EFFECTIVENESS OF REGIONAL ENVIRONMENTAL INSTITUTIONS:

How Can We Build Effective Regional Environmental Institutions?[1]

LEE, Alice Park
Graduate School of Asia-Pacific Studies,
Waseda University
Tokyo, Japan

Abstract This paper aims to explain the variables that can affect improved resolution of environmental problems by regional environmental institutions. Young's (1994, 1999) studies of environmental institutions suggest that both *exogenous* and *endogenous* variables affect institutional goal attainment, which implies that variables related to both inside and outside of institutional issues should be taken into consideration when evaluating effectiveness of environmental institutions. The authors of *Environmental Regime Effectiveness* (2002) demonstrate that *problem malignancy* and *problem-solving capacity* are independent variables that should be used to rate the effectiveness of institutions. Likewise, scholars who support pragmatic studies on the topic have been making discussion about studying environmental institutions from Capacity Development perspective. Capacity Development studies evaluate the ability of individuals, institutions, and societies to solve problems by conducting *Actor-Function Relationship Analysis* (Kanie and Haas, 2004) and *Actor-Factor Analysis* (Matsuoka, 2007). Environmental Sustainability Index (ESI), which provides a composite profile on 21 indicators derived from 76 underlining data set, shows the capacity of nations for environmental sustainability. On the other hand, the mainstream theory of institutions study is New Institutionalism Theory. New Institutionalism studies agree that the central actors in international decisions are states; however, they emphasize that these states have a *collective interest* that can be facilitated into *collective actions* by cooperation with international institutions. In this study, the effectiveness of Asian regional environmental institutions will be evaluated by using both *collective interest* and collective *actions* analysis and *ESI* analysis. The study will tell us why it is important to learn the topic from both approaches, and conclude with a strategic proposal for building an effective Asian regional environmental integration model.

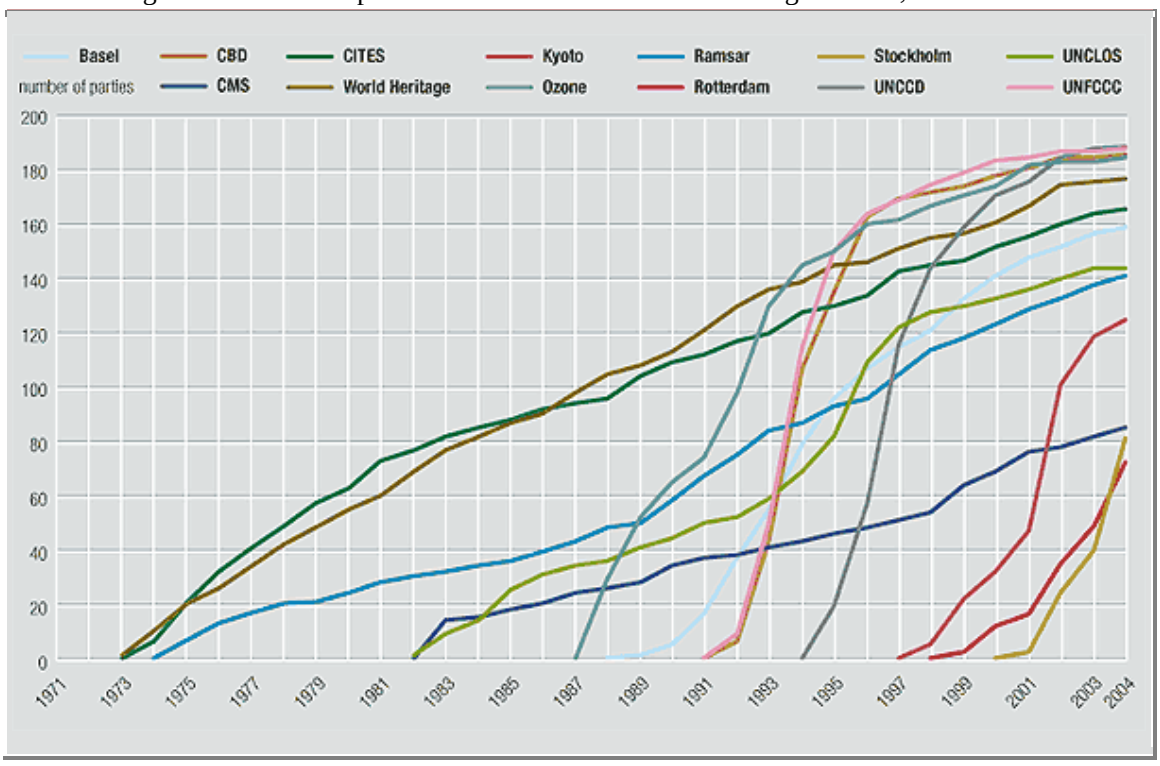
[1] This paper is for presentation at Summer Institute 2009, Global Institute for Asian Regional Integration (GIARI), Waseda University, Japan, Tokyo, August 3rd – 8th, 2009

Introduction

Background

States operate far less autonomously than ever before, and environmental issues impinge on the common interests of separate states in special ways. To survive environmental crises together, states need to abide by rules and norms that are common to all. It became popular to consider the earth as public goods. There are now international cooperation and networks efforts in place to address climate change, whaling, fisheries, marine pollution, river and lake management, endangered species, deforestation, and many other issues. Going back to history, the activities of international environmental institutions began in the 1970s, with the amount of attention given to them having increased rapidly over the past three decades (Figure 1)[2]. Number of ratifications grows steadily, and more than 60 per cent of the potential ratifications have been made in 13 multilateral environmental agreements, according to GEO Data Portal (Table 1). There are more than 500 global, regional or bilateral environmental treaties that together demonstrate international commitment to environmental protection (UNEP, 2004).[3]

Figure 1. Number of parties to multilateral environmental agreements, 1971–2004



Source: GEO Data Portal (2004), compiled from MEA Secretariats

2 Global Environment Outlook Year Book 2004/5, United Nations Environment Programme (UNEP) http://www.unep.org/geo/yearbook/yb2004/117.htm

3 www.unep.org/.../International_environmental_governance_p30-35.pdf

Table 1. Number of parties to multilateral environmental agreements, by GEO region[4]

	CBD	CMS	CITES	Heri-tage	Kyoto	Ozone	Ramsar	PIC	POPs	UN CCD	UN CLOS	UN FCCC	Basel	Total	Poten-tial	%
Africa (53)	52	29	51	45	26	51	40	22	23	53	38	52	39	521	689	76
Asia + Pacfic (45)	45	9	30	40	33	43	24	16	18	44	33	44	33	410	585	70
Europe (49)	46	36	44	48	36	46	46	22	23	46	46	47	46	522	637	82
LAC (34)	32	8	32	31	27	33	25	9	13	33	27	33	30	333	442	75
North America (2)	1	0	2	2	1	2	2	1	1	2	1	2	1	18	26	69
West Asia (12)	10	3	7	11	2	10	4	5	3	10	9	10	10	94	156	60
Global (195)	186	85	166	177	125	185	141	72	81	189	144	188	159	1898	2535	75

Source: GEO Data Portal (2004), compiled from MEA Secretariats

There is evidence of global and regional level of environmental changes such as, increases in global average air and ocean temperatures, widespread melting of snow and ice, rising global average sea level: die prematurely every year due to outdoor and indoor air pollution; 'hole' in the stratospheric ozone layer over the Antarctic; the per capita availability of freshwater is declining, and so on.[5] In order to decrease the additional cost of operating the society and to allow the consistence and effectiveness of solving the environmental problems when it goes serious, institutions are formed. There are many issues which threaten the regional and global level of environment. Asia is facing very serious environmental problems among other regions of the world, and people's efforts to build environmental institutions are actively discussed.

