of monitoring on acid rain is important because it is the basis of monitoring for other pollutants. The improvement of monitoring ability led to the collection of highly accurate data. Moreover, participants at the field level could precisely locate their problem and move to commence countermeasures through the exchange of expertise and sustainable friendship. These activities have contributed to the realisation of international cooperation that ties different levels of actors and organisations effectively.

Thirdly, the constant activity of EANET was able to lead to the establishment of cooperation frameworks, with each state trusting both each other and the network process. Related actors sat at the negotiation table, discussing acid rain as an international issue, at a sequence of meetings in the functional networks in EANET. Shared recognition of issues was embodied in projects organised by JICA and in the assistance offered by the Network Centre (NC) in order to exchange resources. The mission of the (interim) NC encouraged further cooperation by positive participants and a change of recognition of the issue by negative participants. Furthermore, information about EANET's activities and development has been made public at various levels. Therefore, the ability of governance in East Asia has been improved as a whole through EANET and its networks.

The Japanese government had taken the leading roles in hosting the experts meetings, leading the discussions, and providing assistance from the primary phase of the network's existence through to its maintenance and its transition. However, beginning at the end of the transition period, and continuing during the development stage, responsibility for the initiatives for network development has been shared by every participant nation. This has contributed to the levelling of authority and power within the function networks. Including both Northeast and Southeast Asia as the domain of activity in EANET has made a positive impact on the network maintenance. During the early period of the development stage, the vertical network structure remained the same as it was when Japan was the leading actor in EANET. However, the communication among actors has become more sophisticated as a result of resource sharing and increased and constant discussion at meetings. With the increased involvement by all participating nations in initiatives, the function networks have shifted to a horizontal model.

EANET has contributed to improvements in the technologies and techniques of collecting and

analysing data using a common method. In addition to the monitoring of pollutants of a wide area, it has also promoted other benefits, such as the South-South cooperation in Southeast Asia. Furthermore, it has encouraged governments to agree share the costs of dealing with the issue by making financial contributions to the network, added impetus to the movement for the building of an international treaty, and provided a forum for discussions on concrete measures for the reduction of pollutants. In each function network, participants discuss the subject of acid rain as an international environmental issue, and have succeeded in obtaining agreements for further international cooperation.

Based on the above analyses of EANET, as a conclusion, this case study implies that environmental governance in East Asia could provisionally entail three processes along with the whole dynamic of network advancement: international/regional networking, the promotion of good governance, and the implementation of concrete measures for dealing with an environmental issue. First of all, networking relates to the formation of international governance at a regional level. At the experts meeting in the primary phase of the network's existence, it seemed that the states' concerns about the issue did not coincide. However, the matching of their interests and concerns, and the building of trust among participants consequently that led to the sharing of understandings on the issue was achieved through a sequence of meetings. Thus, EANET was established, after an initial interim period, with the aim of networking various international actors; these included governments, experts, local authorities, international organisations, and NGOs, all linked by the issue of acid rain and other air pollutants. The actors in a network (such as EANET) recognise the need, for operational purposes, to be active themselves as a network through network operations and communication via their contacts and meetings.

The second process was assistance in improving the governance at domestic levels and communities, through improving the monitoring ability. It is said that monitoring on acid deposition is the basis of environmental administration because monitoring on other pollutants can be taken only after that on acid rain. Participating countries shared understandings on the significance of international cooperation (in networks) on the environment. Network can create various ways of assistance; these include cooperation using a bilateral scheme and/or through an international organisation. In the case of EANET, two kinds of international cooperation have been used for the improvement of monitoring: bilateral projects (technical assistance) by JICA and the adoption of QA/QC programmes by the Network Centre. They have played significant roles in comprehending the extent of acid rain in participating nations. The connections between experts from other nations have developed along with this constant assistance. Moreover, best practices and lessons on monitoring data and other capacity buildings have been shared among participants in the network. All of these benefits are incentives for East Asian countries to join EANET.

Finally, the third process, the creation of environmental governance via networks, increases the possibilities of providing impetus for the implementation of concrete measures for the reduction of pollutants or, indeed, any other action for the amelioration of environmental problems. Once networking which connects each relevant actor is advanced, actors in networks tend to coordinate themselves, interacting in order to take positive steps towards the resolution of shared problems or the achievement of shared goals. At the same time, they are likely to share not only interests, but also obligations. In the case study in this paper, the advancement of the network has prompted the participants to shift their activity

from monitoring to improving that monitoring to establishing new policies for the process of substantial transition.