Likewise, growing interest in both *globalization* and the *environment* has stimulated efforts to create international environmental institutions in multilevel contexts. However, the world community lacks effective institutional and legal mechanisms to address global-scale environmental degradation.[6] Multi-disciplinary characteristics of environmental institutional studies became more obvious than ever. It is necessary to have comprehensive studies that can explain effectiveness of institutions from both globalization aspect and environment aspect at the same time.

The objective of this research is to ascertain potential way to improve effectiveness of Asian regional environmental institutions. For that reason, this research has focus on both exogenous and endogenous variables of effectiveness, so that this develop into study that solve the crisis of national commitment and interest versus environmental issue problem. The author would like to answer the following question at the end of this study:

- Which variables affect improved resolution of environmental problems by Asian regional environmental institutions?

Cases on Acid Deposition Monitoring Network in East Asia (EANET) and Convention on

[4] CBD: Convention on Biological Diversity; CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora; POPs: persistent organic pollutants

[5] UNEP's Global Environment Outlook Year Book (2007) reported evidence of unprecedented environmental change at global and regional level.

[6] Daniel C. Esty and Maria H. Ivanova eds. , 2002, Global Environmental governance: Options&Opportunities, Yale School of Forestry and Environmental Studies
http://www.yale.edu/environment/publications

Long-Range Transboundary Air Pollution (LRTAP) will be studied for pragmatic explanation on this topic.

Conceptual Framework

Institutions

Table 2 Definition of Institutions, Regimes, and Organizations[7]

	Definition (Institutions > Regimes > Organizations)
Institutions	"Sets of rules or codes of conduct that serve to define international practices assign roles and guide the interactions to the participants."
Regimes	"social institutions governing the actions of those involved in specifiable activities or sets of activities"
Organizations	"material entities possessing offices, personnel, budgets, equipment, and more often than not, legal personality"

Source: Adapted from Young (1989, 1994)

According to Young's definition on institutions, regimes, and organizations, institutions are the wide concept that covers both regimes and organizations. Institutions include a concept of rules or codes of conduct and also a concept of regimes. (Table 2) Institutions can consist of both formal entities like laws, constitutions, written contracts, market exchanges and organizational by-laws and informal ones like shared values, norms, customs, ethics, and ideology.[8] They have actors who operate within the institutions, and also players outside who interact with the institutions.[9] States, business sectors, civil societies, and organizations sometimes participate within the institutions to set rules, to make agreements, or to sign conventions, while some at other times interact with institutions by cooperating (in partnerships), by influencing, or sometimes by ignoring or opposing. [10](Table 3)

Table 3 Institutions - Actors Relations

Institutions		Interact with Institutions	
State A State B State C Business Sectors Civil Society Organization A Organization B	set rules, make agreements, to sign conventions	State D State E TNCs INGOs Organizations	cooperating (in partnerships), influencing, ignoring opposing

Source: Modified from Robert O. Keohane (1998)

Effectiveness

Although regime effectiveness is still an ambiguous concept, it refers mainly to the intended and issue-specific outcomes of the regime.

Institutional effectiveness occurs when the quality of the environment is improved because of an

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[7] 1994, Young
[7] 1989, Young
[8] Justin Yifu Lin and Jeffrey B. Nugent (1995) "Institutions and economic development" P 2307
[9] International Institutions: Two Approaches Robert O. Keohane *International Studies Quarterly*, Vol. 32, No. 4 (Dec., 1988), pp. 379-396 Published by: Blackwell Publishing on behalf of The International Studies Association
[10] Ibid.

institution's activities. Although regime effectiveness is still an ambiguous concept, it refers mainly to the intended and issue-specific outcomes of the regime. Institutions affect the behavior of those whose behavior is regulated, but they may also affect the distribution of capacities, the cognition of different factors, and even the values and interests of participants and nonparticipants. Moreover, different types of targets can be affected: institutions may influence governments, social groups, individuals, and even whole issue areas. Environmental Regime Effectiveness determines how far the model can help us account for the variance actually observed in regime performance.[11] The model is about effectiveness and problem malignancy, and problem-solving capacity.

Effectiveness can be recognized by the results that institutions deliver. Variables can be identified by tracing backwards from results, so careful evaluation is very important for establishing the variables that have an impact on the effectiveness of institutions. The above definition of effectiveness suggests that the purpose of international environmental institutions is to solve problems that include those involving the behavior of actors. Institutions may be said to have contributed to solving problems when the goals they set have been achieved, when the actors in the process have changed any behavior contributing to the problem, or when the resources and ideas initially contributed could be seen, in the end, to have contributed to the solution of an environmental problem.

Table 4 Definition of and Variables Affecting Effectiveness

Author	Name or Paper	Definition of Effectiveness	Variables and Dimensions
Young	*The Effectiveness of International Regimes*	A matter of the contributions that institutions make to solve the problems that motivate actors to invest the time and energy needed to create those institutions	Exogenous and endogenous variables on goal attainment
Haas, Keohane, Levy	*Institutions for the Earth*	What kind of contribution international institutions make to improvement of the environment	Three Cs: concern, contract, capacity
Miles, Underdal, Andresen, Wettestad, Skjaerseth, Carlin	*Environmental Regime Effectiveness*	How far the model can help to account for variance in performance	Problem malignancy and problem-solving capacity

Source: Adapted from Young (1999), Haas, Keohane, Levy (2001), Miles, Underda, Andresen, Wettestad, Skjaerseth, Carlin (2002)

Literature Review

International environmental cooperation has become an issue from 1970s, since the United Nations Conference on the Human Environment (also known as Stockholm Conference) was held in 1972. Most international environmental institutions are relatively recent in origin, and academic research was lagging even further behind. However, the study on international environmental governance has undergone remarkable growth recent years in their scope and depth.

[11] 2002, Miles, Underdal, Andresen, Wettestad, Skjaerseth and Carlin, 2002

Wiess and Jacobson (2000) compared three concepts of implementation, compliance, and effectiveness of international environmental institutions in Engaging Countries: Strengthening Compliance with International Environmental Accords. He focused which factors make states to compliant in order to find an answer to strengthen international environmental treaties. Kanie and Hass's (2004) analyzed current environmental governance according to their "actor-function relationship" analysis in Emerging Forces in Environmental Governance. They suggested institutions' reform in a way to enhance partnership between actors effectively. Oberthur and Gehring (2006) in Institutional Interaction in Global Environmental Governance, shed light the causal relationship of institutions and the results from interaction between them.

The studies show that "effectiveness" of institutions is the driving force of international environmental governance studies. Wiess and Jacobson think partnerships within institutions can make institutions effective, and Kanie and Hass even though studied "compliance" of nations in international environmental institutions, the concept is much overlapping with effectiveness study. Oberthur and Gehring said their study expands the study of the effectiveness of environmental institutions to the investigation of institutional interaction. Scholars such as Young (1996, 1999), Haas, Keohane, Levy (2001), Miles, Underdal, Andersen, Wettestad, Skjaerseth, and Carlin (2002) have done researches on "effectiveness" by using single or multi case studies.

Variables

Dependent Variable

A clear definition of effectiveness of institutions as a dependent variable has not given yet. Young (1999) wrote "a regime that channels behavior in such a way as to eliminate or substantially ameliorate the problem that led to its creation is effective" in The Effectiveness of International Environmental Regimes. He identified six distinct dimensions of effectiveness that covers broad scope of studies. They are: effectiveness as problem-solving; effectiveness as goal attainment; behavioral effectiveness; process effectiveness; constitutive effectiveness; and evaluative effectiveness. Haas (2001) defined the effectiveness of environmental institutions is about what kind of contribution that international institutions make to improve the environment. Miles wrote about the contribution that institutions target for, which is behavioral changes and technical optimum. These definitions of effectiveness are not useful to be an analytical tool for further research, and conceptual groundwork is needed to clarify what precisely the dependent variable is. (Miles, 2002) To get clear dependent variable of the research, evaluation study approach seems to be used.

Independent Variables

Young (1996) in Global Environmental Change and International Governance used endogenous and exogenous variables. Endogenous variables are limited to properties of the environmental regimes themselves, such as objectives of the institutions. On the other hand, exogenous variables range across the full spectrum of driving social forces, such as power factor, interest factors, and knowledge factors. Young (1999) focused on causal relationship of endogenous and exogenous factors that lead to success or failure of institutions in The Effectiveness of International Environment Regimes.

OILPOL was established in 1954 in order to prevent intentional discharges of oil by tankers cleaning their cargo tanks or using empty tanks to hold sea water. It restructured to MARPOL in an effort led by the United States. Though there was some delaying to put into action because of other institutions such as International Marine Organizations, the oil pollution control has been effective because MARPOL restructured the tanker fleet so that it is far less likely to discharge oil intentionally. It is considered that the regime was most effective by targeting the actions of non-state actors. Because oil pollution involves private international trade, the opportunities for inducing behavioral change were greater than they are in other issue areas that concerns with government directly.

Throughout the case study, he knew in causal mechanism, regimes can alter the alternative

available to actors (endogenous), and regime often influence behavior through a complex of causal mechanisms rather than a single one (exogenous).

Haas, Keohane, and Levy (2000) analyzed cases by using 3Cs: concern, contract, and capacity. International environmental regimes increase governmental concern through normative pronouncements, they enhance the contractual environment by reducing transaction costs and providing monitoring and verification mechanisms, and they heighten national capacity through technical assistance and aid. They observed 3Cs in each period of agenda setting, international policy formulation, and national policy development.

In the case of protecting ozone layer, institutions built multi level contract in order to lessen chlorofluorocarbons (CFCs). Vienna Convention did not come out earlier because several delegations continued to push for their preferred form of controls. The Montreal Protocol that came next to Vienna widely praised as a model for future environmental agreements. In 1970s and 80s when the concern to environment raise highly, the Protocol was provided strong leadership by United States. It was bargaining that countries to adopt Montreal Protocol. There are found that the convention boosted concern, building capacity, and facilitating agreements.

Miles (2004) sees regime effectiveness as a function of two main set of independent variables – the malignancy of the problem and problem solving capacity.

Previous studies were focusing on answering "why some institutions are effective while others are not." Empirical evidence and theoretical consideration has been analyzed in many actors, such as non-state, private governance, and multilevel governance, etc. Young (1999), Haas (2000), and Miles (2004) could explain the independent variables with comprehensive case studies. They explained effectiveness of institutions with endogenous factors and exogenous factors; concern and capacity; problem malignancy and problem solving capacity.

Theoretical Framework

In literature review, both Haas and Miles used the term 'capacity.' In Haas's work, he focused on domestic perspective of capacity that can be increased by technical assistant and aid. Miles understanding on effectiveness considers institutions' capacity to solve problems and implement regulations to each country. Young's explanation about endogenous and exogenous variables also takes consideration of capacity. Endogenous variables concern how the institutions can influence within the institutions, such as legal, social, economical, and political behavior changes of membership countries. Exogenous variables are about how institutions deal with issues that outside of institutions as collective actions. Both concepts concerns capacity as each nation state and as institutions.

Capacity Development is the process by which individuals groups, organizations, institutions and societies increase their abilities: to perform functions solve problems and achieve objectives; to understand and deal with their development need in a broader context and in a sustainable.

Capacity is the ability of social actors to monitor, analyze and evaluate taking problems into consideration, and implement sustainable policy.[12] State's capacity is an important factor to let them abide by rules and norms that are common to all. UNDP in 1997 noted capacity development "The process by which individuals groups, organizations, institutions and societies increase their abilities: to perform functions solve problems and achieve objectives; to understand and deal with their development need in a broader context and in a sustainable."[13] If participants of international environmental institutions develop their capacity, then the institutions will have better effectiveness, because those participants can better accomplish the task which given to them. Capacity development is focused on each actor's ability for issue solution, that does not address much of interconnection between actors or other nonissue related factors likewise that we studied in New Institutionalism study.

Capacity is important to strengthen enforcement for implementation of convention and agreement. There are two different types of capacity in international environmental institutions; one

[12] 2006, Matsuoka and Komatsu

[13] UNDP. (1997). Capacity Development . New York: Management Development and Governance Division, UNDP.

is capacity as institutions in collective group and the other is capacity as member countries independently. In this paper, two concepts of Collective Action and Collective Interest Theory and Environmental Sustainability Index are used in order to explain the two perspectives.

Collective Action and Collective Interest

Collective action is concerned with the provision of public goods through the collaboration of two or more individuals, and the impact of externalities on group behavior.

Collective interest is expected value of participation that is bigger than expected value of not participating.

Lin in 1995 defined Institutions as a set of *humanly devised behavioral rules* that govern and shape the interactions of human beings, in part by helping them to form expectations of what other people will do. [14] Institutions also defined as sets of international regulations and organizations that were intentionally established by preexisting actors (states) through explicit, legally or politically binding, international agreements in order to *regulate anthropogenic sources* of negative externalities affecting the natural environment.[15]

Both definitions address the objective of institutions to regulate human behavior. In international institutions, group that has characteristics of common value and advantage counted as an each actors. Groups of individuals with common interests are expected to act on behalf of their common interests much as single individuals are often expected to act on behalf of their personal interests.[16] This called collective action. Collective action is concerned with the provision of public goods through the collaboration of two or more individuals, and the impact of externalities on group behavior. It is more commonly referred to as Public Choice.[17]

International politics contains much of problems about collective action. The state often face domestic problem by groups of people to identify with the common good, but the problem also caused in international relations where each state reserves the right and the force. The Collective Interest model posits that people will participate in a collective endeavor when the expected value of participation is greater than the expected value of not participation is greater than the expected value of not participating. [18] People judge the expected value by assessing the total value of the public good, the probability their participation will affect collective outcomes, and the selective *benefits and costs of participation.*[19]

Olson (1982) and R. Hardin (1982) argued that collective action is likely to be more feasible in the circumstances like: [20]

1. the smaller the group,
2. the more homogeneous the origin of the group,
3. the longer the members of the group have been associated with one another or the group

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[14] Lin, Junstin YiFu and Nugent, Jefferey B. 1995, Handbook of Development Economics, Volume 3, Edited by J. Behrman and T. N. Srinivasan Elsevier Science B.V., 1995, p2037
It refers formal institutions such as laws, constitutions, written contracts, market exchanges, and organizational by-laws; informal ones like shared values, norms, customs, ethics, and ideology.

[15] Bernauer, Thomas. 1995. "The effect of international environmental institutions: how we might learn more," in *International Organization* 49, 2, Spring 1995, pp.354

[16] the logic of collective action, Mancur Olson p.1

[17] Ibid.

[18] Lubell, Mark, Collective Action, Environmental Activism, and Air Quality Policy, Political Research Quarterly, Vol. 59, No. 1 (March 2006): pp. 149-160

[19] Ibid.

[20] Olson, Jr., M (1982) *The rise and decline of nations: The political economy of economic growth, stagflation and social rigidities*, Yale University Press, Hardin R. (1982) *Collective action*, Resources for the future
a) It can be measured by membership size, b) by commonality of place or class of birth of group members, c) by the length of time the group has been in existence, d)by geographic or sectored concentration, e) by differences in stated objectives among group members, and g_ by inequality in the distribution of wealth among group members.

has been in existence,
4. the closer the social and physical proximity among group members,
5. the more differentiated (in a complementary way) the goals of different members (or subgroups) of the group,
6. the greater the sensitivity of the group to a threatened loss arising from inaction,
7. the more unequal the distribution of wealth or power among group members.

The corporate identity of the state generates four basic interests or appetites: [21]

1. Physical security, including its differentiation from other actors
2. Ontological security or predictability in relationships to the world, which creates a desire for stable social identities
3. Recognition as an actor by others, above and beyond survival through brute force
4. Development, in the sense of meeting the human aspiration for a better life, for which states are repositories at the collective level.