EANET is one of the leading institutions in Asia following these processes. Together, the processes are able to lead to the solution or lessening of environmental problems. Networks develop and change (during transition periods) to match changes of actors' goals or of the environment. In this sense, there is the judiciousness of networks in environmental governance which responds to changes in the environment and interacts with both the actors and the links between the actors (i.e. the structure) of the network.

The above argument is summarised in Table 1. The column on the far left of the table shows each stage of the network. The top row depicts the characteristics of each of these stages: indicators found, shape of networks, related actors, and the impact on environmental governance. What this table suggests consequently is the impact on environmental governance will multiply and expand as the network develops. In order to be able to exert influence, it is necessary for an actor to interact with others at each stage of the network's existence: from international networking to establishment of concrete measures. Indicators are not observed in all three phases. This would mean that further inquires to study the factors for the formation and development of networks need to be made. However, it is possible to argue that the change of network shape (or structure) form vertical to horizontal exemplifies the advancement of a network in this case.

Table 4.1 Stages from Network Formation to Development and Several Aspects of Environmental Governance

Features / Stages	Observed Indicators	Type of Networks	Actors	Environmental Governance
Primary Stage	Leadership; symbols; scale; inclusively	Vertical network(N)	Policy-makers (pm); experts	International networking
Maintenance and Transition	Scale; agility; polish relations; achievement	Vertical Ns with two hubs	pm; experts; local authorities;NGOs; international organisations	Resource sharing; Assistance of improving the governance ability
Development Stage	Coordination and exploitation of synergies; ownership	Vertical N with horizontal function Ns	Same as above (Number is increasing)	Sharing burdens; Building of impetus and frameworks

In this article, international cooperation on the issue of acid rain in East Asia has illuminated the "networkness" in the theory of networks. EANET has contributed to the problem solving through utilisation of its function networks. In the case of the absence of international norms and rules which stipulate the action of nations, actors form networks to share information, to recognise the focal points, and to create essential measures for dealing with the issue with which they are concerned. In order to respond to the specific political and environmental conditions in East Asia, the participants in EANET developed their

relations by forming a network. The characteristics of a network were utilised for addressing the issues that the relevant actors had.[81] Networks therefore can be an effective mode of environmental governance in East Asia in this sense.

Considering the complex forms of environmental governance, it can be said that networking is the key function of governance; however, network-based governance is, of course, only one of the modes of environmental governance. It is therefore still necessary to make further investigations of network governance, asking, for instance, whether it can also contribute to the resolving or amelioration of other environmental issues in East Asia. There are currently two ways researchers examining this question. One is to analyse two networks, one that has been effective and one that has not, in order to assess the performance and usability of network governance. The other approach is to pursue the further development of network governance, enquiring whether or not this mode enhances environmental governance. In fact, it is doubtful whether EANET, for instance, will fully develop network governance because one of the characteristics of networks, flexibility, is *not* a characteristic of the conclusion to the treaty on the reduction of pollutants. It is clear that the agreements which implement measures for dealing with acid rain are binding for the signatories. With respect to this question, it is necessary to wait and see the progress of discussions at the Working Group on Future Development of EANET, IG meetings, and other function networks.

Furthermore, it is not be a good idea to privilege one of treaties, regimes, or networks over the others. Rather, it is necessary to argue for better or thoughtful mixtures/arrangements of these elements of governance. Hence, theoretical and practical research into network governance by International Relations scholars is required. Such research will also be valuable because the idea of networks has the potential to reconstruct our understandings of relations among actors. Not only are there multiple interactions among actor, but there are also links between the actors and networks as systems. An example of these diverse interactions, and, therefore, one which can help us to explain and understand these new relations, is EANET, the subject of the case study presented in this paper.

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[81] Wolfgang H. Reinicke and Jan Martin Witte, 'Interdependence, Globalization, and Sovereignty: The Role of Non-Binding International Legal Accords', *Commitment and Compliance: The Role of Non-Binding Norms in the International Legal System*, ed. Dinah Shelton (Oxford University Press, 2000), 75-99; Bob Jessop, *The Future of the Capitalist State* (Polity Press, 2002), 240-243.

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