Environmental Sustainability Index[22]

Environmental Sustainability Index (ESI) is completed by Center for environmental Law and Policy in Yale University, Center for International Earth Science Information Network in Columbia University, in collaboration with World Economic Forum in Switzerland, Joint Research Center of European Commission in Italy. ESI provides a composite profile of national environmental stewardship. They reviewed based on a compilation of 21 indicators that derive from 76 underlying data sets. ESI can explain capacity development. It measures the ability or capacity of nations to protect the environment. The capacity of each country can be observed by underlying indicators and variables of ESI. The 21indicators are categorized to 5 groups:

• Environmental Systems
• Reducing Environmental Stresses
• Reducing Human Vulnerability to Environmental Stresses
• Societal and Institutional Capacity to Respond to Environmental Challenges
• Global Stewardship

Table 6 and Table 7 explained in detailed about 21 indicators and 76 data sets.

Table 6 2005 Environmental Sustainability Index Building Blocks – Components

Component	**logic**
Environmental Systems	A country is more likely to be environmentally sustainable to the extent that its vital environmental systems are maintained at healthy levels, and to the extent to which levels are improving rather than deteriorating.
Reducing Environmental Stresses	A country is more likely to be environmentally sustainable if the levels of anthropogenic stress are low enough to engender no demonstrable harm to its environmental systems.
Reducing Human Vulnerability	A country is more likely to be environmentally sustainable to the extent that people and social systems are not vulnerable to environmental disturbances that affect basic human wellbeing; becoming less vulnerable is a sign that a society

[21] Collective Identity Formation and the International State, Alexander Wendt, 1994, The American Political Science Review, Vol. 88, No.2 (Jun., 1994), pp. 384-396

[22] 2005 Environmental Sustainability Index, Yale Center for Environmental Law and Policy, Yale University, Center for International Earth Science Information Network, Columbia University. In collaboration with: World Economic Forum, Geneva, Switzerland, Joint Research Centre, European Commission, Ispra, Italy.

	is on a track to greater sustainability.
Social and Institutional Capacity	A country is more likely to be environmentally sustainable to the extent that it has in place institutions and underlying social patterns of skills, attitudes, and networks that foster effective responses to environmental challenges.
Global Stewardship	A country is more likely to be environmentally sustainable if it cooperates with other countries to manage common environmental problems, and if it reduces. negative transboundary environmental impacts on other countries to levels that cause no serious harm.

Source: *2005 Environmental Sustainability Index*

The higher a country's ESI score, the better positioned it is to maintain favorable environmental conditions into the future. [23] Finland, Norway, Uruguay, Sweden, and Iceland are the top five ESI ranking countries. On the other hand, North Korea, Iraq, Taiwan, Turkmenistan, and Uzbekistan are the lowest ranking countries are. These countries face numerous issues, both natural and manmade, and have not managed their policy choices well.[24]

[23] *2005 Environmental Sustainability Index*
[24] Ibid.

Table 7 (Continue) 2005 Environmental Sustainability Index - Indicators and Variables

Comp-onent	Indicator Number	Indicator	Variable Number	Variable Code	Variable
Environmental Systems	1	Air Quality	1	NO2	Urban population weighted NO_2 concentration
			2	SO2	Urban population weighted SO_2 concentration
			3	TSP	Urban population weighted TSP concentration
			4	INDOOR	Indoor air pollution from solid fuel use
	2	Biodiversity	5	ECORISK	Percentage of country's territory in threatened ecoregions
			6	PRTBRD	Threatened bird species as percentage of known breeding bird species in each country
			7	PRTMAM	Threatened mammal species as percentage of known mammal species in each country
			8	PRTAMPH	Threatened amphibian species as percentage of known amphibian species in each country
			9	NBI	National Biodiversity Index
	3	Land	10	ANTH10	Percentage of total land area (including inland waters) having very low anthropogenic impact
			11	ANTH40	Percentage of total land area (including inland waters) having very high anthropogenic impact
	4	Water Quality	12	WQ_DO	Dissolved oxygen concentration
			13	WQ_EC	Electrical conductivity
			14	WQ_PH	Phosphorus concentration
			15	WQ_SS	Suspended solids
	5	Water Quantity	16	WATAVL	Freshwater availability per capita
			17	GRDAVL	Internal groundwater availability per capita
Reducing Environmental Stresses	6	Reducing Air Pollution	18	COALKM	Coal consumption per populated land area
			19	NOXKM	Anthropogenic NO_x emissions per populated land area
			20	SO2KM	Anthropogenic SO_2 emissions per populated land area
			21	VOCKM	Anthropogenic VOC emissions per populated land area
			22	CARSKM	Vehicles in use per populated land area
	7	Reducing Ecosystem Stress	23	FOREST	Annual average forest cover change rate from 1990 to 2000
			24	ACEXC	Acidification exceedance from anthropogenic sulfur deposition
	8	Reducing Population Pressure	25	GR2050	Percentage change in projected population 2004-2050
			26	TFR	Total Fertility Rate
	9	Reducing Waste & Consumption Pressures	27	EFPC	Ecological Footprint per capita
			28	RECYCLE	Waste recycling rates
			29	HAZWST	Generation of hazardous waste
	10	Reducing Water Stress	30	BODWAT	Industrial organic water pollutant (BOD) emissions per available freshwater
			31	FERTHA	Fertilizer consumption per hectare of arable land
			32	PESTHA	Pesticide consumption per hectare of arable land
			33	WATSTR	Percentage of country under severe water stress
	11	Natural Resource Management	34	OVRFSH	Productivity overfishing
			35	FORCERT	Percentage of total forest area that is certified for sustainable management
			36	WEFSUB	World Economic Forum Survey on subsidies
			37	IRRSAL	Salinized area due to irrigation as percentage of total arable land
			38	AGSUB	Agricultural subsidies

Comp-onent	Indicator Number	Indicator	Variable Number	Variable Code	Variable
Reducing Human Vulnerability	12	Environmental Health	39	DISINT	Death rate from intestinal infectious diseases
			40	DISRES	Child death rate from respiratory diseases
			41	U5MORT	Children under five mortality rate per 1,000 live births
	13	Basic Human Sustenance	42	UND_NO	Percentage of undernourished in total population
			43	WATSUP	Percentage of population with access to improved drinking water source
	14	Reducing Environment-Related Natural Disaster Vulnerability	44	DISCAS	Average number of deaths per million inhabitants from floods, tropical cyclones, and droughts
			45	DISEXP	Environmental Hazard Exposure Index
Social and Institutional Capacity	15	Environmental Governance	46	GASPR	Ratio of gasoline price to world average
			47	GRAFT	Corruption measure
			48	GOVEFF	Government effectiveness
			49	PRAREA	Percentage of total land area under protected status
			50	WEFGOV	World Economic Forum Survey on environmental governance
			51	LAW	Rule of law
			52	AGENDA21	Local Agenda 21 initiatives per million people
			53	CIVLIB	Civil and Political Liberties
			54	CSDMIS	Percentage of variables missing from the CGSDI "Rio to Joburg Dashboard"
			55	IUCN	IUCN member organizations per million population
			56	KNWLDG	Knowledge creation in environmental science, technology, and policy
			57	POLITY	Democracy measure
	16	Eco-Efficiency	58	ENEFF	Energy efficiency
			59	RENPC	Hydropower and renewable energy production as a percentage of total energy consumption
	17	Private Sector Responsiveness	60	DJSGI	Dow Jones Sustainability Group Index (DJSGI)
			61	ECOVAL	Average Innovest EcoValue rating of firms headquartered in a country
			62	ISO14	Number of ISO 14001 certified companies per billion dollars GDP (PPP)
			63	WEFPRI	World Economic Forum Survey on private sector environmental innovation
			64	RESCARE	Participation in the Responsible Care Program of the Chemical Manufacturer's Association
	18	Science and Technology	65	INNOV	Innovation Index
			66	DAI	Digital Access Index
			67	PECR	Female primary education completion rate
			68	ENROL	Gross tertiary enrollment rate
			69	RESEARCH	Number of researchers per million inhabitants
Global Stewardship	19	Participation in International Collaborative Efforts	70	EIONUM	Number of memberships in environmental intergovernmental organizations
			71	FUNDING	Contribution to international and bilateral funding of environmental projects and development aid
			72	PARTICIP	Participation in international environmental agreements
	20	Greenhouse Gas Emissions	73	CO2GDP	Carbon emissions per million US dollars GDP
			74	CO2PC	Carbon emissions per capita
	21	Reducing Transboundary Environmental Pressures	75	SO2EXP	SO_2 Exports
			76	POLEXP	Import of polluting goods and raw materials as percentage of total imports of goods and services

Source: 2005 Environmental Sustainability Index

Table 7 is the ESI index that show the ESI scores, OECD, non OECD and ESI rank by nations in alphabetical order.

Table 8 2005 Environmental Sustainability Index – Scores and Rankings

ESI Rank	Country Name	ESI Score	OECD Rank	Non-OECD Rank	ESI Rank	Country Name	ESI Score	OECD Rank	Non-OECD Rank	ESI Rank	Country Name	ESI Score	OECD Rank	Non-OECD Rank
24	Albania	58.8		14	67	Greece	50.1	21		2	Norway	73.4	2	
96	Algeria	46.0		70	116	Guatemala	44.0		88	83	Oman	47.9		60
123	Angola	42.9		94	81	Guinea	48.1		58	35	P. N. Guinea	55.2		22
9	Argentina	62.7		3	77	Guinea-Bissau	48.6		54	131	Pakistan	39.9		102
44	Armenia	53.2		28	8	Guyana	62.9		2	28	Panama	57.7		17
13	Australia	61.0	8		141	Haiti	34.8		112	17	Paraguay	59.7		8
10	Austria	62.7	7		87	Honduras	47.4		64	16	Peru	60.4		7
99	Azerbaijan	45.4		73	54	Hungary	52.0	19		125	Philippines	42.3		97
114	Bangladesh	44.1		86	5	Iceland	70.8	4		102	Poland	45.0	27	
47	Belarus	52.8		30	101	India	45.2		75	37	Portugal	54.2	15	
112	Belgium	44.4	28		75	Indonesia	48.8		53	94	Romania	46.2		69
86	Benin	47.5		63	132	Iran	39.8		103	33	Russia	56.1		20
43	Bhutan	53.5		27	143	Iraq	33.6		114	106	Rwanda	44.8		79
20	Bolivia	59.5		11	21	Ireland	59.2	10		136	Saudi Arabia	37.8		107
61	Bosnia & Herze.	51.0		42	62	Israel	50.9		43	59	Senegal	51.1		40
34	Botswana	55.9		21	69	Italy	50.1	22		89	Serbia & Mont.	47.3		66
11	Brazil	62.2		4	109	Jamaica	44.7		82	120	Sierra Leone	43.4		92
70	Bulgaria	50.0		48	30	Japan	57.3	12		48	Slovakia	52.8	18	
97	Burkina Faso	45.7		71	84	Jordan	47.8		61	29	Slovenia	57.5		18
130	Burundi	40.0		101	78	Kazakhstan	48.6		55	93	South Africa	46.2		68
68	Cambodia	50.1		47	100	Kenya	45.3		74	122	South Korea	43.0	29	
50	Cameroon	52.5		32	138	Kuwait	36.6		109	76	Spain	48.8	23	
6	Canada	64.4	5		80	Kyrgyzstan	48.4		57	79	Sri Lanka	48.5		56
25	Central Afr. Rep.	58.7		15	52	Laos	52.4		34	140	Sudan	35.9		111
104	Chad	45.0		77	15	Latvia	60.4		6	4	Sweden	71.7	3	
42	Chile	53.6		26	129	Lebanon	40.5		100	7	Switzerland	63.7	6	
133	China	38.6		104	121	Liberia	43.4		93	117	Syria	43.8		89
23	Colombia	58.9		13	126	Libya	42.3		96	145	Taiwan	32.7		116
39	Congo	53.8		24	22	Lithuania	58.9		12	134	Tajikistan	38.6		105
18	Costa Rica	59.6		9	90	Macedonia	47.2		67	63	Tanzania	50.3		44
88	Côte d'Ivoire	47.3		65	64	Madagascar	50.2		45	73	Thailand	49.7		51
19	Croatia	59.5		10	74	Malawi	49.3		52	111	Togo	44.5		84
53	Cuba	52.3		35	38	Malaysia	54.0		23	139	Trinidad & Tob.	36.3		110
92	Czech Rep.	46.6	25		41	Mali	53.7		25	55	Tunisia	51.8		36
113	Dem. Rep. Congo	44.1		85	124	Mauritania	42.6		95	91	Turkey	46.6	24	
26	Denmark	58.2	11		95	Mexico	46.2	26		144	Turkmenistan	33.1		115
119	Dominican Rep.	43.7		91	58	Moldova	51.2		39	57	Uganda	51.3		38
51	Ecuador	52.4		33	71	Mongolia	50.0		49	108	Ukraine	44.7		81
115	Egypt	44.0		87	105	Morocco	44.8		78	110	United Arab Em.	44.6		83
118	El Salvador	43.8		90	107	Mozambique	44.8		80	65	United Kingdom	50.2	20	
27	Estonia	58.2		16	46	Myanmar	52.8		29	45	United States	52.9	17	
135	Ethiopia	37.9		106	32	Namibia	56.7		19	3	Uruguay	71.8		1
1	Finland	75.1	1		85	Nepal	47.7		62	142	Uzbekistan	34.4		113
36	France	55.2	14		40	Netherlands	53.7	16		82	Venezuela	48.1		59
12	Gabon	61.7		5	14	New Zealand	60.9	9		127	Viet Nam	42.3		98
72	Gambia	50.0		50	66	Nicaragua	50.2		46	137	Yemen	37.3		108
56	Georgia	51.5		37	103	Niger	45.0		76	60	Zambia	51.1		41
31	Germany	56.9	13		98	Nigeria	45.4		72	128	Zimbabwe	41.2		99
49	Ghana	52.8		31	146	North Korea	29.2		117					

Source: 2005 Environmental Sustainability Index

Case Study

Environment is the issue that has a strong linkage among neighbors (close and far), so that it is important to have a multi-level approaches. Many international environmental institutions show improvement and some of regional institution even influence to policy implementation. However, most of Asian regional environmental institutions are not functioning significantly according to reports published. In order to discover the variables that can affect improved resolution of environmental problems by Asian regional environmental institutions, two cases will be examined in this chapter. One is the Acid Deposition Monitoring Network in East Asia (EANET) and the other is the Convention on Long-Range Transboundary Air Pollution (CLRTAP). Each of the case is based on Asia and Europe. This is not to compare Asian case and European case, rather, it is to compare an ineffective case with effective case on almost the same topics of environment.

Overview of EANET and LRTAP

EANET[25]

EANET is a regional cooperative mechanism that aims to promote efforts to prevent atmospheric pollution, and thus to contribute to the protection of the ecosystem and human health. It was established in 1998 under the initiative of the Japanese government, which held serious concerns on the effects of acid rain deposition from trans-boundary air pollutants.[26] In Europe, it was successfully achieved through the activities under the Convention on Long-Range Transboundary Air Pollution.[27] EANET was modeled after LRTAP. There are 13 countries joining EANET: Cambodia, China, Indonesia, Japan, Lao P.D.R., Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Russia, Thailand, Viet Nam.

There are three objectives that has been stated by EANET. 1) To create a common understanding of the state of the acid deposition problems in East Asia. 2) To provide useful inputs for decision making at local, national and regional levels aimed at preventing or reducing adverse impacts on the environment caused by acid deposition. 3) To contribute to cooperation on the issues related to acid deposition among the participating countries.[28]

The World Bank estimated in 1995 that by 2020, if present energy and environment policies remain unchanged, sulfur dioxide emissions in the region will almost triple the 1990 level. Thus, adverse impacts of acid deposition in East Asia will become a critical problem in the near future. Scientist see that a comprehensive approach was most appropriate for assessing the impacts because of the multiple factors involved, including deposition acidity, chemical components and soil sensitivity. The first session of the Intergovernmental Meeting was in 1998 at Yokohama, Japan. The same year, April, at the second session of the Intergovernmental Meeting, ten countries participated in the preparatory phase activities: China, Indonesia, Japan, Malaysia, Mongolia, Philippines, Republic of Korea, Russia, Thailand and Viet Nam. The Environmental Agency of Japan functioned as the interim secretariat for the Network, the Acid Deposition and Oxidant Research Centre of Japan was designated as the interim network center, and an interim scientific advisory group was established to advice on the scientific aspects of the preparatory phase activities.

During this period, the technical manuals and guidelines for monitoring of wet deposition, soil and vegetation and inland aquatic environment were developed and adopted at the Second Interim Scientific Advisory Group Meeting of EANET in March 2000.

The IG2 held in October 2000 in Niigata, Japan concluded that the preparatory activities of EANET had been successful and decided to start EANET activities on a regular basis from January

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[25] This introduction is mainly the summery of information in EANET homepage http://www.eanet.cc/eanet.html (2009-7-19)

[26] http://enviroscope.iges.or.jp/modules/envirolib/upload/2253/attach/nea_report_final.pdf

[27] http://www.eanet.cc/eanet/outline.html

[28] http://www.eanet.cc/eanet/backg.html

2001 based on the *Joint Announcement on the Implementation of EANET* and the *Tentative Design of EANET*.

Under the Regular Phase Activities, the ten countries agreed to establish an institutional framework comprising of the Intergovernmental Meeting, the Scientific Advisory Committee, the Secretariat and Network Center to support the network and promote its activities in close communication, coordination and collaboration with the participating countries.

Cambodia and Lao PDR joined in 2001 and 2002 respectively and Myanmar joined in 2005. The member countries are: Cambodia, China, Indonesia, Japan, Lao PDR, Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Russia, Thailand and Viet Nam.

The major activity and achievement that EANET achieved since 1998 is: acid deposition monitoring; compilation, evaluation, storage and provision of data :promotion of quality assurance and quality control (QA/QC) activities: implementation of technical support and capacity building activities :promotion of research and studies related to acid deposition problems: promotion of public awareness activities

LRTAP[29]

LRTAP started from scientists and ministerial level concerns on sulphur emission in continental Europe and the acidification of Scandinavia lakes. After United Nations Conference on Human Environment in Stockholm ends, they implied that cooperation at the international level was necessary to solve problems such as acidification. Ministerial level of discussion on the issue in 1979 resulted the signature of the Convention on Long-Range Transboundary Air Pollution by 34 governments and European Community. This convention entered into force in 1983 and can legally bind participants. [30] The Convention has been extended by eight protocols that identify specific measures to be taken by Parties to cut their emissions of air pollutants. The Convention, which now has 51 Parties identifies the Executive Secretary of UNECE as its secretariat.

Table 9 Protocols to the Convention

- The 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone; 25 Parties. Entered into force on 17 May 2005. (Guidance documents to Protocol adopted by decision 1999/1, Revised guidance document on ammonia).
- The 1998 Protocol on Persistent Organic Pollutants (POPs); 29 Parties. Entered into force on 23 October 2003.
- The 1998 Protocol on Heavy Metals; 29 Parties. Entered into force on 29 December 2003.
- The 1994 Protocol on Further Reduction of Sulphur Emissions; 28 Parties. Entered into force 5 August 1998.
- The 1991 Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes; 23 Parties. Entered into force 29 September 1997.
- The 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes; 32 Parties. Entered into force 14 February 1991.
- The 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent; 23 Parties. Entered into force 2 September 1987.

[29] This introduction is mainly the summery of information in UNECE homepage.

[30] http://www.unece.org/env/lrtap/lrtap_h1.htm

- The 1984 Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP); 42 Parties. Entered into force 28 January 1988.

Source: UNECE homepage

LRTAP's objectives are: 1) Implementation and further development of the cooperative program 2) Research and Monitoring 3) Information exchange.[31] The convention on LRTAP is one of the main international efforts to combat acidification and other damages to ecosystems, buildings, and human health in Europe and North America. Since 1979, eight protocols on different pollutants and procedural matters of the convention have been signed under the auspices on the UNECE. The convention has set up a multi-layer organization to include scientific assessments on the numerous technical and scientific questions of air-pollution.

One of the main success factors for the LRTAP convention and its assessments certainly was the continuity of a large percentage of its personnel especially in the first decade of its existence. In comparison to the others, the heterogeneity of participants in the LRTAP process was significantly lower as there were no developing countries participating. LRTAP assessments only deal with Northern industrialized countries. The three main subsidiary bodies - the Working Group on Effects, the Steering Body to EMEP and the Working Group on Strategies and Review - as well as the Convention's Implementation Committee, report to the Executive Body each year.[32]

Table 10 The Convention in 1991

The 1991 Geneva Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes

In November 1991, the Protocol to the Convention on Long-range Transboundary Air Pollution on the Control of Emissions of Volatile Organic Compounds (VOCs, i.e. hydrocarbons) or Their Transboundary Fluxes, the second major air pollutant responsible for the formation of ground level ozone, was adopted. It has entered into force on 29 September 1997.

This Protocol specifies three options for emission reduction targets that have to be chosen upon signature or upon ratification:

(i) 30% reduction in emissions of volatile organic compounds (VOCs) by 1999 using a year between 1984 and 1990 as a basis. (This option has been chosen by Austria, Belgium, Estonia, Finland, France, Germany, Netherlands, Portugal, Spain, Sweden and the United Kingdom with 1988 as base year, by Denmark with 1985, by Liechtenstein, Switzerland and the United States with 1984, and by Czech Republic, Italy, Luxembourg, Monaco and Slovakia with 1990 as base year);

(ii) The same reduction as for (i) within a Tropospheric Ozone Management Area (TOMA) specified in annex I to the Protocol and ensuring that by 1999 total national emissions do not exceed 1988 levels. (Annex I specifies TOMAs in Norway (base year 1989) and Canada (base year 1988));

(iii) Finally, where emissions in 1988 did not exceed certain specified levels, Parties may opt for a stabilization at that level of emission by 1999. (This has been chosen by Bulgaria, Greece, and Hungary).

Source: UNECE homepage

Table 11 The Convention in 1988

The 1988 Sofia Protocol concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes

In 1988 the Protocol concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes was adopted in Sofia (Bulgaria). This Protocol requires as a first step, to freeze emissions of nitrogen oxides or their transboundary fluxes. The general reference year is 1987 (with the exception of the United States that chose to relate its emission target to 1978).

Taking the sum of emissions of Parties to the NOx Protocol in 1994, or a previous year, where no recent data are available, also a reduction of 9% compared to 1987 can be noted. Nineteen of the 25 Parties to the 1988 NOx Protocol have reached the target and stabilized emissions at 1987 (or in the case of the United States 1978)

[31] http://www.unece.org/env/lrtap/full%20text/1979.CLRTAP.e.pdf
[32] http://www.unece.org/env/lrtap/

levels or reduced emissions below that level according to the latest emission data reported.
The second step to the NOx Protocol requires the application of an effects-based approach. Applying the multi-pollutant, multi-effect critical load approach, a new instrument being prepared at present should provide for further reduction of emissions of nitrogen compounds, including ammonia, and volatile organic compounds, in view of their contribution to photochemical pollution, acidification and eutrophication, and their effects on human health, the environment and materials, by addressing all significant emission sources.
The collection of scientific and technical information as a basis for a further reduction in nitrogen oxides and ammonia, considering their acidifying as well as nitrifying effects, is under way.

Source: UNECE homepage

EANET and LRTAP

Table 12 Comparison of EANET and LRTAP

	EANET	LRTAP
Started Year	1993	1979
Participant	13 Countries: China, Indonesia, Japan, Malaysia, Mongolia, Philippines, R. of Korea, Russia, Thailand, Viet Nam, Cambodia, Lao PDR, Myanmar	51 parties[33]
Motivation	Established as a regional cooperative initiative to promote efforts for environmental sustainability and protection of human health in the East Asian region.	In 1960s, scientists demonstrated the interrelationship between sulphur emissions in continental Europe and the acidification of Scandinavian lakes.
Activities	Monitoring : Wet deposition 46, dry deposition 37, inland aquatic 13, soil and vegetation 19	General commitments on politicies and strategies to combat the discharge of pollutants
	Dissemination of Information	Exchange of relevant information
	Cooperation on investigation and Research	Review of policies
	Collaboration on developing emission inventory and numerical modeling	Scientific activities
	Assessment of Environmental Data	Technical measures
	Public awareness and general information	Co-operation in research
Objective	Create common understanding of the acid deposition problems	Implementation and further development of the cooperative program
	Provide useful inputs for decision-making	Research and Monitoring
	Contribute to cooperation among countries	Information exchange
Achievements	Network development Development of a high quality dataset Enhancement of technical capacity in participating countries Raising public awareness	8 conventions[34]

[33] Appendix 1
[34] Refer to table 8 and appendix

	Enhancing knowledge and understanding through research Promotion of cooperation between countries and with other regional/international programs	

Source: Adapted from UNECE and EANET homepages

Case Analysis

Variables

Collective Actions and Collective Interest Variables

Comparing EANET and LRTAP in collective action and collective interest, LRTAP show strong collective actions, by requiring countries to sign or ratify to conventions that has judicial impact. In case of EANET, simple network setting is not linkage to institutions' heavy impact other than voluntary cooperation of monitoring. The motivations for both of institutions are about concerning acidification issue. However, the different show that when LRTAP was form to solve an emergent problem of Scandinavia lake, while EANET without having an emergent accident that Japan proposed to build network for preventing and monitoring acidification.

Table 13 Collective Actions and the Motivations

	Collective Actions	Motivations
EANET	Join the network	Concerning on the effects of acid rain, and realize the necessity to cooperate in the issue
LRTAP	Sign or ratify to conventions	Protecting Scandinavia lakes acidification issues

According to the discussion on Collective Action and Collective Interest in previous pages, the analytical comparison of the two environmental institutions is possible based on criteria set by previous studies about collective action and collective interest.

Table 14 Comparison between EANET and LRTAP

Collective Action's Feasibility (Olson, 1982; Hardin, 1982)		
Criteria	EANET	LRTAP
the smaller the group	13 countries (however geographically wider)	51 parties (only deal with Northern industrialized countries)
the more homogeneous the origin of the group	Diversified economic background Main environment problem is different with East and South-East Asia	Similar economic background Share common environmental problem
the longer the members of the group have been associated with one another or the group has been in existence	Not yet	European Community
the closer the social and physical proximity among group members	Culture and political system is various according to countries.	Some differences in culture and political systems, but mainly have more proximity relatively.
the more differentiated (in a complementary way) the goals of	Have no commitment	Highly committed core group of negotiators and scientist

different members (or subgroups) of the group		
the greater the sensitivity of the group to a threatened loss arising from inaction, the more unequal the distribution of wealth or power among group members.	Mainly dealing with monitoring	Have responsibility to perform based on the convention that the participants signed or ratified.
Collective Interests or Appetites (Wendt, 1994)		
Criteria	EANET	LRTAP
Development, in the sense of meeting the human aspiration for a better life, for which states are repositories at the collective level.	Since most of the participants are developing countries, environmental protection is not always the choice between development and environment.	The first motivation of establishment was to solve specific problems in Scandinavia lakes acidification issues, they show very clear interest in meeting the human aspiration for a better life.
Among the 4 basic interests or appetites (1994,Wendt) this paper already discusses in previous pages, neither EANET nor LRTAP shows significant interests in physical or ontological security. 'Meeting the human aspiration for a better life' shows the nearest meaning with the motivations of establishing the two institutions.		

Source: Olson (1982), Hardin (1982), Wendt (1994), and modified from UNECE and EANET homepages

Environmental Sustainability

Environmental Sustainability Index shows the capacity of each participant to build environmental sustainability. By studying ESI of EANET and LRTAP, this study will shed light the relations of participants' capacity and the institutions' effectiveness. (Table 15) Among EANET participants, Japan marks the highest EIS with 57.3 and China marks the lowest with 38.6. Finland achieved 75.1 as the world highest record in LRTAP while Belgium 44.4 marked the lowest. In a brief scope, LRTAP participants generally have higher ESI score than participants of EANET. (figure 6)

Table 15 ESI Index of EANET and LRTAP Participating Countries

EANET	ESI	LRTAP	ESI	LRTAP	ESI	LRTAP	ESI
Cambodia	50.1	Albania	58.8	Georgia	51.5	Portugal	54.2
China	38.6	Armenia	53.2	Germany	56.9	Republic of Moldova	51.2
Indonesia	48.8	Austria	61.0	Greece	50.1	Romania	46.2
Japan	57.3	Azerbaijan	45.4	Hungary	52.0	Russian Federation	56.1
Laos	52.4	Belarus	52.8	Iceland	70.8	Serbia	47.3
Malaysia	54.0	Belgium	44.4	Ireland	59.2	Slovakia	52.8
Mongolia	50.0	Bosnia and Herzegovina	51.0	Italy	50.1	Slovenia	57.5
Myanmar	52.8	Bulgaria	50.0	Kazakhstan	48.6	Spain	48.8
Philippines	42.3	Canada	64.4	Kyrgyzstan	48.4	Sweden	71.7
Republic of Korea	43.0	Croatia	59.5	Latvia	60.4	Switzerland	63.7

Russia	56.1	Czech Republic	46.6	Liechtenstein		The Former Yugoslav Republic of Macedonia	47.2
Thailand	49.7	Denmark	58.2	Lithuania	58.9	Turkey	46.6
Viet Nam	42.3	Estonia	58.2	Netherlands	53.7	Ukraine	44.7
		Finland	75.1	Norway	73.4	United Kingdom	50.2
		France	55.2	Poland	45.0	United States	52.9

Source: Adapted from 2005 Environmental Sustainability

Countries joining LRTAP has higher ESI score than EANET's countries, which average score of 54.6. Some of the countries like Finland and Norway scored over 70, which shows the better positioned it is to maintain favorable environmental conditions into the future. Countries in EANET averagely scored low, especially a country like China (38.6) shows facing numerous issues, both natural and manmade, and have not managed their policy choices well. Moreover, in case of EANET, countries that have high enough schedule to support other country with technical assistance and ODA are few.

Conclusion

EANET has its purpose of establishment in building network within East Asian countries to concern about the effects of acid rain. For that reason, their activities and plans are voluntarily practiced by membership countries. On the other hand, LRTAP has its purpose of establishment to make conventions to protect Scandinavia lakes from acidification issue. They have set up several extra conventions on the acid rain problem, and have official obligation in international world to practice according to the convention they signed or ratified.

In other words, members of EANET found collective interest as building transnational network for acid rain when they first established it, while members of LRTAP found collective interest in signing conventions for a feasible problem at the Scandinavia Lake. Different collective interest caused different actions and the characteristics of institutions. However, it is difficult to make simple comparison of the effectiveness of institutions when they have different motivation at the first spot of establishing. It is more accurate to see whether the institutions could make members to make changes in their behavior, no matter in voluntary or conventional agreement.

Capacity of members' country influences to the effectiveness of institutions. The higher EIS, the members have more ability to make the convention or voluntary agreement into action, because publics, NGOs, firms, local governments have strong awareness of international environmental standards. As participants' capacity is similar, the collective interest they can get throughout the cooperation become common.

This study showed the importance of building capacity of each participant to build effectiveness of environmental institutions, while the common understanding and direction of collective interest and action is crucial for effectiveness. Member states' capacity can influence institutions, while institutions can accelerate technology transmission and finance circulation to support capacity growing. Institutions can motivate the member states to join environmental agreement by embracing collective interest among them, while the idea of collective interest is formed by representatives of each membership countries. It is important for further study to know how states and institutions interact to build collective interest and capacity. Supporting the interaction among states and institutions in a sustainable way will help institutions to be effective.

Reference

Global Environment Outlook Year Book 2004/5, United Nations Environment Programme (UNEP)
http://www.unep.org/geo/yearbook/yb2004/117.htm
www.unep.org/.../International_environmental_governance_p30-35.pdf
Daniel C. Esty and Maria H. Ivanova eds. , 2002, Global Environmental governance: Options & Opportunities, Yale School of Forestry and Environmental Studies
http://www.yale.edu/environment/publications
http://www.eanet.cc/eanet.html (2009-7-19)
http://enviroscope.iges.or.jp/modules/envirolib/upload/2253/attach/nea_report_final.pdf
http://www.eanet.cc/eanet/outline.html
http://www.unece.org/env/lrtap/lrtap_h1.htm

Olson, Jr., M (1982) *The rise and decline of nations: The political economy of economic growth, stagflation and social rigidities*, Yale University Press, Hardin R. (1982) *Collective action*, Resources for the future
Robert O. Keohane (1988) International Institutions: Two Approaches *International Studies Quarterly*, Vol. 32, No. 4 Dec., 1988, pp. 379-396 Published by: Blackwell Publishing on behalf of The International Studies Association
1989, Young, International cooperation: building regimes for natural resources and the environment, Cornell University Press
Peter Haas, Robert O.Keohane, and Marc A. Levy, eds. (1993) *Institutions for the Earth: Sources of Effective International Environmental Protection*. Cambridge: MIT Press
1994, Young, International governance: protecting the environment in a stateless society, Cornell University Press
Alexander Wendt, Collective Identity Formation and the International State, 1994, The American Political Science Review, Vol. 88, No.2 (Jun., 1994), pp. 384-396
Justin Yifu Lin and Jeffrey B. Nugent (1995) “Institutions and economic development” P 2307
Lin, Junstin YiFu and Nugent, Jefferey B. 1995, Handbook of Development Economics, Volume 3, Edited by J. Behrman and T. N. Srinivasan Elsevier Science B.V., 1995, p2037
Bernauer, Thomas. 1995. “The effect of international environmental institutions: how we might learn more,”
International Organization 49, 2, Spring 1995, pp.354
Young, Demkok, Ramakrishna, eds. (1996) *Global Environmental Change and International Governance* Darmouth College
UNDP. (1997). Capacity Development . New York: Management Development and Governance Division, UNDP.
2005 Environmental Sustainability Index, Yale Center for Environmental Law and Policy, Yale University, Center for International Earth Science Information Network, Columbia University. In collaboration with: World Economic Forum, Geneva, Switzerland, Joint Research Centre, European Commission, Ispra, Italy. *2005 Environmental Sustainability Index*
Oran R. Young, eds, *The Effectiveness of International Environmental Regimes*, MIT Press 1999
Edith Brown Weiss and Harold K. Jacobson ed. (2000) Engaging Countries: Strengthening Compliance with International Environmental Accords, MIT Press
Edward L. Miles, Arild Underdal, Steinal Andresen, Jorgen Wettestad, Jon Birger Skjaerseth, Elaine M. Carlin, *Environmental Regime Effectiveness*, MIT Press, 2002
Norichika Kanie and Peter M. Haas ed. (2004) *Emerging Forces in Environmental governance*, United Nations University
Sebastian Oberthur and Thomas Gehring ed (2006) *Institutional interaction in Global Environmental Governance*, MIT Press
Matsuoka and Komatsu (2006) Effective Environmental Management in Developing Countries, IDE-JETRO
Lubell, Mark, Collective Action, Environmental Activism, and Air Quality Policy, Political Research Quarterly, Vol. 59, No. 1 (March 2006): pp. 149-160

Appendix 1
Participants of LRTAP
http://www.unece.org/env/lrtap/status/lrtap_st.htm (2009-07-24)

Status of ratification of
The 1979 Geneva Convention on Long-range Transboundary Air Pollution
as of 17 December 2008

Party	Signature	Ratification
Albania		02.12.2005 (Ac)
Armenia		21.02.1997 (Ac)
Austria	13.11.1979	16.12.1982 (R)
Azerbaijan		03.07.2002 (Ac)
Belarus	14.11.1979	13.06.1980 (R)
Belgium	13.11.1979	15.07.1982 (R)
Bosnia and Herzegovina		06.03.1992 (Sc)
Bulgaria	14.11.1979	09.06.1981 (R)
Canada	13.11.1979	15.12.1981 (R)
Croatia		08.10.1992 (Sc)
Cyprus		20.11.1991 (Ac)
Czech Republic		01.01.1993 (Sc)
Denmark	14.11.1979	18.06.1982 (R)
Estonia		07.03.2000 (Ac)
Finland	13.11.1979	15.04.1981 (R)
France	13.11.1979	03.11.1981 (Ap)
Georgia		11.02.1999 (Ac)
Germany	13.11.1979	15.07.1982 (R)(2)
Greece	14.11.1979	30.08.1983 (R)
Holy See	14.11.1979	
Hungary	13.11.1979	22.09.1980 (R)
Iceland	13.11.1979	05.05.1983 (R)
Ireland	13.11.1979	15.07.1982 (R)
Italy	14.11.1979	15.07.1982 (R)
Kazakhstan		11.01.2001 (Ac)
Kyrgyzstan		25.05.2000 (Ac)
Latvia		15.07.1994 (Ac)
Liechtenstein	14.11.1979	22.11.1983 (R)
Lithuania		25.01.1994 (Ac)
Luxembourg	13.11.1979	15.07.1982 (R)
Malta		14.03.1997 (Ac)
Monaco		27.08.1999 (At)
Montenegro		23.10.2006 (Sc)
Netherlands	13.11.1979	15.07.1982 (At)(3)
Norway	13.11.1979	13.02.1981 (R)
Poland	13.11.1979	19.07.1985 (R)(2)
Portugal	14.11.1979	29.09.1980 (R)
Republic of Moldova		09.06.1995 (Ac)
Romania	14.11.1979 (1)	27.02.1991 (R)
Russian Federation	13.11.1979	22.05.1980 (R)
San Marino	14.11.1979	
Serbia		12.03.2001 (Sc)

Slovakia		28.05.1993 (Sc)
Slovenia		06.07.1992 (Sc)
Spain	14.11.1979	15.06.1982 (R)
Sweden	13.11.1979	12.02.1981 (R)
Switzerland	13.11.1979	06.05.1983 (R)
The Former Yugoslav Republic of Macedonia		30.12.1997 (Sc)
Turkey	13.11.1979	18.04.1983 (R)
Ukraine	14.11.1979	05.06.1980 (R)
United Kingdom	13.11.1979	15.07.1982 (R)(4)
United States	13.11.1979	30.11.1981 (At)
European Community	14.11.1979	15.07.1982 (Ap)
Total:	32	51